Australian Government

Australian Transport Safety Bureau

ATSB
Annual Report
2015–16

Digital report features

The ATSB Annual Report 2015–16 is available in an easy-to-use digital format. Our digital report includes features to help you learn more about the ATSB and the work we do.

Look for the following symbols in our online version to find out more about how the ATSB's work improves transport safety.

VIDEO LINKS

Watch videos on the ATSB's activities and safety initiatives.

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Read about the safety lessons from the ATSB's investigations, research activities and occurrence reports.

WEBSITE LINKS

Go directly to investigation and safety reports published on our website.

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See more of our work in pictures.

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Get the right contact details to ask a question, order a publication or report a safety occurrence.

View the online version on our website at **www.atsb.gov.au/annualreport**

Australian Government
Australian Transport Safety Bureau

Chief Commissioner

4 October 2016

The Hon Darren Chester MP
Minister for Infrastructure and Transport
Parliament House
CANBERRA ACT 2600

Dear Minister

I am pleased to present the Annual Report of the Australian Transport Safety Bureau, reporting on the ATSB's operations for the year ended 30 June 2016.

This annual report has been prepared in accordance with the requirements for non-corporate Commonwealth entities under section 46 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) and summarises the ATSB's performance for the year.

The report includes the ATSB's financial statements as required by section 42 of the PGPA Act and an audit report on those statements in accordance with section 43 of the same Act.

In addition to fulfilling the requirements of the PGPA Act, the report satisfies section 63A of the *Transport Safety Investigation Act 2003*.

I also certify that I am satisfied that the ATSB has prepared risk assessment and fraud control plans and has in place appropriate fraud prevention, detection, investigation, reporting and data collection procedures and processes that meet the specific needs of the ATSB and comply with the Commonwealth Fraud Control Framework.

Yours sincerely

Greg Hood
Chief Commissioner/Chief Executive Officer

62 Northbourne Ave
Canberra ACT 2601
Australia

PO Box 967
Civic Square
ACT 2608 Australia

Tel 02 6274 6144
Web www.atsb.gov.au
Twitter @ATSBinfo

ABN 65 061 156 887

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Introduction

The Australian Transport Safety Bureau (ATSB) 2015–16 Annual Report outlines performance against the outcome and program structure in the 2015–16 Infrastructure and Regional Development Portfolio Budget Statements.

Guide to the report

Information about this report

Information about this report is available from:

The Annual Report Coordinator
Telephone: 1800 020 616
Fax: 02 6247 3117
Email: atsbinfo@atsb.gov.au

Mark your enquiry 'Attention Annual Report Coordinator'.

Other sources of information

Annual reports are available in printed form from more than 20 libraries around Australia under the Australian Government library deposit and free issue scheme. A list of participating libraries can be found at **www.finance.gov.au/librarydeposit**

This report is available from our website at **www.atsb.gov.au**

Before making decisions on the basis of information contained in this report, you are advised to contact the ATSB. This report was up to date at the time of publication but details change over time due to legislative, policy and other developments.


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SECTION 1

Chief Commissioner's review 2015–16

GREG HOOD

This was the ATSB's seventh year as a fully independent body within the Infrastructure and Regional Development portfolio. 2015–16 also marked the final year of Martin Dolan's tenure as the ATSB's Chief Commissioner. While Martin's real and significant contributions to improving transport safety have been widely acknowledged, it was his passion, energy and commitment to maintaining the ATSB's reputation as a world-leading safety investigation body that will be remembered as his most enduring qualities.

Ongoing challenges

As foreshadowed through the ATSB's 2015–16 Corporate Plan, the ATSB entered this reporting period faced with an operating environment of continuing growth in, and progressive changes to, the composition of the aviation, rail and marine transport sectors. In contrast, the ATSB has continued to experience successive reductions to its base appropriations with further reductions projected over its forward estimates. To manage these fiscal circumstances, the ATSB has reduced its core staffing profile, including specialist investigators, by approximately 25 per cent from when it was established as an independent statutory authority in July 2009.

Notwithstanding these challenges, the ATSB was able to complete a range of significant and comprehensive investigation reports during 2015–16, in addition to supporting the secondment of a number of specialist staff to the continuing search for the missing Malaysia Airlines Flight MH370 and the reopened investigation into the Norfolk Island ditching accident.

Limitations

When reflecting on the agency's overall performance against its key deliverables and performance indicators, the ATSB has continued to meet its targets in terms of the quality and quantity of investigation reports completed and published per year. However, it is evident the ATSB has not been able to complete these reports within the published prescribed timeframes.

In relation to other key functions and broader portfolio responsibilities, the ATSB continues to maintain a capacity to record, analyse and research safety data and produce timely reports on safety trends and other research publications. Given its resource constraints, the ATSB has limited capacity to foster safety awareness, knowledge and action through safety education and has relied heavily on social media to disseminate key messages.

The ATSB has continued its transition to becoming the national rail safety investigator, as established through the Council of Australian Governments Intergovernmental Agreement on Rail Safety Regulation and Investigation Reform. In addition to the Defined Interstate Rail Network, the ATSB now has primary responsibility for investigating rail safety accidents and incidents on regional networks and metropolitan passenger networks in all states and territories other than Queensland.

Similarly, the ATSB has continued an active program of regional engagement with other transport safety agencies within the Asia Pacific region. Consistent with the approved projects and associated program funding agreements, the ATSB has undertaken a range of capacity building activities including investigator training and mentoring, policy and guidance development, and establishing compliance with international standards.

The search for Malaysia Airlines Flight MH370

Since May 2014, at the request of the Malaysian Government, the ATSB has been leading the search operations for missing Malaysia Airlines Flight MH370, in the Southern Indian Ocean. The search for the Boeing 777 aircraft remains a major priority for the ATSB.

During the year, the operational search faced a number of significant challenges, including lost and subsequently recovered underwater electronic search equipment, medical evacuation of unwell crew and prolonged severe weather.

In December 2015, the search identified the wreck of a ship, likely to be a steel or iron vessel, dating from the turn of the 19th century. Importantly, the discovery of the shipwreck shows how the methods and technology used in the search will effectively detect and identify the missing Boeing 777 aircraft.

ATSB technical specialists also examined a number of items of aircraft debris, which were discovered on the shorelines of western Indian Ocean states. Several pieces were recovered and examined, one by the French authorities and the remainder by the ATSB. Other parts are being retrieved by the Malaysian Investigation Team for further assessment.

We continue to work with our Minister and our Malaysian and Chinese counterparts to ensure that they are kept appraised of the search progress and to enable joint decisions to be made when required.

Aviation

During the year we completed 44 aviation safety investigations and 90 short factual investigations.

One significant aviation investigation involved the landing below the minima of two Boeing 737 aircraft at Mildura Airport, Victoria due to fog conditions (AO-2013-100). Both aircraft were on scheduled flights when, on nearing Adelaide Airport, fog precluded their landing.

ATSB has recommended that Airservices Australia work in collaboration with the Bureau of Meteorology to instigate a system change to reinstate the alerting function of special weather reports currently not available through an Automatic Broadcast Service.

In parallel with this occurrence investigation, the ATSB commenced a research investigation to examine the reliability of aviation weather forecasts. This research will analyse Bureau of Meteorology weather data for major Australian airports.

Other significant aviation investigations have led to improvements in the inspection method for detecting cracks in the wing attachment fittings in M18 Dromader aircraft and the removal of at-risk lateral tie rods from DH82 and DH82A Tiger Moth aircraft, with worldwide implications for this aircraft type. The ATSB also concluded its involvement as an accredited representative to the investigation by the Dutch Safety Board of the crash of Malaysia Airlines Flight MH17 in Hrabove, Ukraine on 17 July 2014.

Marine

The ATSB completed seven marine safety investigations in 2015–16. Significantly, two of the occurrences we investigated—an engine room fire on board bulk carrier *Marigold* and a man overboard fatality from *Cape Splendor*, both at Port Hedland, Western Australia—highlight the importance of investigating incidents and accidents to improve safe marine work practices.

ATSB urges the maritime industry to give heightened attention to marine work practices. As these incidents have shown, it is essential that employees implement good risk management and safety practices to prevent injury and loss of life.

Rail

During the year, the ATSB completed 19 rail safety investigations. The most significant of these involved rail collisions, derailments and a passenger fatality at Heyington Railway Station in Victoria.

We continue to investigate occurrences where breaches of safe work practices place maintenance crews and operators at risk. The ATSB initiated a safety issue investigation into safe work on track in 2014, which is now nearing completion.

As part of this investigation, we have collected and analysed over 12,000 records, categorised under the Safework Rule Procedure Breach guidelines, between June 2009 and June 2014. Of these, approximately 15 per cent were assessed by the ATSB as being work on track-related occurrences. Preliminary analysis indicates that the majority of these occurrences can be traced to protection types being insufficient or incorrect, protection location being incorrectly positioned, protections being incorrectly removed and worksite location being incorrectly identified.

On 2 November 2015, Western Australia joined the national rail safety scheme and the ATSB now investigates accidents and incidents on Western Australia's metropolitan and regional passenger and freight rail networks.

This new focus in Western Australia will result in more investigations conducted across a greater range of safety matters. It also means that the ATSB is the mandatory notification point for all Category-A occurrences within Western Australia.

We are continuing our negotiations with Queensland to complete the process of establishing a unified national system of rail safety investigation.

Outlook for 2016–17

As the newly appointed Chief Commissioner on 1 July 2016, I am proud to lead a world-class and lean transport safety investigator. But I am keen to reshape how we commit our limited resources to improve safety for the travelling public.

We will continue investigating the majority of accidents and serious incidents involving the travelling public. This is where there is the greatest risk of loss of life and the greatest likelihood of finding significant safety issues that lead to important safety actions.

We will, however, seek to improve our efficiency by becoming more data-driven. The ATSB has one of the richest national information datasets of all safety-related occurrences in aviation as well as accidents and significant safety occurrences in the rail and marine sectors.

We use this data to identify safety trends in the aviation, rail and marine sectors but I would like to interrogate the data more actively. In so doing, we will be able to more selectively allocate our limited resources to investigating those accidents and incidents that that have the greatest potential for improving safety. If there is no obvious public safety benefit to investigating an accident, the ATSB is less likely to conduct a complex, resource-intensive investigation.

The ATSB endeavours to investigate all fatal accidents involving VH-registered powered aircraft subject to the potential transport safety learnings and resource availability. But we will need to carefully consider the resources we allocate to investigations into general aviation fatal accidents and constrain the scope of investigations into non-fatal accidents in this sector.

Safety education is key to addressing accidents and incidents that recur in general aviation. There are diminished safety benefits from investigating occurrences where there are obvious contributing factors, such as unauthorised low-level flying or flying visually into poor weather. Instead, educating pilots on the dangers of high-risk activity is where we will refocus our efforts, with an emphasis on using social media.

There are many challenges facing us in the future. Technology is already having an influence on our work. The use of remotely piloted aircraft is increasing significantly—pizza delivery by drone is reportedly imminent.

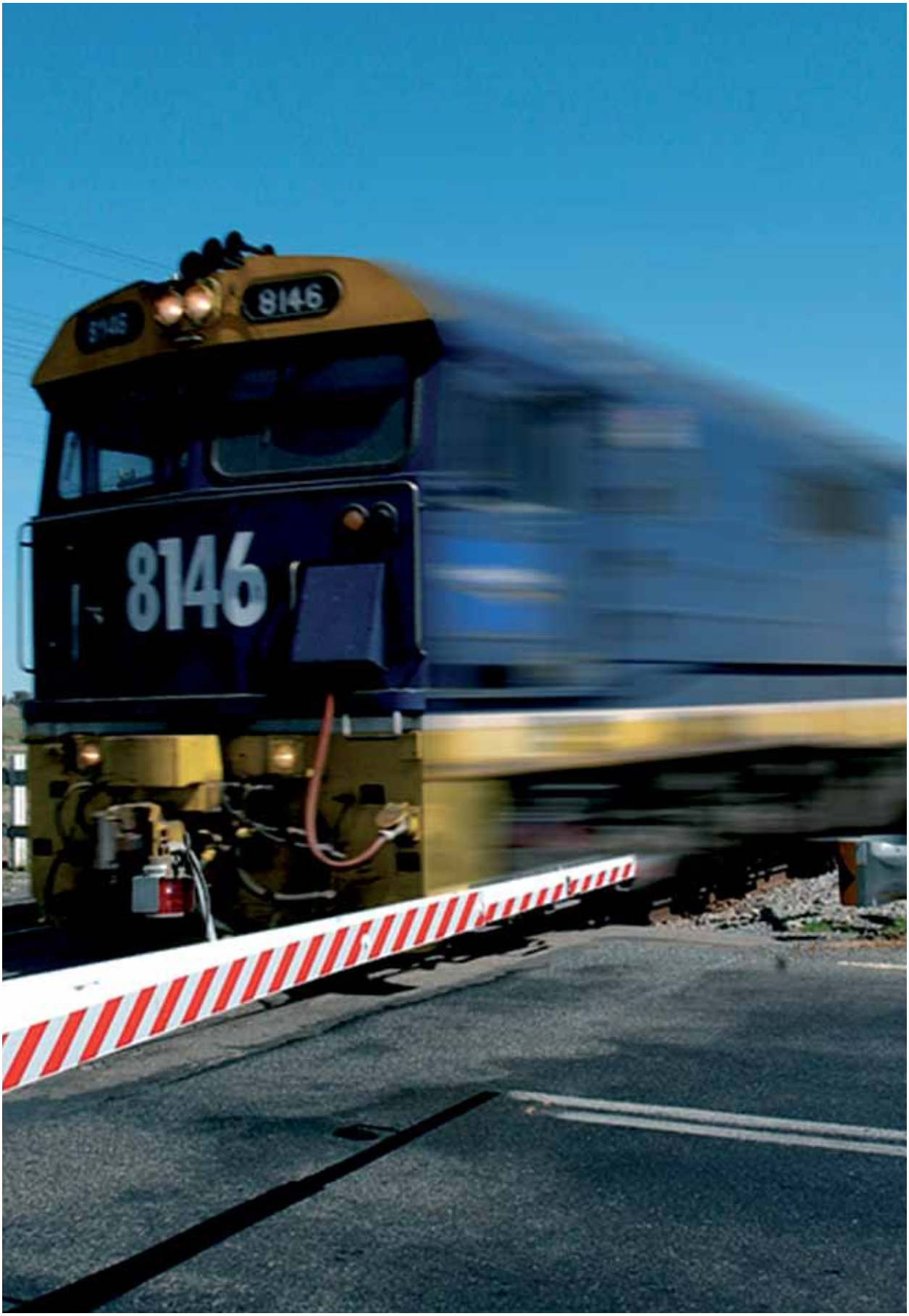
How ATSB investigates and monitors the safety of an increasing number of low-cost carriers operating within Australia will require careful consideration.

The ATSB will accumulate and interrogate its data rigorously to determine if there are indeed any systemic safety issues that affect the safety of the travelling public and others in the industry.

In the meantime, we will work with the marine, rail and aviation industries to highlight the safety concerns already identified from our occurrence data and investigation findings.

While the ATSB faces significant challenges, I am confident that the professionalism and capability of our people will ensure the ATSB remains a world-leading transport safety investigator.

Greg Hood
Chief Commissioner/CEO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SECTION 2

Agency overview

The Australian Transport Safety Bureau (ATSB) was established under the *Transport Safety Investigation Act 2003* (TSI Act) as Australia's national transport safety investigation agency. Its primary function is to improve aviation, marine and rail safety. It does this by receiving information about accidents and other safety occurrences, and by investigating selected occurrences in order to identify and communicate factors that affect, or might affect, transport safety.

The ATSB is part of the Infrastructure and Regional Development portfolio. Within the portfolio are other important transport agencies whose roles are focused on delivering an efficient, sustainable, competitive, safe and secure transport system for all transport users through regulation, financial assistance and safety investigations. These include:

- Department of Infrastructure and Regional Development
- Australian Maritime Safety Authority
- Civil Aviation Safety Authority
- National Transport Commission
- Airservices Australia.

Purpose

The ATSB is an independent statutory agency of the Australian Government. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. At the same time, it is required to cooperate with others who have a role to play in maintaining and improving transport safety, in particular its counterpart agencies in Victoria and New South Wales.

The ATSB performs its functions in accordance with the provisions of the TSI Act and, where applicable, relevant international agreements. The TSI Act makes it clear that, in carrying out its purpose, the ATSB cannot apportion blame, assist in determining liability or, as a general rule, assist in court proceedings. Its sole focus remains the prevention of future accidents and the improvement of safety.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, marine and rail transport through:

- the independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia, as well as participating in overseas investigations involving Australian-registered aircraft and ships and cooperating more broadly with overseas counterparts. A primary focus of its work is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB maintains a national information set of all safety-related occurrences in aviation and of all accidents and significant safety occurrences in the rail and marine sectors. The information it holds is essential to its capacity to analyse broad safety trends and inform its investigation and safety education work.

The ATSB has a specific mandate to report publicly on its analysis and investigations, and to conduct public education programs so as to improve transport safety.

Since 2014, the ATSB has been undertaking a major underwater search program aimed at locating the missing Malaysia Airlines Flight MH370. This activity has been in support of a Malaysian transport safety investigation into this tragic event.

Our role

The ATSB's focus is on improved safety for those who work, or participate, in the various transport industries and for the travelling public. We do this by:

- receiving and assessing reports of transport safety matters, including notifications of safety occurrences and confidential reporting
- independently conducting 'no-blame' investigations of accidents and other safety occurrences
- conducting research into transport statistics and technical issues
- identifying factors that contribute to accidents and other safety occurrences that affect, or have the potential to affect, transport safety
- encouraging safety action in response to safety factors by acknowledging safety action taken by operators, and by issuing safety recommendations and advisory notices
- raising awareness of safety issues by reporting publicly on investigations and conducting educational programs
- assisting Australia to meet its international regulatory and safety obligations, and conducting an active program of regional engagement with other transport safety agencies.

Our objectives

In fulfilling our role of improving transport safety and cooperating with others, the ATSB:

- focuses its resources in the areas that are most likely to result in safety improvements
- harnesses expertise and information necessary to its safety role
- conducts impartial, systemic and timely investigations
- identifies safety issues clearly and objectively without attributing blame or liability
- ensures the significance of safety issues is clearly understood by all concerned
- promotes effective safety action.

Cooperation with the transport industry

The ATSB works cooperatively with the aviation, marine and rail industries, as well as with transport regulators and governments at state, national and international levels to improve safety standards for all Australians.

The ATSB relies on its ability to build trust and cooperation with the transport industry, and the community, for its success in improving safety. The TSI Act requires the ATSB to cooperate with government agencies, private organisations and individuals who have transport safety functions and responsibilities, or who may be affected by our transport safety activities. The ATSB also cooperates with equivalent national bodies in other countries and international organisations with responsibilities for worldwide transport safety standards.

The ATSB actively targets communications to ensure that transport industry stakeholders understand the importance of no-blame investigations. In order to cultivate a strong reporting culture within the transport industry, the ATSB promotes an appropriate level of confidentiality and protection for sensitive safety information provided to us in the course of our work.

Notifications and reporting

The TSI Act requires any responsible person who has knowledge of any accident (or any immediately reportable matter) to report it as soon as is reasonably practicable.

While the terms of this requirement may seem broad, the Transport Safety Investigation Regulations 2003 provides a list of persons who, by the nature of their qualifications, experience or professional association, would be likely to have knowledge of an immediate or routine reportable matter for their mode of transport. In addition, responsible persons are not required to report a transport safety matter if they believe, on reasonable grounds, that another responsible person has already reported, or is in the process of reporting that matter.

The ATSB maintains a 24-hour service to receive notifications, including a toll-free telephone number (for immediately reportable matters in all modes). In aviation, a secure online notification form for written notifications is available on the ATSB website.

Every year the ATSB's Notifications team receives over 15,000 notifications of safety occurrences. These are spread over aviation, marine and rail. Inevitably, there are duplicate notifications and many of the notifications submitted concern matters not required to be reported under the TSI Act. Nevertheless, each one is reviewed and recorded.

In 2015–16, the ATSB's Notifications team received 16,142 aviation notifications in the form of telephone calls, emails, facsimiles, postal letters and website contact. From those, to date, the team has identified 4,998 individual accidents, serious incidents and incidents for the year.

While not all the reported occurrences are investigated, the details of each occurrence are retained within the ATSB's occurrence database. These records are a valuable resource, providing a detailed portrait of transport safety in Australia. The ATSB regularly analyses the database to identify emerging trends and issues. The searchable public version of the aviation occurrence database is available on the ATSB website. It contains data from July 2003 onwards. The online database is used by industry, scholars, the media, and regulators to search and research past events.

Aviation

The ATSB investigates accidents and other occurrences involving civil aircraft in Australia. The ATSB also analyses data on all notified accidents and incidents. It conducts research into specific matters of concern that emerge from data analysis and specific incidents or matters that may be referred by other organisations. It does so in a manner consistent with the Convention on International Civil Aviation (Chicago Convention 1944) Aircraft Accident and Incident Investigation (Annex 13).

The ATSB may also investigate serious accidents or incidents involving Australian-registered aircraft overseas, or assist with overseas investigations involving Australian-registered or foreign aircraft if an overseas investigating authority seeks assistance and the ATSB has suitable resources available. The ATSB may also have observer status in important overseas investigations. This provides valuable opportunities to learn from overseas organisations and to benchmark our knowledge and procedures against our sister organisations.

The ATSB cooperates with organisations such as the Civil Aviation Safety Authority (CASA), Airservices Australia and aircraft manufacturers, and operators, who are best placed to improve safety. The ATSB also works collaboratively with the Department of Infrastructure and Regional Development and other safety agencies to assist the government in implementing transport safety initiatives.

Marine

The ATSB investigates incidents and accidents involving Australian-registered ships anywhere in the world and foreign ships in Australian waters or en route to Australian ports.

We work cooperatively with international regulatory authorities, Australia's maritime regulator, the Australian Maritime Safety Authority (AMSA), the state and territory maritime regulatory authorities, other transport safety investigation agencies and ship owners and operators.

Our marine investigations are conducted in a manner consistent with the International Maritime Organization Casualty Investigation Code.

We publish a range of marine transport safety reports and safety educational material, which are distributed to the international maritime community, the International Maritime Organization, educational institutions and maritime administrators in Australia and overseas.

Rail

Since the implementation of the national transport reform process in January 2013, the ATSB has had primary responsibility for investigating rail safety occurrences (accidents and incidents) on the Defined Interstate Rail Network, regional networks and metropolitan passenger networks in participating states and territories (New South Wales, Victoria, South Australia, Tasmania and the Northern Territory). The ATSB is working to complete the transition to become the national rail safety investigator, as established through the Council of Australian Governments' Intergovernmental Agreement on Rail Safety Regulation and Investigation Reform.

The ATSB works cooperatively with organisations such as the Office of the National Rail Safety Regulator (ONRSR), state and territory rail regulators and rail operators—all of whom share a responsibility to improve safety. The ATSB also has collaboration agreements with the New South Wales and Victorian state safety investigation organisations.

Technical analysis

The ATSB Technical Analysis team provides the direct, in-house ability to examine, extract and analyse the physical and recorded evidence associated with safety occurrences from all modes of transport. Nine specialists in forensic engineering, failure analysis, data recovery and systems analysis, work with other ATSB investigators and external stakeholders to provide a detailed insight into the often complex set of factors that underlie many transport safety occurrences. The team maintains a centre of excellence for rail, marine and flight data 'black box' analysis in the South East Asian and Asia-Pacific regions—providing our international neighbours with technical advice, support and assistance in occurrence investigation and capability development.

Short investigations

In addition to its more complex investigations, the ATSB undertakes short, office-based investigations of less complex safety occurrences. Our capacity to conduct a large number of these short investigations provides us with the opportunity to deliver safety messages and for industry participants to learn from the experience of others. Although many of these investigations examine occurrences that are common, and for which the underlying factors are well known, they also enhance the quality and completeness of the occurrence data held by the ATSB. As a result, a more extensive database expands our ability to identify situations where more detailed investigation may be warranted.

A small team manages and processes these investigations and produces short summary reports. The summary reports detail the information gathered from individuals or organisations involved in the occurrence, the circumstances and what safety action may have been taken or identified as a result. The summary reports are released periodically in a bulletin format.

Confidential reporting (REPCON)

The ATSB operates the voluntary and confidential reporting scheme (REPCON) for the aviation, marine and rail industries. Any person within these industries, or member of the travelling public, may submit a REPCON report of a reportable safety concern. The scheme is designed to capture safety concerns—including unsafe practices, procedures and risk controls within an organisation or affecting part of the industry. The scheme is not about individuals.

Each reported safety concern is de-identified by the ATSB by removing all personal details concerning the reporter and any individual named in the report. This de-identified text is passed back to the reporter who must authorise the content before the REPCON can proceed further. The de-identified text is then forwarded to the relevant organisation that is best placed to address the safety concern. The organisation's response will then be forwarded to the relevant regulator for further action as deemed necessary.

The aim of the REPCON scheme is to ensure safety action is taken to address the reported safety concerns. This can include variations to standards, orders, practices and procedures, or an education campaign. The ATSB may use the de-identified version of the reported safety concern to issue an information brief, or an alert bulletin, to whichever person or organisation is best placed to take safety action in response to the safety concern. The ATSB publishes the outcome of each REPCON on its website.

Reporting, Short Investigations and Research

The Reporting, Short Investigations and Research team researches and analyses the ATSB occurrence databases. In the case of aviation occurrences, the research and analysis provides an opportunity to uncover trends and safety issues across many, rather than individual, occurrences.

Across the transport modes, the team produces official Australian statistics (*Aviation Occurrence Statistics*, *Shipping Occurrence Statistics*), and in-depth analysis of issues and trend monitoring of all occurrences for the benefit of government and industry. The research team also contributes to the ATSB's occurrence investigations in all three modes.

The ATSB is not currently funded for research in the marine and rail transport modes.

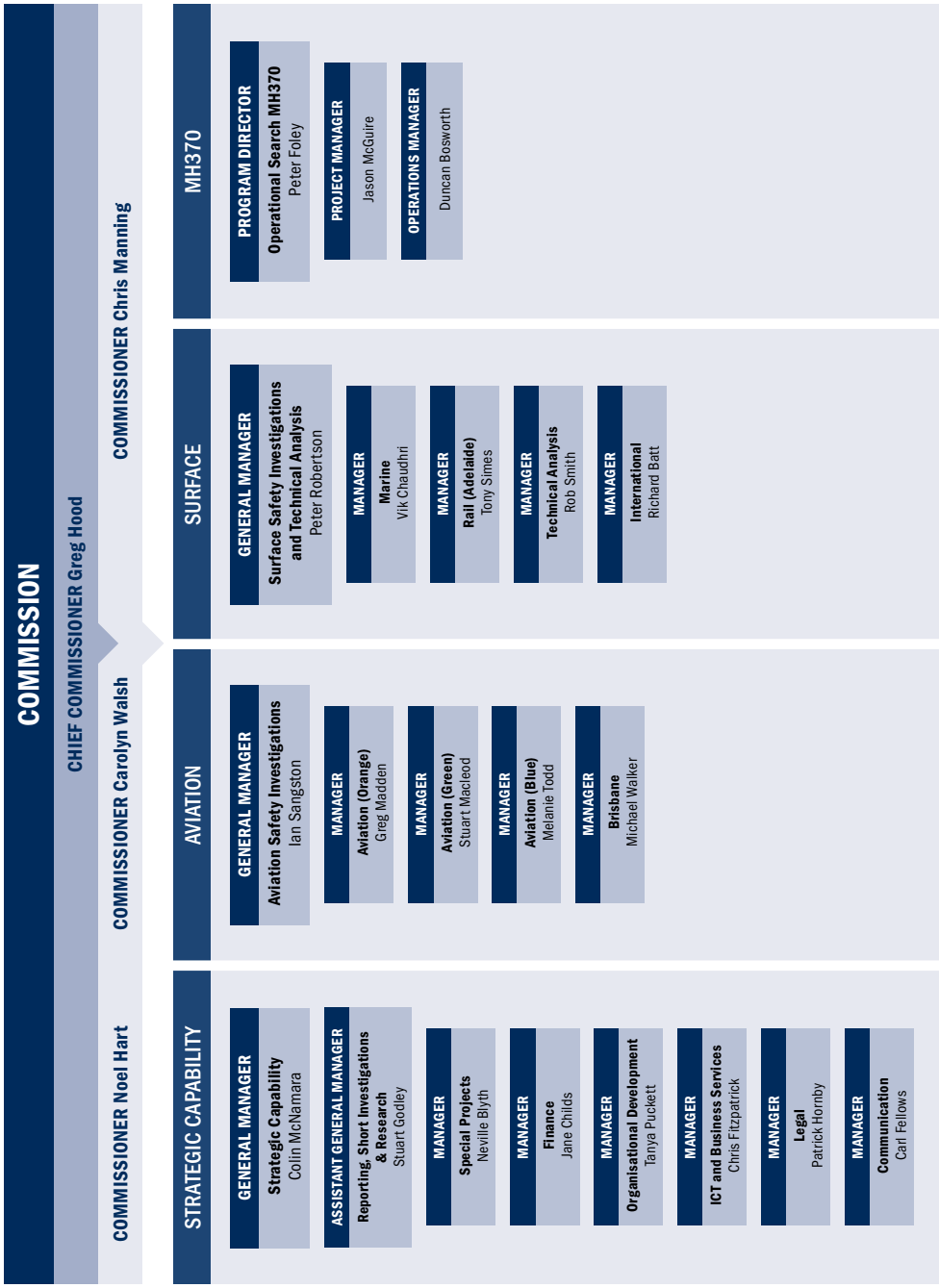
International cooperation

The ATSB is committed to promoting engagement with its international counterpart agencies and with relevant multilateral organisations. It works to assist Australia's regional neighbours through international agreements and participation in intergovernmental programs. It actively supports initiatives to build aviation and maritime safety investigation capability in the Asia-Pacific region.

The philosophy underpinning the ATSB's regional engagement is one of cooperation and mutual respect. The strategic intent is to improve transport safety for the benefit of our regional neighbours and the Australian travelling public.

The ATSB is actively involved in the work of the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO).

ATSB organisational structure



Commission and Executive Management Team

CHIEF COMMISSIONER and CHIEF EXECUTIVE OFFICER

Greg Hood

Greg Hood was appointed as the second Chief Commissioner of the ATSB on 1 July 2016 for a term of 5 years.

Mr Hood has over 35 years' experience in the aviation industry, culminating in his appointment in October 2013 to the position of Executive General Manager of the Air Traffic Control group with Airservices Australia. In this position he was responsible for the management of over 1,300 air traffic management staff that provide services for 11 per cent of the world's total airspace for over 140 million passengers travelling on more than four million flights annually.

Mr Hood serves on the Business Advisory Council for World Vision, is a Fellow of the Royal Aeronautical Society, a Freeman in the Honourable Company of Air Pilots, a Life Member of the Qantas Founders Museum, and the immediate past President of Canberra Philharmonic Society.

Until being appointed as ATSB's Chief Commissioner, he was also a Board Member of Safeskies Australia and internationally, Vice-Chair of the steering committee for the Civil Air Navigation Services Organisation's (CANSO's) Operations Standing Committee.

ATSB COMMISSIONERS WITH THE EXECUTIVE MANAGEMENT TEAM

COMMISSIONER

Noel Hart

Noel Hart has over 40 years' experience in the shipping, oil and gas industries. His qualifications include a Master Mariner Class One qualification, and business administration and MBA certificates.

Mr Hart left his seagoing career to join BP Australia in 1985 and held management positions with BP Shipping in Melbourne, London and Chicago. From 2006 to 2009 he held the position of General Manager of the North West Shelf Shipping Service Company, based in Perth.

In his position he was responsible for the safe shipping of liquefied natural gas from north-western Australia to Asian and other global customers.

While based in London, Mr Hart was Chairman of the General Purposes Committee of both the Oil Companies International Marine Forum and the Society of International Gas Tanker and Terminal Operators. He also served as a director of the Middle East Navigational Aids Service, and was an alternate director of the Alaskan Tanker Company and the Marine Preservation Society in the USA, and the Marine Oil Spill Response Centre in Australia.

He has also been Chairman of Maritime Industry Australia Ltd, Australia's peak maritime association, since 2008.

COMMISSIONER

Chris Manning

Chris Manning has over 40 years' experience in the aviation industry.

In the early 1970s he was an air traffic controller. From 1975 until 2008 he was a pilot for Qantas.

Captain Manning flew several Boeing types gaining a B767 command in 1989. He was a check and training captain throughout the 1990s, and was president of the Australian and International Pilots' Association from 1999 until 2002.

From 2003 until his retirement from Qantas in 2008, Captain Manning was Chief Pilot and Group General Manager Flight Operations. He chaired the Australian Aviation Associations' Forum from 2008 until 2015. He is a director of Aerospace Australia Limited (Avalon Airshow), is chairman of Airport Coordination Australia and is a founding director of the Australian Aviation Hall of Fame.

COMMISSIONER

Carolyn Walsh

Carolyn Walsh has over 30 years' experience in policy development, regulation and safety management at both the Commonwealth and state levels. She has 15 years' experience in the transport sector, initially as Executive Director of Strategy in the NSW Office of the Coordinator-General of Rail, and then as Chief Executive of the NSW Independent Transport Safety and Reliability Regulator.

In addition to her role as a Commissioner of the ATSB, Ms Walsh is currently Deputy Chair of the National Transport Commission and Vice President of Palliative Care NSW. She is also a member of the audit and risk committees for the City of Sydney, NSW Police Integrity Commission, the Aboriginal Lands Council, Western Sydney Local Health District, Office of the Director of Public Prosecutions and NSW Mental Health Commission.

Ms Walsh has specialist expertise in safety (both transport and occupational health and safety), risk management and the regulatory framework governing transport operations in Australia.

Ms Walsh has a Bachelor of Economics degree and is a graduate of the Australian Institute of Company Directors (Company Directors Course).

PROGRAM DIRECTOR Operational Search for Malaysia Airlines Flight MH370

Peter Foley

Peter Foley has held the position of Program Director Operational Search for MH370 since May 2014. He is responsible for the ATSB's operational search activities for missing Malaysia Airlines Flight MH370.

Mr Foley joined the ATSB in 1999 after a career at sea as a marine engineer with Australian shipping companies—including ANL Ltd, the Commonwealth shipping line. Since joining the ATSB he has held a number of roles, most recently as General Manager Surface Safety Investigations. This role included responsibility for marine and rail safety investigations, the ATSB's work on reforms to the National Transport Regulatory framework, and the ATSB's international programs. He has been responsible for performing and managing a large number of marine and rail investigations, many of them significant. He has represented the ATSB, and Australia, at many international marine and rail industry meetings and conferences.

Mr Foley holds professional qualifications in marine engineering and transport safety investigation, degrees in marine and mechanical engineering and a Graduate Diploma in Business Management.

ACTING GENERAL MANAGER Strategic Capability

Colin McNamara

Colin McNamara joined the ATSB as the Manager Learning and Development in October 2004. Prior to this appointment he served as a General Service Officer in the Australian Army and was awarded the Australian Active Service Medal in 1999.

Since joining the ATSB, Mr McNamara's responsibilities have been progressively expanded to include the management of Human Resources, Organisational Development, Governance and Investigator Support. Over the past five years he has also served as the agency's Head of Corporate Services. In this capacity he has been instrumental in the development and implementation of a number of key strategic documents including the Corporate Plan, Workforce Plans and the agency's Enterprise Agreements.

Mr McNamara holds a range of professional qualifications in human resources and is a professional member of the Australian Human Resources Institute.

GENERAL MANAGER Surface Safety Investigations and Technical Analysis

Peter Robertson

Peter Robertson joined the ATSB in May 2016. He has been a Commonwealth public servant for over 30 years after training initially in the RAAF as a pilot.

He has worked in a range of Commonwealth departments, primarily in policy and regulatory areas affecting the aviation, maritime, communications and land transport industries, including the Office of Transport Security. Before taking up his current position he was responsible for legal, communications and environmental matters associated with the development of a second major airport for Sydney following a secondment as deputy coordinator in the search for missing airliner MH370. He holds the degrees of Bachelor of Arts and Master of Commerce.

GENERAL MANAGER Aviation Safety Investigations

Ian Sangston

Ian Sangston joined the ATSB as a Senior Transport Safety Investigator (STSI) in April 2002 after 23 years' service in the Australian Defence Force. In addition to a number of pilot qualifications, he has an undergraduate degree and two masters degrees in Management Studies and Employment Relations.

Mr Sangston managed a number of high profile investigations as an STSI, and completed a Diploma of Transport Safety Investigation in June 2005. He was promoted to Team Leader, Transport Safety Investigation in mid–2006 and assumed responsibility for the Perth Regional Office. As team leader he oversaw more than 80 aviation safety investigations. Mr Sangston was promoted to his present position in August 2009 and has been instrumental in the ATSB's development of a project management approach to investigation management.

Outcome and program structure

PROGRAMME 1.1 OBJECTIVE

The ATSB will work actively with the aviation, marine and rail industries, transport regulators and governments at a state, national and international level to improve transport safety standards for all Australians, particularly the travelling public. Investigations and related activities seek to raise awareness of identified safety issues and to encourage stakeholders to implement actions to improve future safety.

There are three core functions which arise from the ATSB's functions under the *Transport Safety Investigation Act 2003*:

1. **Independent 'no-blame' investigation of transport accidents and other safety occurrences**
   Independent investigations that are selective and systemic, and which focus on future safety rather than on blame, increase stakeholder awareness and action on safety issues and foster industry and public confidence in the transport system.
2. **Safety data recording, analysis and research**
   Timely receipt and assessment of transport accident and other safety occurrence notifications allows the ATSB to identify and refer safety issues at the earliest opportunity. The maintenance and analysis of a body of safety information (including transport safety data and research and investigation reports) enables stakeholders and researchers to gain a better understanding of safety trends and safety issues.
3. **Fostering safety awareness, knowledge and action**
   Awareness and understanding of transport safety issues is increased through a range of activities including consultation, education, and the promulgation of research and investigation findings and recommendations. These contribute to the national and international body of safety knowledge and foster action for the improvement of safety systems and operations.

How the ATSB reports

Section 63A of the *Transport Safety Investigation Act 2003* (TSI Act) requires that:

The annual report prepared by the Chief Executive Officer and given to the Minister under section 46 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) for a period must include the following:

a) prescribed particulars of transport safety matters investigated by the ATSB during the period

b) a description of investigations conducted by the ATSB during the period that the Chief Commissioner considers raise significant issues in transport safety.

The ATSB observes and complies with *Resource Management Guide No 135–Annual reports for non-corporate Commonwealth entities* issued by the Department of Finance. This report is based on the guidance for 2015–16 published in July 2016.

The ATSB will report performance against the program objectives, deliverables and key performance indicators published in the Infrastructure and Regional Development 2015–16 Portfolio Budget Statements. The ATSB annual report also includes audited financial statements in accordance with the PGPA Act.

PRIORITIES FOR INVESTIGATION

The ATSB's highest priority is to investigate accidents and safety occurrences that have the greatest potential to deliver improved transport safety for the travelling public.

The ATSB is not resourced to investigate every single accident or incident that is reported, but allocates priorities within the transport modes to ensure that investigation effort achieves the best outcomes for safety improvement. The ATSB recognises that there is often more to be learned from serious incidents and patterns of incidents and places some focus on these investigations as well as on specific accident investigations.

THREE WAYS TO ACTION

The TSI Act requires specified people and organisations to report to the ATSB on a range of safety occurrences (called 'reportable matters'). Reportable matters are defined in the Transport Safety Investigation Regulations 2003. In principle, the ATSB can investigate any of these reportable matters. In practice, they are actioned in one of three ways to contribute to the ATSB's functions:

1. A report of an occurrence that suggests a safety issue may exist will be investigated immediately. Investigations may lead to the identification/confirmation of the safety issue and evaluation of its significance. It will then set out the case for safety action to be taken in response.
2. A report of an occurrence that does not warrant full investigation may warrant additional fact gathering for future safety analysis, to identify safety issues or trends.
3. Basic details of an occurrence, based primarily on the details provided in the initial occurrence notification, can be recorded in the ATSB's occurrence database to be used in future safety analysis to identify safety issues and trends.

Note: In the third approach, the occurrence is not investigated immediately, but may be the subject of a future safety issue or research investigation.

AVIATION BROAD HIERARCHY

The ATSB allocates its investigation resources in line with the following broad hierarchy of aviation operation types:

1. passenger transport—large aircraft
2. passenger transport—small aircraft:
   - regular public transport and charter on small aircraft
   - humanitarian aerial work (for example, Royal Flying Doctor Service, search and rescue flights)
3. commercial (fare-paying and recreation—for example, joy flights)
4. aerial work with participating passengers (for example, news reporters, geological surveys)
5. flying training
6. other aerial work:
   - non-passenger carrying work (for example, agriculture, cargo)
   - private transport or personal business
7. high-risk personal recreation/sports aviation/experimental aircraft operations.

The ATSB endeavours to investigate all fatal accidents involving VH-registered powered aircraft subject to the potential transport safety learnings and resource availability.

MARINE BROAD HIERARCHY

The ATSB allocates its investigative resources in line with the following broad hierarchy of marine operation types:

1. passenger operations
2. freight and other commercial operations
3. non–commercial operations.

RAIL BROAD HIERARCHY

The ATSB allocates its investigative resources in line with the following hierarchy of rail operation types:

1. mainline operations that impact on passenger service
2. freight and other commercial operations
3. non-commercial operations.

LEVEL OF RESPONSE

The level of investigative response is determined by resource availability and factors such as those detailed below. These factors (expressed in no particular order) may vary in the degree to which they influence the ATSB's decisions to investigate and respond. Factors include:

- the anticipated safety value of an investigation, including the likelihood of furthering the understanding of the scope and impact of any safety system failures
- the likelihood of safety action arising from the investigation, particularly of national or global significance
- the existence and extent of fatalities/serious injuries and/or structural damage to transport vehicles or other infrastructure
- the obligations or recommendations under international conventions and codes
- the nature and extent of public interest—in particular the potential impact on public confidence in the safety of the transport system
- the existence of supporting evidence, or requirements, to conduct a special investigation based on trends
- the relevance to identified and target safety programs
- the extent of resources available, and projected to be available, in the event of conflicting priorities
- the risks associated with not investigating—including consideration of whether, in the absence of an ATSB investigation, a credible safety investigation by another party is likely
- the timeliness of notification
- the training benefit for ATSB investigators.

The objective of the classification process is to quickly identify, allocate resources and appropriately manage occurrences that:

- require detailed investigation
- need to be recorded by the ATSB for future research and statistical analysis
- need to be passed to other agencies for further action
- do not contribute to transport safety.

INVESTIGATION LEVELS

The ATSB's response to reported safety matters is classified by the level of resources and/or complexity and time they require.

The following safety investigation levels are used by the ATSB:

Major investigations

Investigations that are likely to involve, at times, significant ATSB and external resources for up to 24 months and are likely to require additional one-off government funding.

Level 1

Investigations that are likely to involve a large number of ATSB resources, and possibly external resources, and are of a scale and complexity that usually require up to 18 months to complete.

Level 2

Investigations involving in-the-field activity, several ATSB and possibly external resources, and are of a scale and complexity that usually requires up to 12 months to complete.

Level 3

Less complex investigations that require no more than nine months to complete (some of which are 'desktop' exercises requiring no in-field activity) and involve only one or two ATSB staff.

Level 4

Investigations that are less complex and require no more than five months to complete (in some cases, after initial in-the-field or other investigation activity, the investigation level may be changed or the investigation discontinued if it is determined that there is no safety value to be gained from continuing the investigation). These investigations generally involve only one or two ATSB staff.

Level 5

Short investigations are limited-scope factual information only investigations that result in a short summary report of one to two pages. Short investigations are generally completed within two months and are usually published in a monthly bulletin. They require only one ATSB staff member.

Note: For the purpose of reporting against the 2015–16 Portfolio Budget Statements performance measures, the ATSB defines its Level 5 investigations as 'less complex'.


Roll Control (percent)
-100
0
Rudder Pedal (percent)
100

SECTION 3

Report on performance

This section reviews the ATSB's results against the performance criteria and deliverables set out in the Portfolio Budget Statements 2015–16 and ATSB Corporate Plan 2015–16. The ATSB's effectiveness in achieving planned outcomes during 2015–16 is also reviewed here.

Annual performance statement

I, as the accountable authority of the Australian Transport Safety Bureau, present the annual performance statement of the Australian Transport Safety Bureau for the year ended 30 June 2016, as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act). In my opinion, this annual performance statement is based on properly maintained records, accurately reflects the performance of the entity, and complies with subsection 39(2) of the PGPA Act.

Greg Hood
Chief Executive Officer
4 October 2016

Table 1: Results against performance criteria

PURPOSE
As set out in the Portfolio Budget Statements 2015–16 and the ATSB Corporate Plan 2015–16, the ATSB's purpose is to improve the safety of, and public confidence in, aviation, marine and rail transport through: • independent 'no-blame' investigation of transport accidents and other safety occurrences • safety data recording, analysis and research • fostering safety awareness, knowledge and action.

PERFORMANCE CRITERION
Safety actions completed that address 100% of critical safety issues identified by ATSB investigation reports.
Result
No critical safety issues were identified in 2015–16.

PERFORMANCE CRITERION
Safety actions completed that address 70% of all other safety issues identified by ATSB investigation reports.
Result
68% of all other safety issues identified by ATSB investigation reports were addressed in 2015–16.

PERFORMANCE CRITERION
90% of complex investigation reports are published within 12 months.
Result
29% of complex investigation reports were published within 12 months during 2015–16.

PERFORMANCE CRITERION
90% of short investigation reports are completed within two months.
Result
31% of short investigation reports were completed within two months during 2015–16.

PERFORMANCE CRITERION
Stakeholder awareness of safety issues is raised as a result of investigation, research and analysis of findings; and through safety education activities as measured through a biennial survey, scoring a rating of 5 or above based on a 7-point rating scale. Note, this rating scale was revised to a 5-point scale during 2015–16 and therefore a new target rating of 4 or above was set.
Result
A rating of 4 was achieved through the 2015–16 stakeholder awareness survey.

PERFORMANCE CRITERION
70% of safety action is taken by stakeholders to address valid safety concerns identified by confidential reports.
Result
52% of safety action was undertaken by stakeholders to address safety concerns identified by confidential reports.

ANALYSIS OF PERFORMANCE

The ATSB operates in an environment of continuing growth and emerging trends across the aviation, rail and marine transport sectors. In contrast, the ATSB has been subjected to successive reductions to its base appropriations with further reductions projected over its forward estimates. This has resulted in a reduction in the ATSB's core capabilities (staffing profile including specialist investigators) by about 25 per cent since its establishment as an independent statutory authority in July 2009.

The ATSB has continued to meet its key deliverables in terms of the number of investigation reports completed and published per year. However, it is evident the ATSB has not been able to complete these reports within the set timeframes. While the number of deliverables has been maintained, with fewer investigators having to take on greater workloads, completion times have been delayed. To address this situation, the ATSB will initially undertake fewer investigations and will need to carefully consider and constrain the scope of investigations initiated. Concurrently, the ATSB will strengthen its investigation management techniques for planning investigations, assigning resources and tracking resource commitment. By maturing its investigation management practices, ATSB investigators will be better positioned to apply developed project management skills capable of achieving a defined outcome, with agreed resources within a prescribed time period.

Further, the ATSB will also need to enhance its data-driven approach to transport safety through increasing its capacity to carefully analyse available occurrence data. This will enable the ATSB to selectively allocate its limited resources towards investigating those accidents and incidents that will have the greatest potential for safety learnings and enhancement. It will also expand the ATSB's capacity to identify emerging threats to transport safety.

Performance at a glance

Table 2: Performance at a glance

DELIVERABLE	YEAR	NUMBER COMPLETED[1]	PER CENT COMPLETED
Complex investigations			**Per cent completed within 12 months**
Aviation	2015–16	44	18%
	2014–15	39	41%
	2013–14	46	43%
Marine	2015–16	7	14%
	2014–15	5	60%
	2013–14	7	57%
Rail	2015–16	19	58%
	2014–15	20	40%
	2013–14	16	56%
Short investigations			**Per cent completed within 2 months**
All modes	2015–16	90	31%
	2014–15	98	28%
	2013–14	139	38%

1 Includes occurrence, safety issue, external and research investigations conducted under the TSI Act.

Key results

Table 3 summarises the ATSB's performance against key indicators published in the 2015–16 Portfolio Budget Statements.

Table 3: ATSB performance against key indicators

	TARGET	PERFORMANCE	PAGE
Key Performance Indicators			
Safety actions completed that address safety issues identified by ATSB investigation reports: • Critical safety issues • All other safety issues	 100% addressed 70% addressed	 None identified 68% addressed[2]	 81
Complex investigation reports are published within 12 months.	90% published within 12 months.	29%	31
Short investigation reports are completed within two months.	90% completed within two months.	31%	32
Stakeholder awareness is raised as a result of investigation, research and analysis of findings and through safety education activities as measured through a biennial survey, scored on a five point rating scale.	Rating of 4 or above.	4	43
Safety action is taken by stakeholders to address valid safety concerns identified by confidential reports.	70% actioned	52%	33
Deliverables			
Assess, classify and publish summaries of accident and incident occurrences received.	Details of occurrences being investigated are published within one working day. Summaries of aviation occurrences are published within ten working days of receipt.	75% 15%	33
Assess confidential reports for clarity, completeness and significance for transport safety and, where appropriate, advise any responsible party in a position to take action in response to the safety concerns.	A de-identified summary of the confidential report will be provided to any relevant third party within ten working days. Within six weeks advise a responsible party in a position to take safety action in response to the safety concern.	71% 93%	33

2 A further 27% of non-critical safety issues were still pending safety action at the time of publication.

Table 3: ATSB performance against key indicators (continued)

	TARGET	PERFORMANCE	PAGE
Deliverables			
Complete and publish investigations.	Up to 60 complex investigations. Up to 12 short investigations.	70 complex investigation reports published. 90 short investigations completed.	31 32
Complete and publish research and analysis reports, based on safety priorities and trends.	Complete and publish the annual Aviation Occurrence Statistics report and other research publications. Reports on aviation safety trends provided to the Minister, operators and relevant sector of the industry twice per year.	Statistics report plus 3 other research reports published. 1 trend monitoring report published.	32
Ensure preparedness for a major accident by reviewing and testing major accident response and management capabilities through participation in exercises.	One major exercise per annum.	Participation in three exercises.	35
Assist regional transport safety in the Asia Pacific region through direct cooperation with counterpart agencies and the delivery of approved support activities, provided for by program funding agreements.	Delivery of approved projects within program funding allocation.	See detailed report.	42
Assist the Malaysian Government with its investigation into the disappearance of Malaysia Airlines Flight MH370 in accordance with Annex 13 to the Convention on International Civil Aviation. Work with primary and secondary stakeholders in relation to decisions made by governments in relation to the search and/or potential recovery operations of MH370.	Continue to lead the search operations to search up to 120,000 square kilometres. Continue to assist the Malaysian investigation as an Accredited Representative.	See detailed report.	48

Independent 'no-blame' investigations of transport accidents and other safety occurrences

This section describes the ATSB's performance against the deliverables relating to the ATSB's role as the independent 'no-blame' transport safety investigator, as published on page 126 of the 2015–16 Portfolio Budget Statements.

Deliverables

- Assess, classify and publish summaries of accident and incident occurrences received. Details of occurrences being investigated are published within one working day. Summaries of aviation occurrences are ready to be published in the public online database within ten working days of receipt.
- Assess confidential reports for clarity, completeness and significance for transport safety and, where appropriate, advise within six weeks any responsible party in a position to take safety action in response to the safety concern.
- Complete and publish up to 60 more complex investigations and up to 120 short investigations per annum.
- Ensure preparedness for a major accident by reviewing and testing major accident response and management capabilities through participation in one major exercise per annum.
- The ATSB will continue to assist the Malaysian Government with its investigation into the disappearance of Malaysia Airlines Flight 370 (MH370) in accordance with Annex 13 to the *Convention on International Civil Aviation*. The ATSB will continue to work with primary and secondary stakeholders in relation to decisions made by governments in relation to the search and/or potential recovery operations of MH370.

Aviation investigations

In 2015–16, the ATSB initiated 39 complex safety investigations—27 of which were occurrence investigations—from 16,142 accident and incident notifications (of these notifications, to date 4,998 have been classified as aviation occurrences). In addition, one other investigation started as complex, but was downgraded and continued as a short investigation.

During this reporting period, 44 complex investigations were completed (comprising 31 occurrence investigations, 12 external investigations, one research investigation and no safety issue investigations). Of the 44 complex investigations, eight were completed within 12 months.

As of 30 June 2016 there were 73 ongoing complex aviation investigations.

Marine investigations

In 2015–16, the ATSB initiated seven complex marine transport safety investigations from a total of 146 accident and incident occurrences. Seven complex investigations were completed in this time period (six were occurrence investigations, one was assistance to an external organisation), one of which was completed within 12 months.

As of 30 June 2016, the marine investigation team continues to investigate seven marine occurrences (including one external investigation).

Rail investigations

In 2015–16, the ATSB initiated 25 complex rail safety investigations (all occurrence investigations) from 378 notifications of immediately reportable matters.

The ATSB completed 19 complex rail investigations in 2015–16. Eleven of the 19 investigations were completed within 12 months.

As of 30 June 2016, the ATSB continues to investigate 30 complex rail safety occurrences and one safety issue investigation.

Short investigations

In 2015–16, the ATSB initiated 93 short investigations—91 in aviation, one in marine and one in rail.

During this past financial year, 89 aviation short occurrence investigations were completed (28 within two months). One marine short occurrence investigation was also completed.

Research and statistics

The Research Investigations team provided input into 24 aviation occurrence investigations. In addition to a single complex aviation research investigation, counted under aviation investigations above (*Engine failures and malfunctions in light aeroplanes: 2009 to 2014*), two educational research publications were completed in 2015–16. These were *Pilot incapacitation incidents: 2010–2014* and *Aerial application safety: 2014–2015 year in review*.

In 2015–16, the ATSB published two aviation statistical reports, the annual *Aviation Occurrence Statistics* and one aviation trend monitoring review.

Details on the ATSB's research reports are provided in Section 3—Safety data recording, analysis and research.

Reporting

The ATSB's target for assessing, classifying and publishing summaries of accident and incident occurrences is:

- one day for occurrences being investigated
- ten days for summaries of other incidents.

Of 146 occurrences investigated, 111 (75 per cent) were processed with summaries published on the ATSB website within one working day of the start of the investigation.

In 2015–16, 15 per cent of aviation occurrence notifications were processed and ready for publication within ten working days. The average time for processing was 150 working days.

Confidential reporting

In the 2015–16 year, the ATSB's Confidential Reporting Scheme (REPCON) received 130 notifications (of which 65 were classified as REPCONs). Of these 130 notifications, 116 concerned aviation (55 REPCONs), 11 concerned rail (8 REPCONs) and three concerned marine (two of which were REPCONs).

Of the 44 REPCON reports completed in 2015–16, 23 (52 per cent) resulted in safety action by stakeholders.

The following summaries provide examples of safety concerns that were raised, along with the safety action taken after the concerns were reported through REPCON.

Aviation

- The reporter expressed a safety concern regarding the security of the seatbelts throughout the cabin of an Airbus A320. The reporter advised that numerous seatbelts throughout the cabin were incorrectly installed—for example, a 180 degree twist was required to fit the two seatbelt halves together—or not installed in a uniform manner. In a chair assembly of three seats, the window seat had the seatbelt buckle half installed to the passenger's left, while in the middle seat, the seatbelt buckle half was attached to the passenger's right. As a result of this report the operator actioned a corrective action plan and scheduled it to occur before the end of the week.
- The reporter expressed a safety concern regarding the confusion arising from the similarity of two flight numbers being used by an operator. The reporter advised that both aircraft operate in the same area and both flew to Brisbane. The reporter advised that recently both aircraft came onto frequency within about five seconds of each other. The controller issued a clearance to the wrong aircraft but the error was recognised immediately by the other flight crew and corrected. As a result of the report the operator has changed one of the flight numbers. The Civil Aviation Safety Authority (CASA) and Airservices Australia also discussed the issue at their quarterly meeting.

- The reporter expressed a safety concern related to the carriage of spare lithium battery packs by the operator's pilots while on flight duty. The packs are usually carried in flight bags on the flight deck. The reporter advised that many of the lithium battery packs are large capacity, with some up to 185 watt-hour (Wh). The dangerous goods advice on the CASA website is that high powered lithium batteries (more than 160Wh) are not permitted on an aircraft. The reporter advised that many pilots were not aware of the dangerous goods legislation relating to lithium battery packs. As a result of this report, the operator advised that they do not supply their flight crew with external batteries. Guidance on dangerous goods was reissued to flight crew, with further guidance provided on the acceptable limits of lithium battery packs that can be carried by flight crews.

Marine

- The reporter expressed a safety concern relating to the management of large cruise ships entering [location 1]. The reporter advised that in March 2011, the pilot services risk assessment committee produced a risk assessment of the Port of [location 1] passenger vessels. The conclusion of this assessment was that all passenger vessels transiting west of [location 2] have a tug secured to the ship for emergency purposes. The pilots proved that in the event of a loss of control, due to human factors or mechanical failure, a cruise vessel could be prevented from either grounding or having a collision with the [location 3] by using a tug. During this risk assessment, anchoring was not considered in this area due to [location 4] and submarine cables. When the port authority published the final risk assessment in October 2011, it stated that if a ship's master declared that his vessel had been 'incident free' in the previous 30 days and all navigation and propulsion equipment was working 100 per cent, then the obligation to take a tug was waived. The reporter advised that very few cruise vessels that trade in [location 1] have full redundancy with continuous power availability. There is an unknown recovery time from a blackout until power is restored, and often this is only to 50 per cent power. As a result of this report, the port operator agreed to review the risk assessment of the procedures for entering the port and also undertook to conduct a full review of the location of underwater cables in the area.

Rail

- The reporter expressed a safety concern relating to coal trains being overloaded. Overloading causes trains to go too slow—the locomotives overheat, de-rate on entry into a long tunnel and eventually lose traction and fail. Train crew then have to evacuate the tunnel using respirators which was becoming a common occurrence during hot weather. In the two weeks preceding the reporting of this safety concern, three trains failed in the tunnel due to overheating. All three crews had to evacuate the tunnel using respirators. The train and rescue crews escaped without injury. As a result of this report, the Office of the National Rail Safety Regulator (ONRSR) conducted further enquiries with the operator—including monitoring the tunnel for any further instances of trains failing to lift loads within the tunnel and crew evacuating using respirators. Additionally, the ONRSR believed the reported safety concern warranted further action from the rail infrastructure manager and further enquiries were conducted.

Technical analysis

The ATSB Technical Analysis team maintains support and readiness for the detailed examination of physical evidence and the recovery and download of recorded data from a variety of damaged and undamaged sources across the aviation, rail and marine transport modes.

The Technical Analysis team completed five complex investigations in 2015–16. Additionally, the team made significant contribution to 37 more complex investigations, across all three modes, which were published during 2015–16. A further ten investigations were completed where technical assistance in transport safety matters was formally requested from the following external agencies:

- domestic
  - Civil Aviation Safety Authority
  - Recreational Aviation Australia
- international
  - Ministry of Transport Malaysia
  - National Transportation Safety Committee of Indonesia
  - Transport Accident Investigation Committee of New Zealand
  - Accident Investigation Commission of Papua New Guinea.

In the past year, the team expended considerable resources in continuing to provide technical input in support of the ATSB's ongoing assistance to Malaysia, in the search for MH370. The contributions were associated with the definition and refinement of the search area (via the Search Strategy Working Group) and with identification and analysis of recovered debris.

Preparedness for a major accident

Maintenance of the ATSB's operational capability and readiness extends directly to the agency's preparedness for undertaking and managing all aspects of a major transport safety investigation.

Across the 2015–16 period, the ATSB participated in several practical exercises involving hypothetical transport accidents—aimed at directly testing the effectiveness and scope of our response arrangements.

In May 2015, the ATSB attended a State Emergency Managment Committee workshop in Perth, Western Australia to examine the awareness and rating of the risks associated with a major aviation accident in local or remote environs. In November 2015, at Port Melbourne, Victoria, 'Exercise BARCO' tested the TTLine (operator of the passenger ferry *Spirit of Tasmania*) inter-agency response arrangements to a shipboard fire. This enabled a number of ATSB's Senior Marine Transport Safety Investigators to examine our own early response procedures for such a maritime emergency.

During August 2015, a rail accident scenario was played out by local authorities near Nhill, Victoria—allowing the ATSB's Manager of Rail Safety Investigation to examine the logistics of mounting and managing an effective investigation alongside many other responding organisations.

The information gained, and observations made, from all of these activities have provided valuable input into the ATSB's continuous and ongoing improvement program for assuring our readiness to mount a full-scale investigative response in the event of a major transport accident.

Implementing the ATSB's expanded role in rail

In August 2011, the Council of Australian Governments (COAG) agreed on reforms to rail safety regulation and investigation, with a view to introduce consistent national regulation and investigation capabilities. Those reforms were subsequently agreed across New South Wales, Tasmania, South Australia and the Northern Territory in 2013, Victoria in 2014, and Western Australia in 2015.

Significant progress has been achieved in developing and consolidating arrangements for effective independent rail safety investigation under the *Transport Safety Investigation Act 2003*. In particular, cooperation with the NSW Office of Transport Safety Investigation and Victoria's Chief Investigator of Transport Safety has been strong and productive. Through an ongoing program of ATSB-provided training and refresher programs, staff from both agencies have developed a strong working knowledge, along with practical application, of ATSB's policies, procedures and legislation.

In late 2015, the Queensland state government advised its intention to participate in the national regulatory and safety investigation reforms. Subject to the passage of revised rail safety legislation in Queensland, the ATSB will expand its role in the first half of 2017 and will then be responsible for independent rail safety investigations in all Australian states and territories.

The ATSB continues to negotiate with the states on funding for national rail investigation.

Safety data recording, analysis and research

The ATSB is funded to record data and conduct analysis and research into aviation matters.

This section describes the ATSB's performance against the deliverable set out on page 126 of the 2015–16 Portfolio Budget Statements.

Deliverables

- Complete and publish the annual Aviation Occurrence Statistics report and other research publications as informed by the annual research program.
- Reports on aviation safety trends will be provided to the Minister and safety entities twice per year.

In 2015–16, the ATSB continued to analyse occurrence data held in its aviation safety occurrence database as part of Australia's international obligation to determine if preventative safety measures are required.

In addition to the above deliverables, the ATSB research and analysis section increased its role in supporting active aviation occurrence investigations during 2015–16. Significant data analysis was completed for 24 aviation occurrence investigations during the financial year. This work helped to determine the investigation scope, assist in making investigation conclusions, inform safety issue risk assessments and document past occurrences of similar incidents.

The ATSB published five research investigation reports during 2015–16.

Engine failures and malfunctions in light aeroplanes: 2009 to 2014 (AR-2013-107)

Through routine trend monitoring of safety occurrence reporting, the ATSB became aware of a potential issue surrounding the frequency of light aircraft engine failures and malfunctions (both Australian VH and recreationally-registered).

Over the 6 year study period, between 2009 and 2014, 322 engine failures or malfunctions involving light aircraft were reported to the ATSB and/or Recreational Aviation Australia (RAAus). These reports involved single-engine piston aeroplanes with up to 800 kg maximum take-off weight. Aircraft powered by Jabiru engines were involved in the most engine failures or malfunctions, with 130 reported over the 6 years. This represents about one in ten aircraft powered by Jabiru engines in the study set having reported an engine failure or malfunction. Reports from Rotax powered aircraft were the next most common (87, or one in 36), followed by aircraft with Lycoming (58, or one in 35) and Continental engines (28, or one in 35). When factoring in the hours flown for each of these engine manufacturers, aircraft with Jabiru engines had more than double the rate of engine failure or malfunction than any other manufacturer in the study set—3.21 failures per 10,000 hours flown.

Unlike the engines of other manufacturers in this study, nearly half of the Jabiru engine failures or malfunctions related to a fractured component. Engine through-bolt failures were the most commonly reported failure mechanism in Jabiru powered aircraft, with 21 through-bolt fractures reported between 2009 and 2014. Taking into account the number of aircraft registered in the study period, through-bolt failures occurred in about one in 55 Jabiru powered aircraft. Although originally designed to be replaced after 1,000 hours, 19 through-bolts failed before the 1,000 hour mark, with seven failing before 500 hours. At least four failures involved engines with upgraded 3/8 inch diameter through-bolt nuts. There were no failures reported involving the newer 7/16 inch diameter through-bolts, which are used in currently manufactured engines (present in about 20 per cent of Jabiru engines).

The ATSB has issued recommendations to Jabiru Aircraft Pty Ltd and the Civil Aviation Safety Authority to reduce the risk of engine failure or malfunction in aircraft fitted with Jabiru engines and to assure future reliability of these engines (see Section 6–Engine failures and malfunctions in light aeroplanes).

The ATSB research investigation report, *Engine failures and malfunctions in light aeroplanes 2009–2014* (AR-2013-107), is available from the ATSB website at **www.atsb.gov.au**

Aviation Occurrence Statistics 2005 to 2014 (AR-2015-082)

Thousands of safety occurrences involving Australian-registered and foreign aircraft are reported to the ATSB every year by the public and by individuals and organisations in Australia's aviation industry. The aim of the ATSB's statistical report series is to give information to pilots, operators, regulators and other aviation industry participants, about what accidents and incidents have happened, how often they are happening and what we can learn from them.

In the 10 year period of 2005 to 2014, 254 aircraft were involved in fatal accidents in Australia, leading to 374 fatalities. Most fatalities (240) were in CASA-registered (VH registrations) general aviation aircraft (including aerial agriculture, mustering, search and rescue, flying training, private and sport operations). Non-CASA registered recreational aircraft (aeroplanes, weight shift hang gliders, trikes, paragliders and powered parachutes, and gyrocopters) accounted for 98 fatalities. Commercial air transport (passenger regular public transport, charter and medical transport) accounted for 36 fatalities.

Across the 10 year period, the accident rate per hours flown was the highest for recreational aeroplanes, followed by aerial agriculture and private and sport aviation. However, the accident rate for all VH registered private and sport operations (including gliding) was similar to that of all non-VH recreational flying combined. Recreational aircraft, private/sport, and aerial agriculture operation types, were among the most likely to result in a fatal accident when considering the amount of flying activity. Within recreational aviation, half of all gyrocopters accidents were fatal and almost a third of weight shift aircraft accidents were fatal.

In 2014 alone, there was a total of 278 aircraft involved in accidents and 202 involved in serious incidents (indicating an accident nearly occurred). Twenty aircraft were involved in fatal accidents and another 28 resulted in serious injury. In 2014, Australia saw 28 fatalities and 36 serious injuries as a result of aviation accidents.

Commercial air transport recorded no fatalities in 2014. However, there were 27 accidents, an increase compared to the 10 year average of 19. Five of the accidents resulted in seven serious injuries. Most accidents (23) involved charter aircraft and were mostly collisions with terrain or failure of the landing gear. There was also a significant drop in serious incidents (37) when compared to the previous two years (mostly aircraft separation and pilot incapacitation events).

General aviation experienced 149 accidents in 2014 (the highest in 10 years), 11 of which were fatal (the lowest in 10 years) and another 15 resulted in serious injuries. These accidents led to 17 fatalities and 20 serious injuries. General aviation aircraft were involved in 118 serious incidents in 2014. In 2013—the last year with available activity data—the general aviation accident rate per departure was almost five times that of commercial air transport. The year 2013 saw a significant decrease in accident rates compared with the previous 6 years. However, the fatal accident rate was consistent with the 10 year average. Aerial agriculture, followed by private and sport aviation, had the highest general aviation accidents rates. Flying training had the lowest.

The reporting of safety incidents to the ATSB from recreational (non-VH) aviation has increased more than tenfold in the last 10 years. This is due to both the growth in recreational flying and improved awareness of reporting requirements. In 2014, 99 accidents were reported, nine of which were fatal and another eight led to serious injuries. Most accidents involved aeroplanes, as these are the most common recreational aircraft.

Aviation Occurrence Statistics 2005 to 2014 (AR-2015-082) is available on the ATSB website at **www.atsb.gov.au**

Pilot incapacitation occurrences 2010–2014 (AR-2015-096)

Occasionally pilots become incapacitated during flight. Incapacitations can arise from different reasons. They include the development of an acute medical condition, changes in environmental conditions during the flight, or the effects of a pre-existing medical condition. The effect of incapacitation on a pilot can restrict their flight duties for the remainder of the flight, or in the case of single-pilot operations it can cause a collision with terrain.

This research report documents pilot incapacitation occurrences in high capacity air transport, low capacity air transport and general aviation, to help educate industry about the causes and risks associated with inflight pilot incapacitation.

In the past 5 years, there have been, on average, 23 pilot incapacitation occurrences reported each year. Nearly 75 per cent of the incapacitation occurrences happened in high capacity air transport operations (about one in every 34,000 flights), with the main cause being gastrointestinal illness, followed by laser strikes. In the majority of the occurrences reported, the incapacitation was severe enough for the pilot to be removed from duty for the remainder of the flight. With multi-pilot crews in high capacity operations these occurrences usually had minimal effect on the flight.

Low capacity air transport and general aviation had fewer occurrences with a wider variation of causes of incapacitation. These ranged from environmental causes (such as hypoxia), to medical conditions (such as heart attack). Furthermore, 70 per cent of pilot incapacitation occurrences in general aviation had an effect on flight operations, namely return to departure aerodrome or collision with terrain.

This report highlights that pilot incapacitation can occur in any operation type, albeit rarely. In high capacity air transport operations, the practice of ensuring all pilots on the same flight eat different meals, prior to and during the flight, has been an effective defence to prevent all pilots on the same flight becoming incapacitated at the same time. Providing pilots with training in dealing with incapacitation events has been effective for when these events do occur. Pilots are also encouraged to report laser strikes to police and the Office of Transport Security. In low capacity air transport operations, providing emergency training to non-flight crew, such as aeromedical nurses, is an important defence in case of pilot incapacitation. Finally, in general aviation, pilots are reminded to assess their fitness prior to flight. Assessment of fitness includes being aware of any illness or external pressures they may be experiencing.

Pilot incapacitation occurrences 2010–2014 (AR-2015-096) is available on the ATSB website at **www.atsb.gov.au**

Aerial application safety: 2014 to 2015 year in review (AR-2015-031)

This is the first publication in a series from the ATSB on aerial application (agricultural spraying and firefighting) accidents during the previous operational year (May 2014 to April 2015). Aerial application operations have a notably high accident rate relative to other aviation sectors. These operations involve inherent risks that are not present in most other types of flying. Risks include low-level flying with high workloads and numerous obstacles, in particular powerlines and uneven terrain. This report focuses on the aerial application accidents that occurred between May 2014 and April 2015, and fatal accident reports published in this period, to coincide with the agriculture season in most parts of Australia.

Aerial application safety: 2014–2015 year in review (AR-2015-031) is available on the ATSB website at **www.atsb.gov.au**

Emerging trends in Australian aviation safety January–June 2015 (AR-2016-002)

When aviation safety incidents and accidents happen they are reported to the ATSB. The most serious of these are investigated, but most reports are used to help the ATSB build a picture of how prevalent certain types of occurrences are in different types of aviation operations.

The ATSB uses this data to proactively look for emerging safety trends. By monitoring trends, issues of concern can be communicated and action taken to prevent accidents.

ATSB trend monitoring reviews the rate of reported aviation occurrences biennially (per 100,000 departures or hours flown) and compares it to the 5 year average. The ATSB performs this assessment independently for every type of occurrence involving high capacity regular public transport (RPT) and charter, low capacity RPT and charter, general aviation and recreational aviation.

Further analysis can show which aircraft models, operators, or locations account for most of the difference with prevailing trends and whether this has been a long term trend or just a spike. When a single operator accounts for most of the difference, the ATSB contacts them for information and comment. Sometimes, increases in recorded occurrences are solely due to a good reporting culture, because of changes to operations, aircraft, or regulations. Sometimes there is no apparent explanation.

In 2015–16, the ATSB published one aviation safety trend report, *Emerging trends in Australian aviation safety January–June 2015*.

This report summarises significant trends in Australian aviation from January to June 2015, along with resultant safety action being taken to address these trends. Safety action is appropriate when a concerning trend has been identified and can include:

- contacting an operator or industry association for more information
- reporting the trend to the regulator (Civil Aviation Safety Authority), or to the air navigation services provider (Airservices Australia and/or Department of Defence), for further monitoring
- targeting occurrences for new ATSB investigations or research
- having ATSB investigators closely monitor new reports of similar occurrences to gather more information.

Emerging trends in Australian aviation safety January–June 2015 (AR-2016-002) is available on the ATSB website at **www.atsb.gov.au**

Fostering safety awareness, knowledge and action

The ATSB is funded for activities relating to its responsibilities for increasing awareness of safety issues and complying with international safety obligations. This section describes the ATSB's performance against the deliverables set out on page 126 of the 2015–16 Portfolio Budget Statements.

Deliverable

- Assist regional transport safety in the international region through direct cooperation and the delivery of approved projects and other support activities provided for by program funding agreements.

Regional cooperation

During 2015–16, the ATSB continued an active program of regional engagement with other transport safety agencies, over and above that required by its international obligations. Australia's reputation for high quality and rigorous investigations makes it uniquely placed to assist with transport safety in the Asia Pacific region. In particular, the ATSB has an ongoing involvement in the Australian Government Indonesia Transport Safety Assistance Package (ITSAP) and cooperation with Papua New Guinea (PNG) consistent with the *Memorandum of Understanding on Cooperation in the Transport Sector*.

Many countries do not have a well-developed capability to investigate accidents and serious incidents. In this situation, the ATSB believes that the establishment of a regional accident investigation organisation, or the creation of a regional pool of qualified investigators, may be the best way to establish an effective accident and incident investigation and prevention system. Australia will pursue opportunities in this regard in the Asia Pacific region, including taking a leading role in the ICAO Asia Pacific Accident Investigation Group (APAC AIG) and the Marine Accident Investigators Forum in Asia (MAIFA).

Indonesia

The ATSB and the Indonesian National Transportation Safety Committee (NTSC) collaborated on a range of ITSAP activities in 2015–16, including the very successful cooperation between the ATSB and NTSC transport recorder laboratories. Activities included a 'train-the-trainer' project to develop a *Fundamentals of Marine Electronic Data* (FMED) course that was successfully delivered to NTSC staff and Indonesian marine industry participants in the Indonesian ports of Medan and Bali. An NTSC aviation recorder specialist visited the ATSB for on-the-job training and practical assistance related to recorder work for NTSC aviation investigations.

Papua New Guinea

Under the PNG *Memorandum of Understanding on Cooperation in the Transport Sector*, the ATSB has an ongoing program of cooperation and capability building with the PNG Accident Investigation Commission (AIC). An ATSB Senior Transport Safety Investigator (STSI) is deployed full-time to the AIC, in Port Moresby, to assist PNG in developing the capability to meet the international requirements for aviation safety investigation. Ongoing guidance and mentoring of PNG AIC investigators by the ATSB STSI included work in support of the AIC investigation into the crash of a Britten Norman Islander aircraft on approach to Kiunga Airport, Western Province, on 13 April 2016. All 12 people on board, including the Australian pilot, died in the accident.

Other regional engagement activities

The ATSB continues to make its expertise and resources widely available in support of regional transport safety. Representatives from Malaysia, Korea, Indonesia, Papua New Guinea, Macau and Oman visited the ATSB during 2015–16 for discussions related to transport safety. In addition, participants from New Zealand, Malaysia, Korea, Singapore, Taiwan and Macau attended ATSB investigator training courses.

Communication and education

As Australia's national transport safety investigator, we are committed to communicating the safety lessons from our investigation findings, research activity and occurrence reports. This information has valuable safety messages which can help improve transport safety and ultimately save lives.

In 2015–16 we continued to highlight, for the benefit of industry and the travelling public, emerging safety issues and trends using a range of communication channels and activities.

Stakeholder awareness

Between April and June 2016, the ATSB conducted an online survey with members of the transport industry and travelling public.

The survey sought stakeholders' opinions of the ATSB's service standards and activities. We benchmarked the findings of this survey against the results from the 2013 stakeholder survey.

More than 960 people completed the survey, which was predominately promoted via the ATSB Facebook page.

Some of the key findings of this year's survey showed that:

- more than half of the respondents believed the ATSB's activities have increased awareness of transport safety issues in the past 2 years
- the ATSB's strengths are our technical ability in conducting investigations and in the quality of our reports
- the area in which the ATSB needed to improve was timeliness in completing investigations
- there was an increase in overall knowledge of the ATSB
- there was an increase in visits to the ATSB website.

The findings of the survey will provide valuable input into our future business planning. The ATSB greatly appreciates the time and effort of everyone who completed the survey.

SafetyWatch

In 2015–16, we continued to promote our SafetyWatch initiative. SafetyWatch highlights the broad safety concerns identified from our investigations and from the occurrence data reported to us by industry.

The initiative includes priority areas where more can be done to improve safety. These include:

- general aviation pilots
- safety around non-controlled aerodromes
- data input errors
- handling approach to land
- flying with reduced visual cues
- safe work on rail
- maritime pilotage
- under-reporting of occurrences
- marine work practices.

Throughout the year, the ATSB undertook a range of communication activities (direct mail, web news items, social media and general media) to raise awareness of these issues within the transport industry.

Social media

During 2015–16, we made extensive use of our social media platforms to reach and engage with the transport industry, media and the travelling public.

In July 2015, we launched the ATSB's Facebook page to expand our online engagement with the Australian public. Since its launch, the ATSB's Facebook page has attracted around 7,500 followers and referred more than 85,000 views to the ATSB website.

The ATSB's Twitter account continues to be an effective channel for releasing reports and investigation updates. Through this social media platform, we can provide a short safety message along with a link to more information on our website.

By the end of June 2016, the ATSB's Twitter followers had increased to around 5,500 people. These include journalists, members of the public and transport industry specialists.

Media

The ATSB undertakes responsive and proactive media activity to inform the transport industry, and travelling public, of our investigations and activities. During the year we worked closely with local, national, state and international media to raise community awareness of transport safety.

We also regularly contributed articles to key industry publications throughout the year.

Website

The ATSB website (**www.atsb.gov.au**) continues to be our principal communication channel. In 2015–16, the ATSB website received 2,665,121 page views. This represents an increase of 169,320 page views from the previous financial year.

The launch of the ATSB Facebook page has been particularly effective in referring users to the ATSB website. In 2015–16, Facebook resulted in more than 85,000 sessions on the ATSB website. Facebook was the number one referral site by far.

Going digital

We are continually working to improve our website to meet audience needs and to allow for new and emerging technologies.

In 2015–16, all of our reports became available in html format (along with current pdf and rich text formats).

Having our content in html format has allowed us to embed more digital content—such as video, animation and audio. It also forms part of our response to the Australian Government's digital first agenda.

Online aviation database

The ATSB National Aviation Occurrence Database contains de-identified information on aviation accidents and incidents in a searchable format. The database has been designed to fulfil searches for information involving the most common requests received by the ATSB—date range, aircraft and operation type, injury level, occurrence category and type, and location and airspace type and class. Users are able to search aviation occurrence statistics from the ATSB website.

In 2015–16, the National Aviation Occurrence Database had 6,014 page views.

Industry engagement

In 2015–16, the ATSB continued its industry engagement program. The program comprised industry events where the ATSB participated, presented and/or contributed. This represented around 35 events with stakeholders from the aviation, maritime and rail industries, including:

- Safeskies 2015
- Regional Aviation Association of Australia convention
- AusRail Plus 2015
- Airport Safety Week event
- Advanced Marine Pilot seminars and courses
- Australian Seafarers Welfare Council
- Australian Federation of Air Pilots seminars
- Airservices Australia Waypoint 2015
- Australian Women's Pilots Association Conference
- Aerial Application Association of Australia Convention
- Rail Industry Safety and Standard Board Rail Safety event.

Financial performance

This section should be read in conjunction with the ATSB's audited financial statements for 2015–16 that appear in section 7 of this report.

The ATSB operates as a separate non-corporate Commonwealth entity, having been established on 1 July 2009. The main assets of the ATSB were transferred from the (then) Department of Infrastructure and Regional Development and include plant and equipment, specialised laboratory assets and intangible software assets.

The ATSB recorded a deficit of $2.5 million for 2015–16, compared to a surplus of $14.0 million in 2014–15. Excluding depreciation and amortisation, the ATSB realised an underlying deficit of $1.6 million which compares to a $14.9 million surplus in 2014–15.

ATSB's approved operating loss for 2015–16 after accounting for depreciation and amortisation was $24.3 million compared to an actual operating loss of $2.5 million mainly due to the timing differences between revenue received and originally forecast. In 2015–16 ATSB has recognised additional $27.9 million in contributions and $8.0 million in resources received free of charge from other countries in relation to the search for the missing Malaysia Airlines flight 370 (MH-370), with the majority of the additional contributions expected to be fully utilised in 2016–17.

Non-financial assets are mainly comprised of Information and Communication Technology hardware and software applications and Laboratory equipment required to deliver ATSB's core activities and leasehold improvements on rental accommodation.

The Government no longer provides appropriation funding to cover non-cash expenses of depreciation and amortisation to non-corporate Commonwealth entities. In the absence of revenue for depreciation and amortisation, the ATSB and other non-corporate entities are more likely to deliver a negative operating result or deficit, and these will accumulate. Offsetting this build-up of retained deficits requires a commitment by the Government to provide annual capital injections to meet new capital requirements.

The ATSB's new capital requirements are detailed in its Departmental Capital Budget published in the 2015–16 Portfolio Budget Statements. Over time, the ATSB's estimated capital injections fall short of the deficits associated with the non-funding of depreciation and amortisation. Without adequate capital injections by Government, this presents a challenge to the ATSB in maintaining its underlying equity and asset capability going forward.

Table 4: Summary of financial performance and position

		2015–16 $M	2014–15 $M
Revenue from Government		68.2	98.5
Other revenue		39.6	34.6
Total income		107.8	133.1
Employee expenses		15.4	15.6
Supplier expenses		94.0	102.6
Depreciation and amortisation		0.9	0.9
Total expenses		110.3	119.1
Operating surplus/(deficit)		(2.5)	14.0
Financial assets	A	46.3	51.5
Non-financial assets	B	2.1	2.6
Liabilities	C	22.0	25.9
Net Assets - A + B – C		26.4	28.2

The search for Malaysia Airlines Flight MH370

Background

On 8 March 2014, Malaysia Airlines Flight 370 (MH370), a Boeing 777-200ER registered 9M-MRO, was travelling on a scheduled international passenger flight from Kuala Lumpur to Beijing. There were 239 people on board—12 Malaysian crew members and 227 passengers. Six of the passengers were Australian citizens.

During the transition from Malaysian airspace to Vietnamese airspace, the aircraft, for unknown reasons, lost contact with air traffic control. It also disappeared from air traffic control secondary surveillance radar.

It was later determined (through review of primary radar data) that, after disappearing from secondary radar, the aircraft had turned and flown back over the Malaysian peninsular prior to a further turn in a north westerly direction to fly through the Malacca Strait. The aircraft was last detected on primary radar above the northern tip of Sumatra.

After the final detection of the aircraft on primary radar, the only available information relating to the aircraft's flight path was derived from information recorded during a series of satellite communications between the ground station and the aircraft's satellite communication system, via Inmarsat's Indian Ocean Region satellite. Analysis of this satellite data indicated that MH370 continued to fly for around six hours after radar contact was lost.

The data associated with the periodic satellite transmissions during the flight and the aircraft's performance have been extensively analysed. This analysis indicates that the aircraft entered the sea close to a long, but narrow, arc in the southern Indian Ocean.

Early searches

Under agreement between Australia and Malaysia, a surface search of probable impact areas along the arc was carried out from 18 March to 28 April 2014, coordinated by the Australian Maritime Safety Authority. This included a search for the flight recorders using a towed pinger locator, sonar buoys and an autonomous underwater vehicle (AUV) to search the ocean floor, in the northern section of the search area. The AUV underwater search, coordinated by the Joint Agency Coordination Centre (JACC), was completed on 28 May 2014. The ATSB then became responsible for refining the search area and leading an expanded underwater search.

Defining the underwater search area

Since May 2014, the Search Strategy Working Group (SSWG), coordinated by the ATSB, has been working towards defining the most probable position of the aircraft at the time of the last satellite communication. The SSWG brings together satellite and aircraft specialists from the following organisations:

- Air Accidents Investigation Branch (UK)
- Boeing (USA)
- Defence Science and Technology Group (Australia)
- Department of Civil Aviation (Malaysia)
- Inmarsat (UK)
- National Transportation Safety Board (USA)
- Thales (UK).

These agencies work, both independently and collaboratively, as the Flight Path Reconstruction Group. Using various techniques, the group has undertaken analysis of the satellite communication information to produce probable flight paths. The SSWG also continues to consult with the SATCOM sub-group, which is part of the wider Malaysian investigation group.

Following the surface search, the Flight Path Reconstruction Group continued to analyse both the flight and satellite data, and reached a consensus on the initial priority underwater search area. In June 2014, the ATSB published a report, *MH370—Definition of Underwater Search Areas*, describing the methods and means used to identify a priority search area of 60,000 square kilometres. Work continued on refinements to the analysis of the satellite communications data, with the understanding that the ongoing work could result in changes to the prioritisation and locale of search activity. In August 2014, the ATSB published an updated version of the report, which included additional explanatory material relating to the Perth ground station.

In October 2014, the ATSB published *MH370—Flight Path Analysis Update*, which described the continuing work to define the underwater search area. Among other insights, further analysis gave greater certainty about when the aircraft turned south into the Indian Ocean and produced a better understanding of the parameters within which the satellite ground station was operating during the last flight of MH370. The analysis indicated that the underwater search should be prioritised further south within the wider search area.

Refinements to update the search area definition continued during 2015–16, with the Australian Defence Science and Technology Group (DST Group) conducting a comprehensive analysis of available data. In December 2015, the ATSB published an updated report, *MH370 – Definition of Underwater Search Area,* which describes the results of the DST Group analysis.

The analysis, based on Bayesian techniques, models the satellite communications (SATCOM) data, the aircraft dynamics and the environmental conditions during the flight. The SATCOM model was calibrated using data from B777 flights, including previous flights of the accident aircraft. Validation experiments were also conducted, to ensure that the modelling could predict the actual flight path of previous flights of the accident aircraft using available flight data.

The output of the DST Group analysis was a probability density function (PDF) defining the probable location of the aircraft's crossing of the 6th arc. These results were then extrapolated to the 7th arc. The analysis indicated that the majority of solutions (flight paths predicted by the model) only contained one significant turn after the last recorded radar data. DST Group have written a book, *Bayesian methods in the search for MH370,* detailing the entire analysis.

Performance analysis by Boeing produced a series of achievable ranges, with time intervals, for different cruise altitudes. It was noted that maintaining a constant altitude of FL350, or higher, gave range values that closely matched the region on the arc corresponding to the DST Group analysis results. The DST Group and Boeing results were obtained independently and it is significant that they were in general agreement.

In addition to the series of data points that were recorded from the SATCOM system, only the following indirect information was available to assist the ATSB in determining the end-of-flight scenario and therefore the search area width:

- probable aircraft systems status
- simulator results
- review of previous accidents
- glide distance.

The original ATSB underwater search area definition report, published in August 2014, identified a width of 20 NM behind the arc and 30 NM forward of the arc as the priority search area width. This primary priority width was later widened to account for simulated aircraft behaviour following fuel exhaustion. Work has continued refining the analysis of the satellite communications, and other data, to assist in defining the search area width.

Funding

In April 2015, senior Ministers from Malaysia, Australia and the People's Republic of China (referred to as the Tripartite) met to discuss the next steps in the search for MH370. The Ministers agreed that if MH370 was not found within the 60,000 square kilometre search area, the search area would be extended by an additional 60,000 square kilometres (bringing the total search area to 120,000 square kilometres) to cover the entire highest probability area identified by expert analysis.

The resourcing commitments from the Tripartite for the underwater search for MH370 totals A$180 million, to search an area of 120,000 square kilometres. The outline of the resourcing commitments follow.

Australian Government contribution

As announced in the Federal Budget on 13 May 2014, the Australian Government has committed up to A$89.9 million over 2 years from 2013–14, as part of Australia's contribution to the search for MH370. This Australian Government funding included up to A$60 million for the ATSB to undertake the underwater search.

Malaysian Government contribution

On 28 August 2014, Australia and Malaysia signed a Memorandum of Understanding on areas of cooperation in search activities, including financial arrangements. The Malaysian Government's contribution to the underwater search for MH370 totals A$100 million, as follows:

i) an initial contribution of up to A$60 million, to match the contribution by Australia

ii) an additional contribution of A$20 million, as agreed at the April 2015 Ministerial Tripartite meeting

iii) a further contribution of A$20 million, in December 2015.

In addition, Malaysia provided a number of vessels and equipment that have been utilised in the search.

People's Republic of China (China) Contribution

In December 2015, China confirmed it would contribute A$20 million to the underwater search that included the provision of the vessel *Dong Hai Jiu 101*. A formal agreement between the ATSB and the Dong Hai Rescue Bureau was signed on 15 March 2016.

Bathymetry

The sea floor in the search area has been progressively mapped to help ensure the safe operation of the sonar search systems. *Fugro Equator* uses a hull mounted multibeam sonar system to gather bathymetric and other data relating to the seafloor. Processing of this data by staff at Geoscience Australia has revealed many new seabed features, providing necessary information to plan the operation of sonar-equipped vehicles close to the sea floor. By mid-June 2016, around 271,000 square kilometres of search-related area had been surveyed since May 2014. Additional bathymetry data is gathered during transit to and from port visits.

Underwater search

2015–16 is the second full year of the underwater search for MH370. At 30 June 2016, a total of around 110,000 square kilometres had been searched, with more than 55,000 square kilometres being searched in 2015–16.

Fugro Discovery continued underwater search operations during the year with a 6,000 m rated Edgetech DT deep tow system (towfish), tow winch and mission crew.

Figure 1: *Fugro Discovery*

Source: Oliver Edwards

In addition to performing bathymetric survey work, *Fugro Equator* also continued underwater search operations using similar equipment to *Fugro Discovery*. The towfish on each of the Fugro vessels are towed on a cable at slow speed up to 10 km behind the vessel, at an altitude of between 100 m and 150 m above the sea floor. The towfish is fitted with a side-scan sonar, which surveys a wide swathe of the sea floor either side of the towfish, and a multibeam echo sounder, which surveys the sea floor immediately under the towfish.

Figure 2: *Fugro Equator*

Source: ATSB

In December 2015, the Fugro vessel *Havila Harmony* joined the underwater search, with the Hugin 4500 AUV fitted with sonar equipment similar to that used by the DT towfish.

An AUV is a free swimming (it is not connected to the vessel by a cable) submersible vehicle with a battery-powered propulsion system. The vehicle is highly manoeuvrable and therefore capable of surveying difficult terrain in some parts of the search area more effectively. The AUV, using a purpose-built launch and recovery system, dives to the seafloor where it executes a pre-programmed mission. When the mission is complete, the AUV ascends and is recovered by the vessel in order for the acquired data to be downloaded and the AUV's batteries to be changed out with a spare charged set.

The AUV was used to search gaps in deep tow sonar coverage, due to difficult seafloor terrain. *Havila Harmony* and the AUV left the underwater search at the end of March 2016. The AUV remains stored in Fugro's warehouse in Perth where it can rejoin the underwater search at short notice.

Figure 3: *Havila Harmony*

Source: ATSB

In February 2016, the Chinese vessel *Dong Hai Jiu 101* joined the underwater search after extensive preparatory engineering work in Shanghai and the mobilisation of the ProSAS 60 synthetic aperture sonar search system.

The search equipment and mission crew are provided by Phoenix International (Phoenix) and their sub-contractors.

While similar in operation to the Edgetech DT towfish, the ProSAS 60 towfish gathers and processes data differently, resulting in higher resolution imagery of the seafloor than is possible using conventional side scan sonar of a similar frequency and range.

Figure 4: *Dong Hai Jiu 101*

Source: ATSB

Search challenges

This year, underwater search operations in the southern Indian Ocean have encountered a number of significant challenges including 'lost' and subsequently recovered equipment, medical evacuation of unwell crew and severe weather.

Lost towfish

Loss of Fugro 'Intrepid' towfish

On the morning of 24 January 2016, *Fugro Discovery* was undertaking deep tow search operations in the search area. The towfish, Intrepid, was approaching an underwater feature (volcano) which rose from a seafloor depth of 3,700 m to a depth of 2,100 m, with a gradient of 20° to 30°. Intrepid collided with the side of the volcano, at a depth of 2,550 m, and separated from the tow cable.

Intrepid was successfully recovered on 3 February 2016, using a Remotely Operated Vehicle (ROV) which had been mobilised on *Havila Harmony*.

Loss of Phoenix ProSAS 60 towfish

On 21 March 2016, the tow cable became slack and communication was lost with the ProSAS 60 towfish. The depressor and towfish had separated from the tow cable in 3,600 metres of water.

Phoenix subsequently mobilised their 6000 m rated Remora III ROV on *Dong Hai Jiu 101* and on 18 April 2016 both the towfish and the depressor were recovered.

Medical evacuations

Three medical evacuations took place during 2015–16 for sick or injured crew—two on board *Fugro Discovery* and one from *Dong Hai Jiu 101*. Decisions in relation to medical evacuations are made by the doctor on board the vessel, in consultation with onshore medical advice. The crew member's welfare is always the primary consideration. Medical evacuations are undertaken when medical treatment for an illness or injury in a shore-based hospital is in the patient's best interest.

Weather

Weather severely impacted search operations during the latter stages of 2015–16. The vessels have experienced extreme weather conditions since May 2016 and sea states which at times prevented the safe launch or recovery of search systems.

Contacts of interest

As the search progresses, sonar analysts on board the vessels and ashore, identify and assess sonar 'contacts'—features or objects on the seabed that stand out from their surrounds which may require further investigation. Contacts of interest include anything that appears to be man-made or potentially exhibits characteristics of an aircraft debris field.

While various objects have been, and will continue to be, detected on the sea floor, most are related to geomorphology and none have yet fit the profile of an aircraft debris field. When a possible debris field is detected using the wide area coverage lower frequency sonar, the search operation will investigate it further using higher frequency sonar and optical imaging.

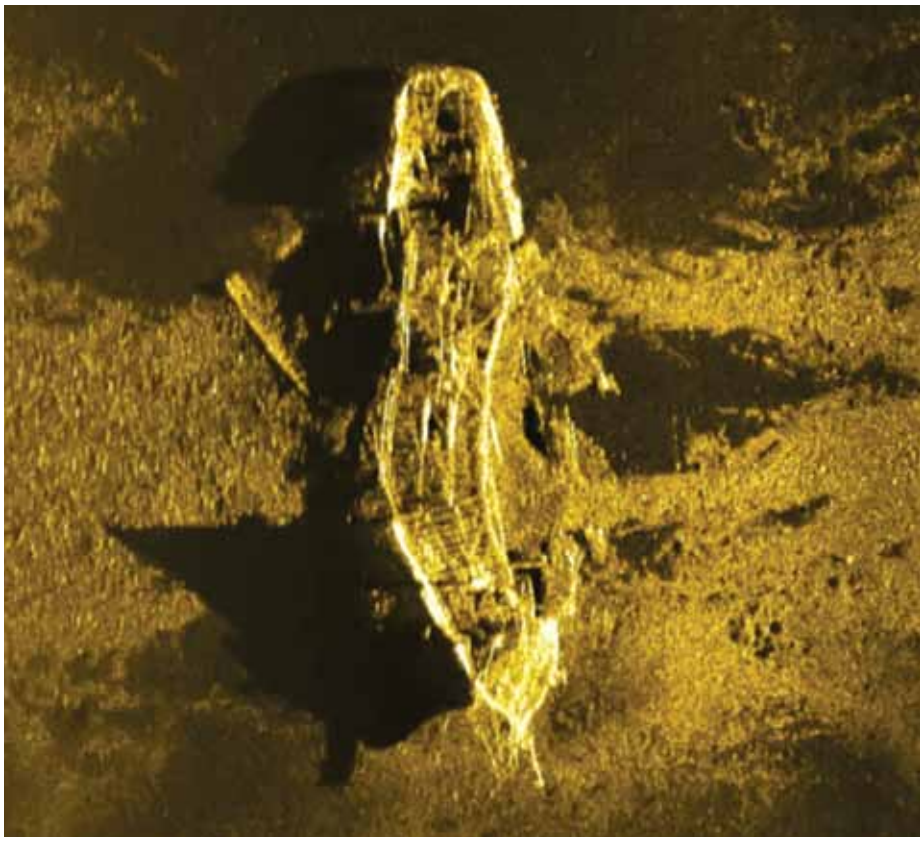
Classification 3 is assigned to sonar contacts that are of some interest as they stand out from their surroundings but have low probability of being significant to the search. The underwater search, so far, has identified more than 500 seabed features that have been categorised as classification 3.

Classification 2 sonar contacts are of more interest but are still unlikely to be significant to the search. There have been more than 40 features that have been categorised as classification 2. These objects may or may not be man-made, but expert analysis of the sonar imagery ranks them as having a low probability of being an aircraft debris field. Many of these sonar contacts have been reacquired and eliminated using the Fugro AUV or deep tow systems.

On 19 December 2015, an anomalous sonar contact was identified in the course of the underwater search as a Classification 2 contact, with analysis suggesting the object was likely to be man-made, probably a shipwreck. *Havila Harmony* was tasked with further examination of the contact using the AUV. On 2 January 2016, the AUV captured high-resolution sonar imagery of the contact, confirming that it was indeed the wreck of a ship.

The Shipwreck Galleries of the Western Australian Museum conducted a preliminary review of the sonar imagery and advised that the vessel is likely to be a steel/iron vessel dating from the turn of the 19th Century.

Figure 5: A shipwreck discovered in December 2015



Source: ATSB

Classification 1 sonar contacts are of high interest and warrant immediate further investigation. When a Classification 1 sonar contact is reported, the search vessels are instructed to gather higher resolution/high frequency sonar data flying the AUV or towfish closer to the seafloor—at an altitude of between 35 and 50 m. If the high-resolution sonar data looks promising, a photo mission is run at very low altitude—between eight and ten metres—to positively identify any objects on the seafloor. Generally, these contacts are rare, with only two marked to date. They were found to be a rock field and an old wooden shipwreck.

Discovery of aircraft debris

During the year, a number of items of aircraft debris were discovered on the shorelines of western Indian Ocean nations. Five pieces were recovered and examined—one by the French authorities and four by the ATSB. The other parts are being retrieved by the Malaysian Investigation Team for further assessment.

On 29 July 2015, a part resembling an aircraft flight control surface was found on La Réunion Island in the western Indian Ocean. The part was recovered by the French judicial authorities and examinations subsequently confirmed that it was a right flaperon (an aircraft flight control surface) from MH370. Since then, other items have been recovered in Mozambique, South Africa and Mauritius and are now considered almost certainly to be from MH370. More recently, a section of wing flap was discovered in Tanzania and is being examined by the ATSB.

Figure 6: Investigators examine a piece of aircraft debris

Source: ATSB

Apart from the flaperon, which has been retained by the French authorities, the other four parts were transported by safehand to Australia for examination.

The recovery and locations of MH370 parts are important to the aircraft search as they may provide information on the paths the parts have taken through the Indian Ocean, possibly giving information on where they originated (splash point).

Examination methods used to inform the search include:

- part identification
- marine ecology examination
- drift analysis of the parts
- failure analysis.

Part identification

It is important to initially determine whether the recovered parts are, in fact, from a Boeing 777 (B777) aircraft and the likelihood that they originated from MH370. Examinations were conducted of identifying features, part numbers, serial numbers, paint and decal details and conformity to Boeing manufacturing drawings. The results of the four parts examined by the ATSB indicate that they almost certainly came from MH370. More information on the examinations is available in the debris examination updates (AE-2014-054) on the ATSB website at **www.atsb.gov.au**

Marine ecology examinations

As the parts arrived in Australia for examination, they were first taken to the quarantine facilities at Geoscience Australia for the marine ecology to be removed and examined. All parts showed evidence of colonisation by marine ecology, however most had already been removed, likely through scavenger activity soon after beaching. The internal cabin part from Rodrigues Island contained a substantial amount of remnant ecology and barnacle attachments, with the largest individual barnacle specimen being over 20 mm in length.

The on-going marine ecology identification and examinations are being conducted by the Australian National University (ANU) in collaboration with other institutions[3] and are important to help understand where the parts travelled in the ocean. As barnacles and other organisms develop and grow, they retain indicators of the temperature and salinity of the seawater conditions in which they were growing. This information can be used, in comparison with known oceanographic data, to determine the ocean areas where the barnacles developed. While not a precise indicator, this method can give an approximate path of the floating parts through the ocean. Collaboration between French and Australian institutions is taking place on the barnacle specimens from the flaperon which is held by the French.

3 Including the Australian Museum, the Western Australian Museum, the Museum and Art Gallery of the Northern Territory and the Museum of Tropical Queensland.

Drift analysis

Another method to determine the origin of recovered aircraft parts is the drift analysis of the parts through the ocean. This work is being conducted by specialists at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and utilises the work of the Global Drifter Program, which has been monitoring drifting buoys deployed in the Indian Ocean over the last 30 years, as well as global ocean modelling based on satellite measurements. Results to date indicate that the drift patterns of the recovered parts are not inconsistent with the current search area for the aircraft. Details of the drift analysis work is available on the CSIRO website at **www.marine.csiro.au/~griffin/MH370/**

The CSIRO is undertaking further drift analysis using physical replicas of the flaperon built by ATSB. This will help measure the difference between their windage factors (drift speed and direction in relation to wind velocity) and that of Global Drifter Program drifters. The results of this work will enhance the accuracy and reliability of the drift analysis, in order to refine the understanding of the likely behaviour and paths of drifting aircraft parts.

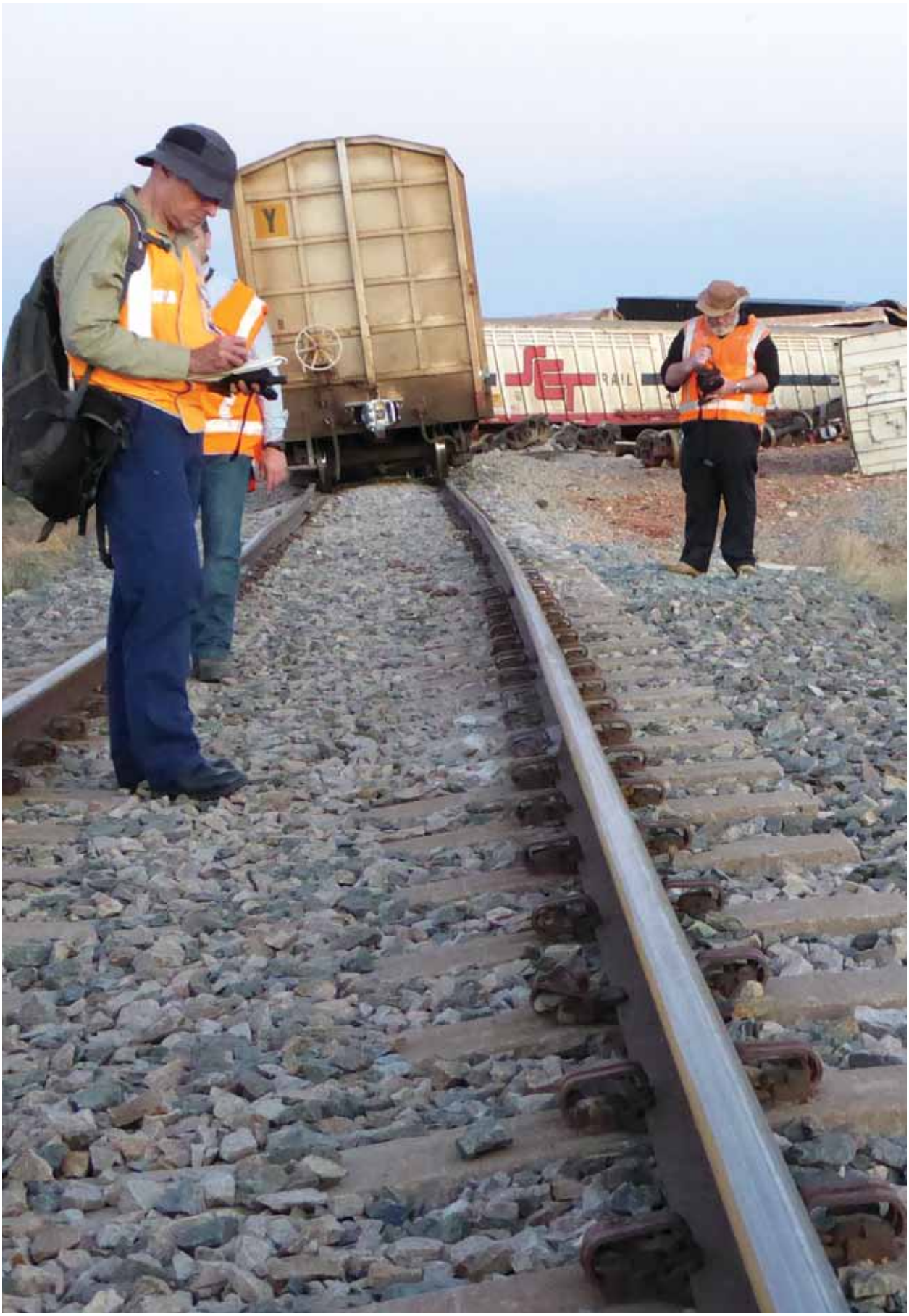
Failure analysis

Where considered of value, the recovered aircraft parts were subjected to failure analysis to determine how they failed and separated from the aircraft. The results of this work may provide indications, such as flight control positions—whether the aircraft flaps were extended or retracted at the time of failure—which may inform the end-of-flight scenarios being considered. This work is ongoing.

Recovery

In the event that the aircraft is found and is accessible, Ministers from Malaysia, Australia and the People's Republic of China have agreed to plans for recovery activities—including securing all necessary evidence for the investigation, in accordance with the requirements of Annex 13 to the Chicago Convention.

Further to the agreement by the Tripartite that Australia, through the ATSB, would be the coordinating authority for the intensified underwater search, the Tripartite also agreed that Australia, through the ATSB, would lead the recovery operations should the aircraft be positively identified. Preparations have been made so that a recovery operation can be mobilised efficiently and effectively when needed.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RAIL

SECTION 4

Significant safety investigations

This section of the Annual Report fulfils section 63A of the *Transport Safety Investigation Act 2003,* which requires the Chief Commissioner to report investigations to the Minister that were conducted during the financial year and raise significant issues about safety.

Aviation investigations

Landing below minima due to fog involving Boeing 737s, registered VH-YIR and VH-VYK, at Mildura Airport, Victoria on 18 June 2013 (AO-2013-100)

On 18 June 2013, two Boeing 737 aircraft were on scheduled flights to Adelaide, South Australia—VH-YIR operated by Virgin Australia Airlines Pty Ltd as Velocity 1384 and VH-VYK operated by Qantas Airways Ltd as Qantas 735. On nearing Adelaide, the forecast improvement in weather conditions had not occurred. As a result, both aircraft diverted to Mildura. On arrival at Mildura, the actual weather conditions were significantly different to those forecast, in particular visibility reduced by fog. Both flight crews conducted an instrument approach and landed below minima. The flight crew of Velocity 1384 landed with fuel below the fixed reserve.

The ATSB found that the weather deterioration at Adelaide had not appeared on the forecast when both aircraft departed their respective ports. Furthermore, the forecast duration of the fog in the subsequent, amended, forecast showed a clearance time which was earlier than actually occurred. This meant that Qantas 735 continued to Adelaide with the expectation that the fog would clear prior to its arrival—this did not occur. These forecasts also influenced the decision-making of the Virgin flight watch personnel, who did not pass the weather information on to the flight crew of Velocity 1384.

Regarding the weather at Mildura, the ATSB found that the deterioration was significantly worse than originally forecast. This resulted in the need for both flights to land in conditions that were below minima. The ATSB identified that both flight crew uploaded sufficient fuel for the originally-forecast conditions, in accordance with their operators' fuel policy and the Civil Aviation Safety Authority's (CASA) requirements.

The ATSB also found that in certain weather patterns and at certain locations, fog is both rare and difficult to forecast reliably.

In addition, the ATSB noted that the industry expectation for the provision of flight information services was not aligned with that provided by Airservices Australia. It was identified that, in certain circumstances, pilots would not be made aware of a deterioration in the weather at airports equipped with an Automatic Weather Information Service or other Automatic Broadcast Service. These services do not provide for the recognition and active dissemination of special weather reports (SPECI) to pilots, therefore do not meet the intent of the SPECI alerting function provided by controller-initiated flight information service.

As a result of this investigation, the ATSB issued a safety recommendation to Airservices Australia that they work in collaboration with the Bureau of Meteorology in order to instigate a system change that will reinstate the alerting function of SPECI reports—which are currently unavailable through an automatic broadcast service.

The ATSB's investigation report (AO-2013-100) is available from the ATSB website at www.atsb.gov.au

In-flight break-up involving PZL Mielec M18A Dromader, registered VH-TZJ, 37 km west of Ulladulla, New South Wales on 24 October 2013 (AO-2013-187)

This accident confirmed that even when flying within operational limits, the 'harder' and faster an aircraft is flown, the more rapidly the structure will fatigue. Also highlighted was the importance of using properly-approved maintenance instructions and referring to them when conducting maintenance.

On 24 October 2013, the pilot of a modified PZL Mielec M18A Dromader, registered VH-TZJ, was conducting a firebombing mission about 37 km west of Ulladulla, New South Wales. On approach to the target point, the left wing separated. The aircraft immediately rolled left and descended, impacting terrain. The aircraft was destroyed and the pilot was fatally injured.

The ATSB found that the left wing separated because it had been weakened by a fatigue crack in the lower attachment fitting. The fatigue crack originated at small corrosion pits in the attachment fitting. These pits formed stress concentrations that accelerated the initiation of fatigue cracks.

Figure 7: Outer section of left wing of VH-TZJ

Source: ATSB

The ATSB also found that although the aircraft manufacturer's instructions required the corrosion pits to be removed, they were not completely removed during previous maintenance. During maintenance, the wing fittings were inspected using an eddy current inspection method. This inspection method was not approved for that particular inspection and may not have been effective in detecting the crack.

Data from a series of previous flights indicated that the manner in which the aircraft was flown during its life probably accelerated the initiation and growth of the fatigue crack.

Finally, the ATSB also found a number of other factors which, although they did not contribute to the accident, had the potential to reduce the safety of operation of PZL M18 and other aircraft. These included the incorrect calculation of the flight time of M18 aircraft and a lack of robust procedures for approving non-destructive inspection procedures.

As a result of this accident, CASA revised the airworthiness directive for inspection of wing attachment fittings, to ensure that they were inspected using the magnetic particle inspection method. CASA also made, or plans to make, a number of changes to their systems and procedures to address issues identified by the ATSB's investigation.

Separately, the ATSB reminded M18 aircraft operators of the importance of the correct application of service life factors when operating at weights above the original maximum take-off weight. PZL Mielec indicated it would release additional maintenance documentation clarifying the need for removal of the wings for proper inspection of the wing attachment fittings. Finally, at the request of the owner, the supplemental type certificate for operation of the modified M18 Dromader at take-off weights up to 6,600 kg was suspended by CASA.

The ATSB's investigation report (AO-2013-187) is available from the ATSB website at www.atsb.gov.au

In-flight break-up involving de Havilland DH82A Tiger Moth, registered VH-TSG, 300 m east of South Stradbroke Island, Queensland on 16 December 2013 (AO-2013-226)

The in-flight break-up of DH82A Tiger Moth near South Stradbroke Island, Queensland, emphasises the need to fully consider the service history of a part when redesigning and manufacturing parts critical to the structural integrity of the aircraft. It also shows the importance of the regulator's role in ensuring that parts approved under an Australian Parts Manufacturer Approval (APMA) are fully considered and comply with design requirements. Further, in the context of maintenance, this in-flight break-up shows the importance of utilising genuine or approved substitute aircraft parts that are suitable for purpose—especially in sections of the aircraft that are critical to flight.

This accident also highlights how important it is for commercial vintage aircraft operators to consider the risks associated with aircraft age and to understand the originally intended use of the design before commencing their operations.

On 16 December 2013, at about 1215 EST, a de Havilland DH82A (Tiger Moth) aircraft took off on a commercial joy flight, in the Gold Coast area, from the operator's airstrip at Pimpama. A pilot and passenger were on board. At about 1224, one minute after the pilot commenced aerobatics, the left wings failed and the aircraft descended steeply impacting the water. The aircraft was destroyed and the two occupants were fatally injured.

The ATSB found that both of the aircraft's fuselage lateral tie rods, which assist in transferring flight loads through the fuselage, had fractured. The location of the fracture coincided with areas of pre-existing fatigue cracking in the threaded sections of the rods, near the join with the left wing. The tie rods fractured during an aerobatic manoeuvre, resulting in the left lower wing separating from the aircraft and the subsequent in-flight break-up. The ATSB also found that the tie rods were aftermarket-parts manufactured under an APMA. Safety issues were identified in the tie rods' design and manufacture, as well as in the supporting regulatory approval processes. Safety issues were also identified in the maintenance and operation of the aircraft.

Figure 8: VH-TSG wreckage reconstruction

Source: ATSB

The ATSB consulted with the Type Design Organisation, as well as regulators and investigation authorities from Australia, New Zealand and the United Kingdom, about the failure of the APMA tie rods. A failure that occurred well before the published retirement life for Tiger Moth tie rods. In response, the United Kingdom Civil Aviation Authority issued an airworthiness directive on 21 March 2014, that mandated the removal from service of all tie rods produced by the same

Australian manufacturer. The airworthiness directive was subsequently also mandated by CASA and the New Zealand Civil Aviation Authority. Significant additional safety action is being carried out by the Type Design Organisation to further enhance the safety of all Tiger Moth operations.

In addition, the ATSB issued a safety recommendation to CASA to take action to provide assurance that over a thousand other parts, approved for APMA at about the same time as the tie rods, were appropriately considered before approval.

The ATSB's investigation report (AO-2013-226) is available from the ATSB website at **www.atsb.gov.au**

Accredited Representative to the Dutch Safety Board investigation into the loss of Malaysia Airlines Boeing 777-200, registered 9M-MRD, near Hrabove, eastern Ukraine on 17 July 2014 (AE-2014-130)

On 17 July 2014, a Malaysia Airlines Boeing 777-200, registered 9M-MRD, en route from Amsterdam in the Netherlands to Kuala Lumpur, Malaysia, disappeared from air traffic services radar overhead the eastern Ukraine. Aircraft wreckage was identified over a large area to the south and west of the village of Hrabove, eastern Ukraine. There were no survivors.

As the occurrence took place in the Ukraine, the National Bureau of Air Accident Investigation of Ukraine (NBAAI) commenced an accident investigation, under Annex 13 to the Convention on International Civil Aviation *Aircraft Accident and Incident Investigation*, on 17 July 2014. As part of its investigation, the NBAAI requested assistance from the ATSB and, under clause 5.23 of Annex 13, the ATSB appointed an accredited representative and an adviser to the NBAAI investigation. In addition, an external investigation was initiated under the provisions of the Australian *Transport Safety Investigation Act 2003*.

The ATSB investigators departed for Kiev, Ukraine, on 21 July 2014 to participate in the NBAAI accident investigation. Subsequently, on 23 July 2014, the Ukrainian Government delegated the conduct of the investigation to the Dutch Safety Board (DSB), under clause 5.1 of Annex 13. The ATSB investigators remained in Kiev to assist the Dutch investigation before relocating with the investigation team to the DSB headquarters in the Netherlands on 1 August 2014. The ATSB investigators returned to Australia on 8 August 2014.

During the investigation, the ATSB and other accredited representatives contributed to the development of the DSB's preliminary investigation report, which was released to the public on 9 September 2014. In addition, the ATSB representative attended two investigation progress meetings in the Netherlands. The second of these meetings included an examination of the reconstruction of the aircraft from recovered wreckage, items and components.

Subsequently, and consistent with Annex 13 standards and recommended practices, the ATSB and other accredited representatives received a copy of the draft investigation report for comment. The DSB considered these, and comments from other relevant parties to the investigation, before finalising their report.

The DSB completed its investigation and, in accordance with the provisions of Annex 13, the final investigation report was published on 13 October 2015. This report, together with information on the investigation, is available from the DSB's website at **www.onderzoeksraad.nl/en**

Marine investigations

The two marine safety investigations described below identify the broad safety concerns related to marine work practices, an ATSB SafetyWatch priority. Both investigations also highlight the importance of emergency response capability in Australian ports.

Engine room fire on board *Marigold*, Port Hedland, Western Australia on 13 July 2014 (312-MO-2014-008)

On 13 July 2014, a fire started in the engine room of the bulk carrier *Marigold*, while it was loading a cargo of iron ore in Port Hedland, Western Australia.

While fighting the fire, the ship's crew activated the Halon gas fixed fire suppression system for the engine room. However, a full release of Halon gas did not occur, nor was the engine room effectively sealed. Consequently, the fire continued for about 12 hours until it burnt itself out.

The ATSB determined that the source of the fire was *Marigold*'s number one generator, where a fuel oil pipe fitting had failed. The resulting spray of fuel oil likely contacted the hot surface of the generator and ignited.

Failures within the Halon system, and multiple failures of the ventilation closing mechanisms, were indicative of a lack of effective planned maintenance on board.

The port's emergency response plan was initiated, but there were misunderstandings between the agencies involved as to their roles during the initial stages of the incident and response. Their emergency plans did not refer to trigger points for transfer of control, nor did it include detailed instructions on how to hand over control during an incident.

Figure 9: A harbour tug assisting the firefighting efforts

Source: Port Hedland Pilots

As a result of this fire, and another shipboard fire in Fremantle, Western Australia, the State Emergency Management Plan for a Marine Transport Emergency (WESTPLAN MTE) was revised and it now covers formal incident controller delegations.

Further, the WA Department of Fire and Emergency Services (DFES)—the State's hazard management agency—has initiated new 'level 1' and 'level 2' marine firefighting training programs.

The operator of the ship's berth, BHP Billiton, will now provide international shore connections at its berths to improve water supply to a ship's fire line during emergencies. Additionally, BHP Billiton has aligned its standardised response checklists with those of DFES. The emergency response plan for shipboard fires is now consistent with these checklists.

Marigold's managers have taken action to address safety issues related to the maintenance and operation of the fixed fire suppression systems, as well as the ventilation closing mechanisms.

The ATSB has issued a recommendation to the ship's managers to further address the safety issue concerning the operational status of fixed fire suppression systems. It has also issued five recommendations to DFES to address issues related to shore response to shipboard fires.

Response to a large fire on board a ship in port involves the ship's crew and shore fire crews. The initial response, and fire containment, by the ship's crew requires a thorough knowledge and understanding of firefighting procedures and systems. A knowledge which needs to be effectively maintained. Where multiple shore response agencies are involved, their emergency procedures need to be consistent with each other so that individual, and team, roles and responsibilities are well understood. This will ensure that agencies can coordinate an effective response.

The ATSB's investigation report (312-MO-2014-008) is available from the ATSB website at www.atsb.gov.au

Man overboard fatality from *Cape Splendor*, Port Hedland, Western Australia on 6 October 2014 (314-MO-2014-011)

On 6 October 2014, *Cape Splendor*'s boatswain (bosun) descended to the lower platform of the bulk carrier's accommodation ladder during his lunch break. He intended to fish from this location and asked a seaman to assist. At 1250 WST, the bosun lost his balance and fell into the sea.

The seaman immediately returned to the ship's deck and threw a lifebuoy toward the bosun, before raising the alarm. The ship's crew deployed its rescue boat within 10 minutes, and an extensive air and sea search continued for 3 days. However, the bosun was not found.

The ATSB found that the bosun, and the seaman, were not wearing any flotation devices or fall prevention equipment. The bosun had seen fish below the accommodation ladder, which was in the shade. He probably saw it as a good opportunity to fish and did not consider the risks involved. Factors such as the lack of a lifejacket, wet clothing, possible entanglement with fishing gear, sea conditions and the current would have adversely affected the bosun's ability to stay afloat and swim.

The ATSB investigation also identified that the ship's safety management system procedures for working over the ship's side were not effectively implemented. Hence, the ship's crew routinely did not take all the required safety precautions when working over the side. It was also found that the crew had differing attitudes towards taking safety precautions during work and recreation times as the safety culture on board was not well developed.

Cape Splendor's managers conducted a fleet-wide review of procedures and training, to ensure ship crews complied with procedures and permits to work, with particular emphasis on working aloft and/or over the side. A number of fleet-wide memoranda describing the accident were issued to promulgate lessons learned, encourage compliance with policies and procedures and reiterate the importance of taking safety precautions during both work and leisure periods.

Figure 10: *Cape Splendor*'s accommodation ladder

Source: ATSB

The ship's managers have prohibited fishing from ships' accommodation ladders and warning signs have been posted. Man overboard recovery procedures were reviewed and the accident was highlighted in training programs.

The ATSB has issued a safety advisory notice (SAN) to shipmasters, owners and operators to promote the importance of an effective safety culture on board ships. The SAN reinforces the importance of safety awareness at all times, during both work and recreational activities.

Any task or activity that involves a person being on a ship's accommodation ladder, or other location over the side of the ship, can result in serious or fatal injury. Therefore, precautions are critical to prevent a person from falling overboard and to improve survivability in case one does fall into the water. It is important to ensure that these precautions are always taken, regardless of whether the person is engaged in work, recreational or other activities.

The ATSB's investigation report (314-MO-2014-011) is available from the ATSB website at www.atsb.gov.au

Rail investigations

Collision between freight trains 2MP9 and 2MP1, Mile End, South Australia on 31 March 2015 (RO-2015-007)

At about 0730 (CDT) on 31 March 2015, intermodal freight train 2MP9 passed No. 1 signal at the southern end of the Mile End crossing loop. The signal was displaying a 'Calling on/Low speed' indication. The train proceeded at low speed, but subsequently collided with the rear end of intermodal freight train 2MP1, which was stationary on the main line. The collision resulted in moderate track damage and the derailment of three wagons at the rear of train 2MP1. There were no injuries to train crews.

Figure 11: Collision site near Mile End

Source: ATSB

The ATSB determined that the signalling and communications systems were operating correctly and as designed. The investigation found that the driver of train 2MP9, on receiving a 'Calling on/Low speed' signal indication, proceeded at a speed not greater than 25 km/h, but was unable to stop the train 'within half the distance the line ahead was clear'—as prescribed by the operational rules. The driver was aware that the operational rules stipulate that 'block ahead may be occupied or obstructed', but did not expect that train 2MP1 was stationary on the track so close ahead. As he approached train 2MP1, some stumpy vegetation and a low fence initially obscured his view of the empty flat wagons at the rear of the train. When the driver finally saw the rear of train 2MP1, he immediately made an emergency brake application, but was unable to stop the train before it collided with 2MP1.

The ATSB noted that the pathing of a train by a network control officer (NCO) onto a line occupied by a preceding train, when an alternate route is available and not obstructed, presents an elevated level of risk. Similarly, well thought out and clear communications between an NCO and the crew of an approaching train, as to the proximity of a train occupying the track ahead, can significantly enhance situational awareness and reduce operational risk.

The Australian Rail Track Corporation and SCT Logistics have implemented a range of proactive strategies for enhancing the safe operation of train movements, when entering an occupied section of track under a 'Proceed restricted authority'. This includes the use of all available infrastructure to reduce risk, encouraging communications between train drivers and NCOs where clarification of operational conditions is necessary and a review of the National Train Communications System for the Adelaide area.

The ATSB advised that train drivers should carefully consider their obligations when accepting a 'Calling on/Low speed' signal indication in relation to sighting constraints, train speed and occupation of the track ahead. In circumstances where sighting constraints may exist, drivers should consider requesting further information from the NCO before moving through the track ahead.

NCOs should carefully consider the pathing of trains under their control and the communication of information that may mitigate collision risk when dispatching trains.

The ATSB's investigation report (RO-2015-007) is available from the ATSB website at **www.atsb.gov.au**

Collision between track worker and passenger train at Guildford, Western Australia on 10 February 2015 (RO-2015-002)

On 10 February 2015, a Public Transport Authority (PTA) maintenance crew commenced work at Meadow Street, Guildford, Western Australia. The crew's assigned tasks included maintaining the pedestrian gates adjacent to the level crossing.

At about 1035 WST one of the track workers was struck by a Perth-bound suburban passenger train. The track worker sustained fatal injuries.

Figure 12: Meadow Street level crossing and pedestrian gate

Source: ATSB

The ATSB investigation found that the PTA maintenance workers had not implemented any form of track worker protection at the work site. This was partially due to the PTA not having documented instructions specifying the level of protection required, preferring that track workers make their own assessment based on their knowledge of the Network Rules. The ATSB found that, under these arrangements, track workers could make an incorrect assessment, placing themselves at a greater risk of being struck by a train.

A review of the safeworking training provided to the track workers found that the training material did provide a suitable level of safeworking knowledge.

Following the occurrence, the toxicology report on the deceased track worker identified the presence of amphetamine and methamphetamine—methamphetamine being a prescribed drug under the Rail Safety Regulations 2011. The use of stimulants such as methamphetamine is associated with a range of neurocognitive effects in humans that may affect performance.

The ATSB found that in this instance, the presence of a prescribed drug within the worker's system appeared to be a relatively isolated case. An examination of the company's drug and alcohol policy and procedures found them to be generally effective in managing drugs and alcohol in the workplace.

The PTA issued a safety alert following the incident, to highlight the importance of implementing the correct level of track worker protection. The subsequent introduction of new safeworking rules, track access accreditation levels and training further supported this.

Further, the PTA has created the role of Workplace Trainer and Assessor with the task of ensuring track workers comply with the network rules, by way of competency-based assessments. Implementation of a new track access accreditation system, with improved training and job mentoring, has also commenced.

The ATSB advised that this incident strongly emphasises the need for rail transport operators to provide clear and concise work instructions to employees working within the railway corridor. It also highlights the potential for recreational and other drug use to impair performance and affect workplace safety.

The ATSB's investigation report (RO-2015-002) is available from the ATSB website at www.atsb.gov.au

Fatality at Heyington Railway Station, Toorak, Victoria on 22 February 2014 (RO-2014-005)

At about 2355 AEDT on 22 February 2014, an 18-year-old male was fatally injured at Heyington Railway Station in Toorak, Victoria, when he fell between a moving train and the platform. He was running alongside the moving train when he fell in an attempt to board it while passengers inside the train were forcibly holding the carriage doors open.

The train was equipped with a traction interlocking device to prevent the train from moving while its carriage doors were open. The device, as designed, deactivated after a period of time and allowed the train to depart with the doors held open.

Due to the curvature of the track, a wide gap existed between the mid-body of the carriage and the platform.

Figure 13: Heyington Railway Station

Source: Chief Investigator, Transport Safety (Vic)

Metro Trains Melbourne (MTM) has commenced a risk review of the door open traction interlock timing on their rolling stock.

In order to minimise the gap between the train and platform, MTM has realigned the track at Heyington railway station and a rubber finger coping has been installed along the entire edge of the platform face. Further, a barrier has been constructed at the platform entrance to deter passengers from running for the train.

MTM has also completed a survey of all the stations to identify curved track and platforms of higher risk. In the short term these platforms have had 'Mind the Gap' signs painted on them. Announcements are also made to warn passengers of the gap. Works plans have been developed to institute further risk measures in the long term.

The ATSB advised that rail operators should ensure that safety systems fitted to passenger trains are designed and operated to ensure the safety of patrons in the event of interference with the normal operation of train doors.

The ATSB's investigation report (RO-2014-005) is available from the ATSB website at **www.atsb.gov.au**

Derailment of Sydney Trains passenger train 602M near Edgecliff station, Sydney, New South Wales on 15 January 2014 (RO-2014-001)

At about 1654 AEDT on 15 January 2014, a Sydney Trains service made up of two four-carriage Tangara electric multiple units, entered the underground section of the Eastern Suburbs Line, under Sydney city centre, heading towards its destination, Bondi Junction. Some smoke and a burning smell were apparent, emanating from the train at Central Station and at all subsequent stations to Bondi Junction. A number of station and train crewing staff were aware of this, but the condition was not reported to the appropriate network control officer, as required under Sydney Trains' Network Rules and Procedures.

The train terminated at Bondi Junction, where a different driver took control before it departed on its return journey. It then travelled to the next station, Edgecliff. Shortly after departure from Edgecliff, at 1726, the lead bogie of the third carriage derailed due to a broken axle. A piece of angle iron, which became dislodged from the track infrastructure, penetrated the floor of the third carriage and entered a space occupied by passengers.

Figure 14: Derailed bogie on train 602M

Source: Office of Transport Safety Investigations (NSW)

The ATSB found that an unauthorised, non-standard, repair had been carried out on the axle in December 1998, or January 1999, which introduced stress initiators. This caused a crack to develop which, over time, propagated to the extent that the axle failed in service.

It was also determined that a number of organisational factors contributed to the incident. Examples of poor communication, and lack of adherence to procedures and reporting lines, led to the train's continued service and subsequent derailing.

Sydney Trains, along with their maintenance contractors, undertook an archival document search and determined that seven axles, including the failed axle, had been repaired in the same way. All were immediately removed from service.

Sydney Trains, after conducting its own investigation into the circumstances surrounding the incident, produced a number of safety recommendations which they are considering through their own Safety Action Management procedures.

The ATSB advised that rail operators should ensure maintenance procedures are followed and that non-standard repairs comply strictly with an approved variation and do not introduce new risks to operations.

Also, rail operators should review their internal training, and communication pathways, both within and between business units/operational areas, to ensure that critical communication can occur in line with best current Rail Resource Management principles.

The ATSB's investigation report (RO-2014-001) is available from the ATSB website at **www.atsb.gov.au**


ATSB


Canon

SECTION 5

Formal safety issues and actions

This section reports on the formal safety issues and actions issued by the ATSB in 2015–16 and their current status.

ATSB investigations primarily improve transport safety by identifying and addressing safety issues. Safety issues are events or conditions that increase safety risk and:

- can reasonably be regarded as having the potential to adversely affect the safety of future operations, and
- are characteristics of an organisation or a system, rather than of a specific individual, or operational environment at a specific point in time.

Safety issues will usually refer to an organisation's risk controls, or to a variety of internal and external organisational influences that impact the effectiveness of its risk controls. They are factors for which an organisation has some level of control and responsibility and, if not addressed, will increase the risk of future accidents.

The ATSB prefers to encourage stakeholders to take proactive safety action to address safety issues identified in its reports. Nevertheless, the ATSB may use its powers under the TSI Act to make a formal safety recommendation either during or at the end of an investigation—depending on the level of risk associated with a safety issue and the extent of corrective action already taken.

When safety recommendations are issued, they clearly describe the safety issue of concern—they do not provide instructions or opinions on a preferred corrective action. Like equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the organsiation to which an ATSB recommendation is directed to assess the costs and benefits of any means of addressing a safety issue and act appropriately.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue a Safety Advisory Notice (SAN) suggesting that an organisation, or an industry sector, consider a safety issue and take appropriate action. There is no requirement for a formal response to a SAN.

Safety issues are broadly classified in terms of their level of risk:

- **critical safety issue**—associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation unless corrective safety action has already been taken
- **other safety issue**—associated with a risk level regarded as unacceptable unless it is kept as low as reasonably practicable. Where there is a reasonable expectation that safety action could be taken in response to reduce risk, the ATSB will issue a safety recommendation to the appropriate agency when proactive safety action is not forthcoming.

All ATSB safety issues and associated safety actions, along with the most recent status, are published on the ATSB website for all investigation reports released since July 2010.

Safety issues identified through ATSB investigations

All safety issues are risk assessed by the ATSB. In 2015–16, the ATSB identified the following number of safety issues.

Table 5: Number of safety issues identified in 2015–16

SAFETY ISSUE RISK	AVIATION	MARINE	RAIL	TOTAL
CRITICAL	0	0	0	0
OTHER	32	23	30	85
Total	**32**	**23**	**30**	**85**

Safety action is sought to address any safety issues when proactive safety action is not forthcoming. Once safety action has been undertaken, the ATSB conducts another risk assessment of the safety issue. When the post-action risk assessment results in either an acceptable level of risk or a risk as low as reasonably practicable, the safety issue status is categorised as 'adequately addressed'.

The Portfolio Budget Statements (PBS) specify, as two of the ATSB's key performance indicators (KPIs), that:

- safety action is taken by stakeholders to address 100 per cent of critical safety issues identified
- safety action is taken by stakeholders to address 70 per cent of all other safety issues identified.

KPI status of safety issues identified in 2015–16

There were no critical risk safety issues identified through ATSB investigations in 2015–16.

The breakdown of other safety issues, by transport mode, is summarised in the following table:

Table 6: Status of safety issues identified in 2015–16

STATUS OF SAFETY ISSUES	AVIATION	MARINE	RAIL	PER CENT
Adequately addressed	24	15	19	68%
Partially addressed	0	3	0	4%
Not addressed	0	0	0	0%
No longer relevant	0	0	1	1%
Safety action still pending	8	5	10	27%
Total	**32**	**23**	**30**	**100%**

Reponses to safety issues identified in 2015–16

The tables below document each safety issue identified in 2015–16 and its current status assigned by the ATSB, along with the justification for that status.

Table 7: Aviation—Responses to safety issues identified in 2015–16

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2012-120 Operational non-compliance involving Boeing 747, N409MC, 11 km ESE Melbourne Airport, Victoria, 9 September 2012		
AO-2012-120-SI-01: Unlike other Australian standard arrival routes that included a visual segment, the visual approach to runway 34 at Melbourne via the SHEED waypoint could be issued to super or heavy jet aircraft operated by foreign operators, despite there being more safety occurrences involving the SHEED waypoint than other comparable approaches.	Adequately addressed	The ATSB is satisfied that the action taken by Airservices Australia to issue a local instruction and the amendment of the Manual of Air Traffic Services in March 2016 has eliminated the risk associated with the safety issue.
AO-2012-120-SI-02: The LIZZI FIVE RWY 34 VICTOR ARRIVAL required a 3.5° descent profile after passing the SHEED waypoint for visual approach to runway 34 at Melbourne, increasing the risk of an unstable approach.	Adequately addressed	The ATSB is satisfied that the action taken by the Civil Aviation Safety Authority in reviewing the approach design, in conjunction with the amendment of the Manual of Air Traffic Services in March 2016 (AO-2012-120-NSA-050) has eliminated the risk associated with the safety issue.
AO-2013-047 Flight path management and ground proximity warning involving Airbus A330-202 VH-EBV 15 km NNE of Melbourne Airport, Victoria, 8 March 2013		
AO-2013-047-SI-01: Qantas provided limited guidance on the conduct of a visual approach and the associated briefing required to enable the flight crew to have a shared understanding of the intended approach.	Adequately addressed	The ATSB is satisfied that the safety action by Qantas to enhance guidance on the conduct of visual approaches adequately addresses this safety issue.
AO-2013-095 Flight path management occurrence involving Boeing 737, VH-YIR, Sydney Airport, New South Wales, 4 June 2013		
AO-2013-095-SI-01: The Virgin Australia procedures did not require its flight crew to, whenever practicable, announce flight mode changes.	Adequately addressed	The ATSB is satisfied that the change in policy requiring the announcement of flight mode changes has adequately addressed the safety issue.

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2013-095-SI-02: Air traffic control did not, and was not required to, provide traffic information to aircraft using adjacent runways and abeam each other during independent visual approach procedures at Sydney.	Adequately addressed	The ATSB is satisfied that the safety action implemented by Airservices Australia for Sydney air traffic control to provide traffic advice to pilots whenever aircraft operate within 1 NM of traffic on the adjacent final approach during independent visual approach procedures has adequately addressed the safety issue.
AO-2013-100 Landing below minima due to fog involving B737s VH-YIR and VH-VYK, Mildura Airport, Victoria, 18 June 2013		
AO-2013-100-SI-02: The automatic broadcast services do not have the capacity to recognise and actively disseminate special weather reports (SPECI) to pilots, thereby not meeting the intent of the SPECI alerting function provided by controller-initiated flight information service.	Safety action still pending	
AO-2013-130 Descent below approach path involving Boeing 777, VH-VPF Melbourne Airport, Victoria, 15 August 2013		
AO-2013-130-SI-01: The presentation of the runway 34 visual approach procedure in the operator's Route and Airport Information Manual increased the risk of the runway threshold crossing altitude being entered into the runway extension waypoint without being detected.	Adequately addressed	The ATSB is satisfied that the safety action by the operator to discontinue the use of the SHEED approach to runway 34 at Melbourne by its Boeing 777 crews minimises the risk associated with the safety issue.
AO-2013-160 Loss of separation involving a Beechcraft B300, VH-FIZ and a formation of four Boeing FA/18 aircraft, near Williamtown, New South Wales, 19 September 2013		
AO-2013-160-SI-01: The applicability (for the Department of Defence air traffic services) of a general requirement to conduct aviation risk assessments for complex, new, unusual or irregular activities was open to interpretation.	Adequately addressed	Changes made to the Department of Defence aviation risk management instructions have clarified those activities that require a review of risk assessments.

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2013-172 Engine shut down in-flight, Airbus A330-302, B-18358, 887 km ENE of Darwin, Northern Territory, 3 October 2013		
AO-2013-172-SI-01: Debris originating from the starter failure was not contained by the starter casing and severed the number one engine Bsump oil scavenge pipe.	Adequately addressed	The action taken with regards to the change in design will eliminate those air turbine starter failures associated with single pawl and ratchet crash engagements, however, it will not completely eliminate failures (contained or otherwise) from all causes. Nevertheless, as a result of these safety actions, the ATSB is satisfied that the likelihood and consequence associated with these starter failures will remain low.
AO-2013-187 In-flight break-up involving modified PZL Mielec M18A Dromader, VH TZJ, 37 km west of Ulladulla, New South Wales, 24 October 2013		
AO-2013-187-SI-01: Operators of some Australian M18 Dromaders, particularly those fitted with turbine engines and enlarged hoppers and those operating under Australian supplemental type certificate (STC) SVA521, have probably conducted flights at weights for which airframe life factoring was required but not applied. The result is that some of these aircraft could be close to or have exceeded their prescribed airframe life, increasing the risk of an in-flight failure of the aircraft's structure.	Adequately addressed	The ATSB considers that the Civil Aviation Safety Authority has taken all reasonable steps to alert operators of M18 aircraft of the requirement to correctly calculate and record all flight times that have service life factors applicable to them.
AO-2013-187-SI-02: Although wing removal was necessary to provide adequate access for effective visual and magnetic particle inspections of M18 wing attachment fittings, the aircraft manufacturer's service bulletin E/02.170/2000 allowed the wings to remain attached during these inspections.	Adequately addressed	The improved clarity for operators/ maintainers in Service Letter M19/034/2016 should significantly reduce the likelihood, and therefore risk, of an organisation attempting to develop a system whereby the wings are not removed and an inappropriate inspection method used.
AO-2013-187-SI-03: The eddy current inspection used on VH-TZJ, and other M18 aircraft, had not been approved by the Civil Aviation Safety Authority as an alternate means of compliance to airworthiness directive AD/PZL/5. This exposed those aircraft to an inspection method that was potentially ineffective at detecting cracks in the wing attachment fittings.	Adequately addressed	The ATSB is satisfied that the actions taken by the Civil Aviation Safety Authority, involving amendments to airworthiness directive AD/PZL/5, address the safety risk associated with this issue.

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2013-187-SI-04: Operation of M18 aircraft with a more severe flight load spectrum results in greater fatigue damage than anticipated by the manufacturer when determining the service life of the M18. If not properly accounted for, the existing service life limit, and particular inspection intervals, may not provide the intended level of safety.	Adequately addressed	At the time of publishing this report, there were 12 registered operators of PZL M18 aircraft on the Australian Civil Register. The ATSB has sent a copy of this report to each of those operators to alert them of this safety issue.
AO-2013-187-SI-06: The documented procedure for eddy current inspection of M18 wing attachment fittings did not assure repeatable, reliable inspections.	Adequately addressed	As a result of the actions taken by the Civil Aviation Safety Authority in response to AO-2013-187-SI-03, the eddy current inspection procedure is explicitly prohibited from use. This action has minimised the safety risk associated with this safety issue.
AO-2013-187-SI-07: Important information relating to Civil Aviation Safety Authority (CASA) airworthiness directive AD/PZL/5 was not contained in CASA's airworthiness directive file, but on other CASA files with no cross-referencing between those files. This impacted CASA's future ability to reliably discover that information and make appropriately informed decisions regarding the airworthiness directive.	Adequately addressed	A search of the ATSB occurrence database identified no occurrences where separate, non-referenced AD files were found to have contributed to the occurrence. The ATSB considers that although some risk remains, it is as low as reasonably practicable.
AO-2013-187-SI-08: The Civil Aviation Safety Authority did not have a defined process for a robust, systematic approach to the assessment and approval of alternative non-destructive inspection procedures to ensure that the proposed method provided an equivalent, or better, level of safety than the original procedure.	Safety action still pending	
AO-2013-187-SI-09: The engineering justification package supporting Australian supplemental type certificate SVA521 did not contain consideration of the effect an increase in the average operating speed could have on the rate of fatigue damage accumulation.	Adequately addressed	The cancellation of supplemental type certificate SVA521 will prevent its operational use, thereby addressing the safety issue.

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2013-226 Air data system failure involving Airbus A330-243, A6-EYJ near Brisbane Airport Queensland, 21 November 2013		
AO-2013-212-SI-01: The relevant tasks in the trouble shooting manual did not specifically identify the pitot probe as a potential source of airspeed indication failure.	Adequately addressed	The actions taken by Airbus to modify the trouble shooting manual significantly reduce the risk of pitot probe related problems remaining undetected during investigation of airspeed loss or discrepancy events.
AO-2013-226 In-flight break-up involving de Havilland DH 82A Tiger Moth, VH-TSG, 300 m east of South Stradbroke Island, Queensland, 16 December 2013		
AO-2013-226-SI-01: The two JRA-776-1 tie rods fitted to VH-TSG had significant pre-existing fatigue cracks in the threaded sections.	Adequately addressed	The safety action by the UK Civil Aviation Authority, which was automatically mandated by the Civil Aviation Safety Authority and the Civil Aviation Authority of New Zealand, minimises the safety risk associated with this safety issue. Since the release of safety issue AO-2013-226-SI-01, the ATSB has, as a result of its investigation, a clearer understanding of the development, manufacture, installation and use of the JRA-776-1 fuselage lateral tie rods. This has resulted in the identification of a number of additional safety issues that present a risk to the operation of all DH82 or DH82A Tiger Moth aircraft fitted with these tie rods. Safety actions taken to address the identified risks follow (see safety issues AO-2013-226-SI-04, AO-2013-226-SI-05, AO-2013-226-SI-07 and AO-2013-226-SI-02).
AO-2013-226-SI-02: The manufacturer's quality system did not prevent non-conforming tie rods from being released for use on aircraft.	Adequately addressed	As a result of the safety action taken by the United Kingdom Civil Aviation Authority, New Zealand Civil Aviation Authority and the Civil Aviation Safety Authority in response to safety issue AO2013-226-SI-01, all JRA-776-1 tie rods were removed from service. This action minimises the safety risk associated with this safety issue.
AO-2013-226-SI-03: Together with a number of other Australian Tiger Moths, VH-TSG was fitted with non-standard Joint H attachment bolts that did not conform to the original design with the result that the integrity of the Joint H could not be assured.	Safety action still pending	

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2013-226-SI-04: When approving the change in material for the manufacture of the replacement tie rods, the design engineer did not identify that the original parts had a life limitation, or that they had shown susceptibility to fatigue cracking. As a result, the engineer did not compare the fatigue performance of the alternative design to the original, and the replacement tie rods were manufactured to that design and released into service with an unknown fatigue life.	Adequately addressed	As a result of the safety action taken by the United Kingdom Civil Aviation Authority, New Zealand Civil Aviation Authority and the Civil Aviation Safety Authority in response to safety issue AO2013-226-SI-01, all JRA-776-1 tie rods were removed from service. This action minimises the safety risk associated with this safety issue.
AO-2013-226-SI-05: The JRA-776-1 fuselage lateral tie rods that were inspected by the ATSB were not appropriately marked with part and serial numbers, affecting the traceability and service history of the parts in a number of aircraft.	Adequately addressed	As a result of the safety action taken by the United Kingdom Civil Aviation Authority, New Zealand Civil Aviation Authority and the Civil Aviation Safety Authority in response to safety issue AO2013-226-SI-01, all JRA-776-1 tie rods were removed from service. This action minimises the safety risk associated with this safety issue.
AO-2013-226-SI-06: It was likely that, because of the Civil Aviation Safety Authority's policy at the time, their engineering assessment of the tie rod design, for inclusion in the manufacturer's Australian Parts Manufacturer Approval, did not consider the service history of the original tie rods or identify that they were subject to airworthiness directive AD/DH 82/10. Consequently, the assessment team was likely unaware that the original tie rods were subject to a life limitation, and did not require the life limits for the replacement tie rods to be established.	Adequately addressed	As a result of the safety action taken by the United Kingdom Civil Aviation Authority, New Zealand Civil Aviation Authority and CASA in response to safety issue AO-2013-226-SI-01, all JRA-776-1 tie rods were removed from service. This action minimises the safety risk associated with this safety issue.
AO-2013-226-SI-07: Over 1,000 parts were approved by the Civil Aviation Safety Authority, for Australian Parts Manufacturer Approval, using a policy that accepted existing design approvals without the authority confirming that important service factors, such as service history and life-limits, were appropriately considered.	Safety action still pending	

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2013-226-SI-08: Although a number of aerobatic manoeuvres were permitted in Tiger Moth aircraft, there was no limitation on the amount of aerobatic operations that was considered to be safe. As a result, operators may be unaware that a high aerobatic usage may exceed the original design assumptions for the aircraft.	Safety action still pending	
AO-2014-028 Runway excursion involving a Fairchild Metro 23, VH-UUB at Portland, Victoria, 20 February 2014		
AO-2014-028-SI-01: The maintenance program for the aircraft's landing gear did not adequately provide for the detection of corrosion and cracking in the yoke lug bore.	Adequately addressed	Awareness of the issue has been raised by the Civil Aviation Safety Authority and the type certificate holder has improved component maintenance such that the issue should not reoccur without an additional contributing factor.
AO-2014-074 Loss of separation involving Airbus A330, 9V-STQ and Airbus A320, VH-VFH near Tindal, Northern Territory, 24 April 2014		
AO-2014-074-SI-01: The utilisation of shift sharing practices for the Tops controllers resulted in them sustaining a higher workload over extended periods without a break, during a time of day known to reduce performance capability.	Safety action still pending	
AO-2014-074-SI-02: Airservices Australia had not provided en route air traffic controllers with effective simulator-based refresher training in identifying and responding to compromised separation scenarios, at intervals appropriate to ensure that controllers maintained effective practical skills.	Adequately addressed	The ATSB is satisfied that this safety action by Airservices Australia in respect of its compromised separation recovery training satisfactorily addresses the safety issue.
AO-2014-114 Loss of control and collision with terrain involving de Havilland Canada DHC-1 Chipmunk, VHUPD, Coffs Harbour, New South Wales, 29 June 2014		
AO-2014-114-SI-01: The spin recovery methods taught by the flying school were inconsistent across instructors and training material, and were not always appropriate for the Chipmunk aircraft type used by the school.	Adequately addressed	The ATSB is satisfied that the actions taken by the flying school to standardise its instructors adequately addresses this safety issue.

Aviation—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
AO-2014-162 Data entry error and tailstrike involving a Boeing 737, VH-VZR, Sydney Airport, New South Wales, 1 August 2014		
AO-2014-162-SI-01: The Flight Crew Operating Manual procedure for crew comparison of the calculated Vref40 speed, while designed to assist in identifying a data entry error, could be misinterpreted thereby negating the effectiveness of the check.	Adequately addressed	The action by Qantas Airways provides an additional defence to address the risk associated with the safety issue. It does this by directing the crew's attention to the APPROACH REF page in order to verify the Vref40 speed.
AO-2014-163 Collision with terrain involving One Design DR-107 VH-EGT, near Goolwa South Australia, 10 October 2014		
AO-2014-163-SI-01: The Civil Aviation Safety Authority did not require builders of amateurbuilt experimental aircraft to produce a flight manual, or equivalent, for their aircraft following flight testing. Without a flight manual the builder, other pilots and subsequent owners do not have reference to operational and performance data necessary to safely operate the aircraft.	Safety action still pending	
AR-2013-107 Engine failures and malfunctions in light aeroplanes: 2009 to 2014		
AR-2013-107-SI-01: Thicker 7/16 inch diameter through-bolts, fitted to newer Jabiru engines and some retro-fitted engines, have had limited service to date to confirm early indications that they reduce this risk. Retro-fitting engines with thicker through-bolts has only been recommended for aircraft involved in flight training by JSB031 issue 3. Most light aircraft in service with Jabiru engines continue to use 3/8 inch diameter engine through-bolts which, even after upgrades in accordance with Jabiru service bulletins JSB031 issues 1 and 2, remain at an elevated risk of fracturing within the service life of the bolt, leading to an engine failure or malfunction in flight.	Safety action still pending	

Table 8: Marine—Responses to safety issues identified in 2015–16

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
MO-2014-003 Anchor dragging and contact between ships, Fremantle anchorage, 8 May 2014		
MO-2014-003-SI-01: The poor condition of Royal Pescadores' anchoring equipment was indicative of inadequate maintenance. The shipboard management team were not aware of the equipment's maintenance history, nor able to provide relevant documents from the ship's planned maintenance system.	Adequately addressed	The ATSB considers that the proactive safety action taken by the ship's managers will adequately address this safety issue.
MO-2014-003-SI-02: The International Association of Classification Societies (IACS) recommendation for having a means of slipping the anchor cable bitter outside the chain locker had not been provided on board Royal Pescadores. Further, the ship's classification society, ClassNK, does not consider that the IACS recommended slipping arrangement is necessary for reducing safety risk.	Partially addressed	Proactive safety action has been undertaken by Shih Wei Navigation and the ATSB has issued safety advisory notice MO-2014-003-SAN-020.
MO-2014-003-SI-03: While the Fremantle vessel traffic service (VTS) operational procedures were aimed at having precautionary measures in place for adverse weather conditions, the triggers specified in the procedures only referred to Bureau of Meteorology (BoM) issued severe weather and gale warnings. As no wind speed limits were specified, the gale force winds recorded throughout the early hours of 8 May did not trigger the procedural responses until 0600, after the receipt of BoM-issued warnings.	Adequately addressed	The ATSB considers that the proactive safety action taken by Fremantle Port Authority will adequately address this safety issue.
MO-2014-006 Collision between *Kota Wajar* and the yacht *Blazing Keel*, Moreton Bay, Queensland, 6 July 2014		
MO-2014-006-SI-01: *Kota Wajar*'s safety management system procedures with regard to posting a dedicated lookout were not effectively implemented.	Adequately addressed	Pacific International Lines, Singapore (PIL) has taken adequate proactive safety action. The action includes an enhanced master-pilot exchange checklist and focused audits to monitor and verify compliance with navigational procedures.

Marine—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
MO-2014-006-SI-02: Brisbane Marine Pilots' standard passage plan and master-pilot exchange did not ensure that a ship's bridge team is provided adequate information with respect to local traffic and areas where attention must be paid to other vessels, including small craft.	Adequately addressed	Proactive safety action taken by Brisbane Marine Pilots (BMP). The action taken and proposed by BMP includes amending its standard passage plan, enhancing the master-pilot exchange process and reviewing and amending its pre-arrival information for ship masters.
MO-2014-006-SI-03: Over the past 26 years, investigations into 41 collisions between trading ships and small vessels on the Australian coast have identified that not maintaining a proper lookout and taking early avoiding action, in accordance with the collision regulations, has been a consistent and continuing contributor to such collisions.	Partially addressed	The ATSB has issued a safety advisory notice as a broad safety message to again reiterate the importance of keeping a proper lookout and taking early action to avoid collision between trading ships and small vessels.
MO-2014-008 Engine room fire on board the bulk carrier *Marigold*, Port Hedland, WA, 13 July 2014		
MO-2014-008-SI-01: A number of *Marigold*'s engine room fire doors were held open by wire and/or rope. The open doors allowed smoke to spread across the engine room and into the accommodation spaces.	Adequately addressed	Proactive safety action taken by Korea Leading Company of Ship Management (KLCSM), includes: signage on all fire doors requiring the doors to be closed; company's superintendents will inspect each ship for compliance with this procedure and the condition of each fire door; all crewmembers across the fleet will be trained in fire prevention and response. The safety actions taken should reduce the risk of fire doors been held open.
MO-2014-008-SI-02: The maintenance of the opening/closing arrangements for *Marigold*'s engine room fire dampers, ventilators and other openings was inadequate. A number of these could not be closed, resulting in the inability to seal the engine room to contain and suppress the fire.	Adequately addressed	Proactive safety action taken by KLCSM includes: resources committed to inspect all fire dampers and ventilators on board its ships to identify defects and the condition of each damper/ventilator and any defective equipment will be repaired or replaced; the planned maintenance system amended with enhanced checks for opening and closing mechanisms of ventilators and dampers; focused training on fixed fire extinguishing systems to all crewmembers across its fleet.

Marine—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
MO-2014-008-SI-03: *Marigold*'s Halon gas fixed fire suppression system for the engine room was not fully operational—probably as a result of inadequate maintenance. The multiple failures of the system, at the time of the fire, were not consistent with proper maintenance and testing.	Safety action still pending	Proactive safety action has been undertaken by KLCSM by amended checks and increased frequency for inspecting the main distribution valves. However, the ATSB recommends KLCSM take further action as detailed in the recommendation MO-2014-008-SR-035.
MO-2014-008-SI-04: *Marigold*'s shipboard procedures associated with crew induction, familiarisation, fire drills and safety training were not effectively implemented. As a result, the ship's senior officers were not sufficiently familiar with the Halon system's operation. They did not identify its partial failure and did not activate the override function.	Adequately addressed	Proactive safety action taken by KLCSM includes focused training on fixed fire extinguishing systems to all crewmembers across its fleet.
MO-2014-008-SI-05: Port Hedland's emergency response teams did not use the ship's international shore fire connection. As a result *Marigold*'s fire main was not pressurised with water from ashore.	Safety action still pending	Proactive safety action has been undertaken by BHP Billiton by ordering international shore fire connections. However, the ATSB recommends the DFES take further action as detailed in the recommendation MO-2014-008-SR-037.
MO-2014-008-SI-06: The emergency response plans for a ship fire in Port Hedland did not clearly define transfer of control procedures for successive incident controllers from different organisations or contain standard checklists for their use.	Safety action still pending	BHP Billiton are aligning their checklists with DFES and the WESTPLAN Maritime Transport Emergency (MTE) has recently been rewritten. However, the ATSB recommends DFES take action as detailed in the recommendation MO-2014-008-SR-040.
MO-2014-008-SI-07: Suitable atmospheric testing equipment was not available in Port Hedland to ensure safe entry to fire-affected spaces on board *Marigold*. Access to these areas was not controlled until 53 hours after the fire.	Safety action still pending	
MO-2014-008-SI-08: The limited professional firefighting capability in Port Hedland restricted the ability to launch an effective response to the fire on board *Marigold*.	Safety action still pending	
MO-2014-008-SI-09: The large size and weight of the ship firefighting cache made it difficult for the duty Port Hedland volunteer firefighter to transport it to the wharf.	Safety action still pending	

Marine—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
MO-2014-009 Breakaway of the *Grand Pioneer* and *AAL Fremantle* at Fremantle, WA, 17 August 2014		
MO-2014-009-SI-01: Fremantle Ports' assessment of risks associated with a ship contacting the Fremantle Rail Bridge as a result of a breakaway (particularly from berths 11 and 12) was limited. Preventing a breakaway from berths, where the wind was likely to be on a ship's beam, had not been considered. Similarly, the impediments to assisting a ship near Wongara Shoal after a breakaway had not been assessed.	Adequately addressed	Fremantle Ports' safety action adequately reduces the possibility of a ship breaking away from the port's inner harbour berths.
MO-2014-009-SI-02: The Bureau of Meteorology (BoM) marine forecast title of 'strong wind warning' understated the 'damaging winds' expected during the 'severe thunderstorm'. The forecast did not use recognised marine weather terms for wind speed, such as 'gale force'.	Adequately addressed	The undertaking by BoM to use standard terminology in marine weather forecasts should prevent a forecast being misunderstood. The formal consultative forums will also help in this regard while continuing to improve BoM's product delivery and meeting the needs of the end users of its forecasts and warnings.
MO-2014-009-SI-03: Fremantle Ports' procedures for adverse weather were not adequate for weather that could reasonably be expected to occur. Some procedures could not be reasonably implemented and others were not monitored for compliance.	Adequately addressed	Fremantle Ports' safety action includes procedures, systems and equipment that will allow it to better manage adverse weather events.
MO-2014-009-SI-04: Fremantle Ports' staff did not understand the significance of some wind and weather terminology used in the BoM forecast. Consequently, port procedures triggered by a BoM 'gale' or 'severe weather' warning, such as preparing the tugs and calling the harbour master, were not followed.	Adequately addressed	Fremantle Ports' revised procedures, in combination with the new weather information system and equipment, will allow the port to better manage adverse weather events.
MO-2014-011 Man overboard fatality from *Cape Splendor*, Port Hedland, WA, 6 October 2014		
MO-2014-011-SI-01: *Cape Splendor*'s safety management system (SMS) procedures for working over the side of the ship were not effectively implemented. As a result, the ship's crew routinely did not take all the required safety precautions when working over the side. Further, they did not consider that any such precautions were necessary if going over the side when not working.	Adequately addressed	The safety action taken should reduce the risk of a similar accident and assist in improving the safety culture on U-Ming Marine Transport ships. The action should better assist the effective implementation of SMS procedures for working over the side and/or at heights, including safe practices during recreational activities.

Marine—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
MO-2014-011-SI-02: The safety culture on board *Cape Splendor* was not well developed and the ship's managers had identified it as such. A consequence of this inadequacy was the ineffective implementation of working over the side procedures, including the general belief by its crew that safe work practices applied only when working, and not during recreational activities.	Adequately addressed	U-Ming Marine Transport has identified the importance of continuing to develop the safety culture on board its ships and across the organisation. This has been promulgated across its fleet through safety circulars and the internal auditing system, which will support a positive safety culture to develop over time. The ATSB has issued the safety advisory notice, MO-2014-011-SAN-024, to promulgate this safety issue more broadly across industry.
MO-2014-012 Fire on board the livestock carrier *Ocean Drover*, Fremantle, WA, 9 October 2014		
MO-2014-012-SI-01: *Ocean Drover*'s bridge deck stairwell fire door was fitted with a holdback hook in contravention of international regulations. The door was hooked open, which allowed the fire to spread up to the bridge deck from the deck below.	Adequately addressed	Proactive safety action taken complies with regulations. The actions taken will prevent this fire door from being latched open in the future.
MO-2014-012-SI-02: The smoking policy and associated risk controls on board *Ocean Drover* were not effectively managed. While use of designated smoking rooms was identified as the preferred option, smoking was permitted in cabins. In addition, approved ashtrays were not always used to extinguish and dispose of cigarettes.	Adequately addressed	Proactive safety action taken, including: smoking policy updated; designated smoking areas implemented, not including cabins; all accommodation cabins fitted with smoke detectors.

Table 9: Rail—Responses to safety issues identified in 2015–16

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
RO-2013-020 Derailment of locomotive and wagon during main line shunting South Dynon Junction, West Melbourne, Victoria, 25 July 2013		
RO-2013-020-SI-01: The placement of the insulated rail joints adjacent to signal DYN150 was not in accordance with the ARTC engineering procedure ESC-07-01.	Adequately addressed	The ATSB is satisfied that the action taken by the ARTC addresses this safety issue.
RO-2013-020-SI-02: The practice of using a third party (the shunt planner) to facilitate communication between Network Control Officers and train drivers at the Melbourne Freight Terminal, prevented an effective response to the emergency.	Adequately addressed	The ATSB is satisfied that the action taken by Pacific National addresses this safety issue.
RO-2013-026 Derailment of freight train 3XW4 Newport, Victoria, 30 October 2013		
RO-2013-026-SI-01: When the AK Car was operating in manual mode, the methods used to identify the location of a defect and assist track staff to locate the defect could be ineffective in certain scenarios. At the derailment location, there was a consistent offset of about 58 m between the recorded location of the wide-gauge defect and its actual location due to the presence of a 'long kilometre'.	Safety action pending	The development of a GPS-based system that is effective in areas that include long and short kilometres and changes in kilometre count direction should improve the reliability of defect location information.
RO-2013-026-SI-02: Track patrol processes were ineffective at detecting and remedying the wide-gauge defect at the derailment location. Track patrols were overly reliant on the AK Car geometry recording vehicle to trigger maintenance action on this track geometry defect.	Adequately addressed	The additional training and audit activity should improve measurement of track gauge and compliance with network maintenance requirements of track patrols.
RO-2013-026-SI-03: The ARTC response to the derailment on 11 September 2013 was ineffective and did not prevent a similar derailment at the same location on 30 October 2013.	Adequately addressed	ARTC has taken safety actions to address the recommendation and safety issue.
RO-2013-026-SI-04: ARTC processes for managing the condition of the rail were ineffective despite repeated recording of rail head wear by the AK Car, and local knowledge of the worn rail. The rail was worn beyond the rail condemning limits specified within the network code of practice.	Adequately addressed	Improved asset management policy and planning, combined with local verification of rail wear, should reduce the likelihood of rail wear exceeding condemning limits.

Rail—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
RO-2014-001 Derailment of Sydney Trains Passenger Train 602M Near Edgecliff station, Sydney, New South Wales, 15 January 2014		
RO-2014-001-SI-01: Drivers are desensitised to the wheel slip protection indicator light activations through its regular activation in response to momentary losses of adhesion. This, coupled with the inadequate warning provided by the TMS, may result in delayed reaction in response to activations that need driver intervention.	Safety action still pending	At the time of this report release, the safety actions advised by Sydney Trains had not yet been fully implemented. The ATSB is satisfied that the actions proposed by Sydney Trains will, when completed, adequately address this safety issue.
RO-2014-001-SI-02: Reporting and communications were not carried out in accordance with Sydney Trains rules and procedures, so that key employees in the Rail Management Centre received delayed and/or partial information and allowed the train to continue in service.	Safety action still pending	At the time of this report release, the safety actions advised by Sydney Trains had not yet been fully implemented. The ATSB is satisfied that the actions proposed by Sydney Trains will, when completed, adequately address this safety issue
RO-2014-001-SI-03: Key staff had not been trained in Rail Resource Management.	Safety action still pending	At the time of the report release, ATSB considers that further actions could be taken to provide suitable RRM training for employees.
RO-2014-001-SI-04: The lack of an appointed Officer in Charge of the incident site, prior to the arrival of an Incident Rail Commander, led to a fragmented response with no single employee having a recognised leadership role on site.	Safety action still pending	At the time of the report release, ATSB considers Sydney Trains proactive safety action does not fully address the safety issue.
RO-2014-005 Fatality at Heyington railway station, Toorak, Victoria, 22 February 2014		
RO-2014-005-SI-01: As designed, the traction interlock deactivated after a period of time. This allowed traction to be applied and the train to depart with the carriage doors open.	Safety action pending	ATSB accepts Metro Trains Melbourne's (MTM) proposed actions on this safety recommendation. However, until the proposed circuit modifications are completed, the ATSB will retain the status of this safety issue as 'pending'.
RO-2014-005-SI-02: The train door open/close indicator on the driver's control console was inadequate as a warning device once the traction interlock had deactivated.	No longer relevant	Given the circuit modification and provision of a manual key operated switch described in response to Action number: RO-2014-005-SR-030, this action is no longer applicable.

Rail—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
RO-2014-005-SI-03: The existing standards stipulated minimum clearances between trains and platforms, but did not consider the effect of the resulting gaps with respect to safe accessibility.	Adequately addressed	MTM has developed a design practice note to address safety issue.
RO-2014-005-SI-04: Due to the curvature of the track, a wide gap existed between the platforms and trains at the Heyington Railway Station. There are several stations on the Melbourne metropolitan rail network where wide gaps exist between platforms and trains due to track curvature. These gaps pose a risk to passengers with respect to safe accessibility.	Safety action pending	ATSB accepts MTM's proposed actions on this safety recommendation. However, until the proposed works are completed at platforms identified as presenting higher risk, the ATSB will retain the status of this safety issue as 'pending'.
RO-2014-007 Derailment of train 3WB3 Nambucca Heads, New South Wales, 14 May 2014		
RO-2014-007-SI-01: The Pacific National freight loading manual, and application of it, was ineffective at preventing load shift of rod-in-coil product.	Adequately addressed	Pacific National have engaged consultants to identify and recommend any changes to the freight loading manual and continue to monitor load shifts with the aim to prevent reduce occurrences.
RO-2014-014 Derailment of train 6DA2 near Marryat, South Australia, 26 July 2014		
RO-2014-014-SI-01: The scheduled ultrasonic tests conducted, in November 2013 on the 80 lb/yd rail between Northgate and Alice Springs had been ineffective in detecting and quantifying the significant defects present at 1036.541 km and 975.244 km locations.	Adequately addressed	The ATSB is satisfied that the action taken by Genesee & Wyoming Australia (GWA) addresses this safety issue.
RO-2014-014-SI-02: Contrary to the requirements of procedure IN-PRC-020, GWA had not established a list of specific locations known to have an increased likelihood of failure, such that particular attention may be applied in those locations during inspections.	Safety action still pending	
RO-2014-018 Derailment of train 5DD2 Thevenard, South Australia, 23 October 2014		
RO-2014-018-SI-01: Track defect monitoring and reporting was not being conducted, as specified in the Westrail Narrow Gauge Mainline Code of Practice, limiting the awareness of the deteriorating track condition and the need for reassessment of track operating limits.	Adequately addressed	The ATSB is satisfied that the actions taken by Transfield Services will adequately address this safety issue.

Rail—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
RO-2014-018-SI-02: The rail transport operator (GWA) had not maintained sufficient oversight of the activities of the rail infrastructure manager (Transfield Services), allowing the track to deteriorate to a level where trains could not be run in a safe manner	Adequately addressed	The ATSB is satisfied that the actions taken by Genesee & Wyoming Australia will adequately address this safety issue.
RO-2014-021 Incident Involving Absolute Signal Blocking, Warnervale, New South Wales, 24 November 2014		
RO-2014-021-SI-01: There was a breakdown in the NCO handover process used at Morisset, which resulted in ASB being granted to the Protection Officer at Warnervale without the exact location of trains being properly established, signals V8 and V6 being set back to stop and blocking facilities applied in accordance with Network Rule NWT 308.	Adequately addressed	Sydney Trains' coded ASB trial has continued while Sydney Trains prepare for full implementation. In order to fully implement coded ASB rule changes and consultation are required. The development of the rules is underway and consultation will follow. The ATSB recognises Sydney Trains' continued action on this issue by way of assessing and implementing a 'coded Absolute Signal Blocking process' and is satisfied that this process will improve how parties confirm the ID and current location of the last train to pass the protecting signals and result in the lowering of risk associated with worksite protection by ASB. On the basis therefore, that Sydney Trains remain committed to implementing a new (Coded) ASB rule/procedure, the ATSB has re-assessed the status of this issue and has formally closed it as 'Adequately addressed'.
RO-2014-022 Load shift collision between train 2MP9 and road over rail bridge, 227 km near Great Western Loop, Victoria, 9 December 2014		
RO-2014-022-SI-00: SCT Logistics' freight loading procedures did not specifically provide for the restraint and securement of double-stacked commercial road transport vehicles for transportation on rail vehicles.	Safety action still pending	
RO-2014-022-SI-00: SCT Logistics' maintenance processes and systems did not detect the wagon's side bearer faults or ensure that life-limited components were replaced in a timely manner.	Safety action still pending	

Rail—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
RO-2014-024 Collision between passenger train and truck Woodvale, Victoria, 19 December 2014		
RO-2014-024-SI-01: V/Line's process for the inspection of level crossing sighting did not provide explicit instructions for the identification and removal of problem vegetation.	Adequately addressed	The ATSB is satisfied that the actions proposed by V/Line Pty Ltd will, when fully implemented, adequately address this safety issue.
RO-2015-002 Collision between track worker and passenger train at Guildford, Western Australia, 10 February 2015		
RO-2015-002-SI-01: The Public Transport Authority of Western Australia did not have any documented work instructions to ensure a consistent and safe approach to maintaining automatic pedestrian crossing equipment.	Adequately addressed	The ATSB is satisfied that the actions taken by the Public Transport Authority of Western Australia significantly reduces the safety risk, and when combined with completion of the additional training should fully address this safety issue.
RO-2015-003 Passenger train collision with maintenance equipment, Montgomery, near Sale, Victoria, 16 February 2015		
RO-2015-003-SI-01: There were no formal systems in place to manage the accepted practice of Protection Officers leaving a worksite to return a Track Warrant and Train Staff, prior to ceasing work, off-tracking and ensuring the line was clear. This practice led to the informal delegation of responsibility for ensuring the track was clear to others at the work site.	Adequately addressed	The ATSB is satisfied that the actions taken by V/Line following this incident, combined with other actions under way (refer additional safety actions), will reduce the risk of track maintenance equipment remaining on track when Track Force personnel are clearing a line for the passage of rail traffic.
RO-2015-005 Wrong running direction involving passenger train 165-S Mt Druitt, New South Wales, 12 March 2015		
RO-2015-005-SI-01: Sydney Trains' fatigue management processes were ineffective in identifying the fatigue impairment experienced by the driver.	Safety action pending	
RO-2015-007 Collision between freight trains 2MP9 and 2MP1 Mile End, South Australia, 31 March 2015		
RO-2015-007-SI-01: Vegetation and a low fence adjacent to the Mile End crossing loop partially obscured the view that the crew of train 2MP9 had of the empty flat wagons at the rear of train 2MP1.	Adequately addressed	The ATSB considers greater proactive action should be taken by the Australian Rail Track Corporation (ARTC) to resolve this safety issue.

Rail—Responses to safety issues identified in 2015–16 (continued)

SAFETY ISSUE	STATUS	STATUS JUSTIFICATION
RO-2015-007-SI-03: The practice of pathing a following train onto a line occupied by a preceding train, when an alternate route was available and not obstructed, presented an elevated level of risk.	Adequately addressed	The ATSB is satisfied that the actions proposed by the ARTC, for maximising the use of available and suitable infrastructure will reduce the risk of this type of safety issue.
RO-2015-007-SI-04: The practice of pathing a following train onto the same line occupied by a preceding train, without pre-warning the driver regarding the train ahead, presented an elevated level of risk.	Adequately addressed	The ATSB is satisfied that the actions proposed jointly by the ARTC and SCT Logistics will reduce the risk of this type of safety issue.
RO-2015-007-SI-05: The design of the National Train Communications System in screening Adelaide metro broadcast communications prevented the driver of 2MP9 from gaining an appreciation of activities close to his area of operation, in particular the position of train 2MP1 along the Mile End main line.	Safety action pending	At the time of this report release, the safety action advised by the ARTC was yet to be fully implemented.
RO-2015-010 Derailment of track maintenance vehicles Singleton, New South Wales, 11 June 2015		
RO-2015-010-SI-01: The ARTC Network Control centre procedures did not address the unique operation of the Singleton E Frame equipment to ensure correct and consistent interpretation of the indications provided on the Phoenix display.	Adequately addressed	The ATSB is satisfied that the actions taken by ARTC will adequately address this safety issue.
RO-2015-010-SI-02: The ARTC Local Appendix Unit North–Volume 3 did not reflect current equipment installation arrangements for E Frame at Singleton.	Adequately addressed	The ATSB is satisfied that the actions taken by ARTC will adequately address this safety issue.
RO-2015-015 Derailment of loaded Pacific National coal service MB520 near Pangela, New South Wales, 28 August 2015		
RO-2015-015-SI-01: The wheel inspection processes and systems were not effective in detecting surface damage or cracks on the R4 wheel on wagon NHIH97081 prior to the wheel failure.	Safety action still pending	
RO-2015-015-SI-02: Despite a number of incidents, Pacific National did not take adequate action before the derailment to reduce the risk of wheel defects, especially in light of previously identified contributors, such as low rim thickness.	Adequately addressed	The ATSB is satisfied that the safety action taken by Pacific National will address the safety issue.

Safety actions

Table 10: Number of safety actions released in 2015–16

SAFETY ACTION TYPE	AVIATION	MARINE	RAIL	TOTAL
Proactive safety action	31	16	22	69
Safety Advisory Notice	0	3	0	3
Safety recommendation	5	6	14	25
Total	**36**	**25**	**36**	**97**

ATSB recommendations closed in 2015–16

Aviation—ATSB recommendations closed in 2015–16

There were no aviation safety recommendations closed in 2015–16.

Table 11: Marine—ATSB recommendations closed in 2015–16

INVESTIGATION	MI-2010-011 INDEPENDENT INVESTIGATION INTO QUEENSLAND COASTAL PILOTAGE
Safety issue	Risk identification and mitigation in coastal pilotage is inadequate as a result of the under-reporting of risk events and incidents by pilots. Indicators of the inadequacies in risk management and/or under-reporting amongst the 82 pilots surveyed included: • significant under-reporting where the number of grounding or collision risk events claimed by pilots in 2010 was about 10 times the number included in Australian Maritime Safety Authority (AMSA) and pilotage provider incident records • pilots citing reasons for under-reporting being personal disadvantage, lack of corrective action taken, no risk reduction and remuneration risk/organisational pressure • no process to record and analyse informal reports made by pilots to AMSA.
Number	MI-2010-011-SR-054
Organisation	Hydro Pilots
Recommendation	The ATSB recommends that Hydro Pilots takes safety action to address the safety issue and facilitate action taken by AMSA to address this issue.
Released	24 October 2012
Final action	1 February 2016

Marine—ATSB recommendations closed in 2015–16 (continued)

Final action	Hydro Pilots advised ATSB as follows: Hydro Marine Pilots as part of the larger Aviator Group operate a 'just culture' to create a safe and fair workplace. The safety or our employees, customers and contractors are our number one priority. The safety and efficiency of our operations are mutually supportive and are achieved through a commitment to continuous improvement. Under our Standard Operating Procedures we clearly state the requirements for the reporting of incidents and hazards that could impact on navigation or the environment: Incident and Reports during the Voyage: Pilots must be aware of and comply with all applicable laws, rules and regulations including relevant international conventions and any shipboard safety instructions. Pilots are obligated to report to the appropriate authority any concerns regarding any potential hazards to navigation or the environment. It should be noted that Australian legislation provides significant penalties for failing to comply with any reporting requirements.' Hydro Marine Pilots support all pilots in encouraging the reporting of any event without fear of penalty. We do not support the assumption that the lack of reports is indicative of a poor safety culture. Unlike the other two pilotage providers, Hydro Marine Pilots only operate within the compulsory area of Hydrographers Passage. As a provider, we engage with our marine pilots face to face on a daily basis due to the location of our operations whereby our pilots are carried by our own helicopter. Discussions on the conduct of the pilotage are frequent with our marine pilots when they disembark the vessel. Our culture is one of inclusion with a shared responsibility for safety.

INVESTIGATION	**MI-2010-011 INDEPENDENT INVESTIGATION INTO QUEENSLAND COASTAL PILOTAGE**
Safety issue	Risk identification and mitigation in coastal pilotage operations is inadequate as a result of the under-reporting of risk events and incidents by pilots. Indicators of the inadequacies in risk management and/or under-reporting amongst the 82 pilots surveyed included: • significant under-reporting where the number of grounding or collision risk events claimed by pilots in 2010 was about 10 times the number included in AMSA and pilotage provider incident records • pilots citing reasons for under-reporting being personal disadvantage, lack of corrective action taken, no risk reduction and remuneration risk/organisational pressure • no process to record and analyse informal reports made by pilots to AMSA.
Number	MI-2010-011-SR-056
Organisation	Torres Pilots
Recommendation	The ATSB recommends that Torres Pilots takes safety action to address the safety issue and facilitate action taken by AMSA to address this issue.
Released	24 October 2012

Marine—ATSB recommendations closed in 2015–16 (continued)

Final action	25 January 2016
Final action	Torres Pilots (TP) provided updates on 27 November 2015 and 25 January 2016. These updates, in part, repeated previous commentary that TP had submitted during the investigation and after the final investigation report was published. The following summarises the main points of the recent updates. Torres Pilots repeated its partial rejection of ATSB's findings on risk event and incident reporting, stating that it does not accept that there was a tenfold underreporting of incidents. Torres Pilots also repeated its concerns about AMSA's approach to incident reporting and related matters, citing a recent example to support its view. These ongoing TP concerns have been reported in its previous responses, as published and detailed in the investigation report. However, TP's update also stated that since the ATSB investigation, 'AMSA's governance of coastal pilotage has markedly improved'. In terms of safety action to address the safety issue, TP advised that it has appointed a dedicated safety management system, risk, and compliance manager. The manager's duties include a focus on risk event and incident reporting matters. This update also repeated safety action listed in TP's previous update. Supporting evidence, such as TP's non-compliance register summary, was not provided on this occasion.

INVESTIGATION	**MI-2010-011 INDEPENDENT INVESTIGATION INTO QUEENSLAND COASTAL PILOTAGE**
Safety issue	The coastal pilot fatigue management plan is inadequate. Factors that limit the effectiveness of the fatigue management plan amongst the 82 pilots surveyed included the: • largely self-managed approach where individual pilots may have conflicting priorities relating to remuneration and other working arrangements • pilot travel and transfer times regularly being included in rest periods • variations in sleep patterns due to irregular working hours and the effect of multiple, consecutive pilotages not being taken into account • dispensations being granted from requirements and, when granting dispensations, the pilot's agreement being used to support the fatigue risk assessment despite a clear conflict of interest with the pilot's remuneration • lack of effective measures to ensure that fatigue during a single-handed pilotage, particularly in the Inner Route, never exceeds an acceptable level.
Number	MI-2010-011-SR-050
Organisation	Australian Maritime Safety Authority (AMSA)
Recommendation	The ATSB recommends that AMSA takes further safety action to address the safety issue with regard to the high level of fatigue risk involved in single-handed pilotage through the Inner Route of the Great Barrier Reef.
Released	24 October 2012
Final action	1 February 2016

Marine—ATSB recommendations closed in 2015–16 (continued)

Final action	AMSA advised ATSB as follows: The fatigue management arrangements detailed in the existing default fatigue risk management plan (FRMP) were developed in consultation with independent subject matter experts (SMEs), including the Centre for Sleep Research, University of South Australia. The fundamental concept of the FRMP is to deliver effective fatigue management arrangements for coastal pilots, based on relevant science and SME input which reinforces the FRMP. The effectiveness of the current FRMP is evidenced by a number of factors, including: • marine incident statistics involving vessels under pilotage (i.e. there have been no coastal pilotage related marine incidents reported to AMSA where fatigue has been identified as a contributing factor since the establishment of the FRMP as a regulatory requirement for coastal pilots and pilotage providers) • wide-spread acceptance and support for the plan by licensed pilotage providers and extremely high levels of compliance by individual pilots • indications received from coastal pilots regarding the effectiveness of the FRMP (as part of annual FRMP effectiveness review procedures where input is sought). It should be noted that it is a condition of both an individual pilot's licence and a pilotage provider's licence to ensure the fatigue management requirements detailed in the FRMP (or an alternative AMSA-approved fatigue management plan) are complied with. Whilst the default FRMP does incorporate the concept of individual pilots self-assessing their level of fatigue so as to protect a pilot's capacity to decline work, the primary responsibility for ensuring pilots do not exceed minimum rest periods lies with providers. As a condition of a pilotage provider licence, a provider is required to ensure that pilots comply with the terms of the default FRMP (or an alternative AMSA-approved fatigue management plan). Marine Order 54 (Coastal pilotage) 2014 (MO54) requires a pilotage provider to have a safety management system (SMS). It is a mandatory requirement that the SMS describes, to AMSA's satisfaction, how the provider's work practices are conducted safely and how the provider complies with the applicable FRMP. AMSA conducts compliance audits on providers in accordance with the provisions of MO54. These compliance audits specifically include an assessment of the provider's compliance with all fatigue management requirements. The regulatory arrangements outlined above are considered to provide appropriate guidance and incentives to pilotage providers to ensure compliance with the FRMP requirements in order to ensure the provider's licence is not jeopardised as a result of potential systemic non-compliance with fatigue management provisions. Online fatigue management training and assessment has also been reviewed and implemented by AMSA for the benefit of coastal pilots (AMSA Fatigue Management e-Learning Course). The course is designed to provide pilots with focussed information on the unique challenges and realities of fatigue and personal fatigue management in their working environment. Completion of this course is a mandatory requirement for the issue of a (Restricted) coastal pilot's licence and a certificate is issued upon successful completion. As provided previously, AMSA approached the market via a 'request for quotation' for the conduct of possible coastal pilot fatigue field assessment. Subsequently, due to the prohibitive costs quoted, AMSA has not pursued this further.

Marine—ATSB recommendations closed in 2015–16 (continued)

INVESTIGATION	MI-2010-011 INDEPENDENT INVESTIGATION INTO QUEENSLAND COASTAL PILOTAGE
Safety issue	The coastal pilot training program and ongoing professional development is inadequate. Factors that limit the effectiveness of the training program and ongoing professional development include the: • absence of a pilotage safety management system for trainees to learn standard, risk-analysed pilotage procedures and practices, consistent with best practice • training program's 'self-learning' approach by observing different systems and practices of pilots that promulgates non-standard systems when trainees develop individual piloting systems increases the potential for sub-optimal practices • bridge resource management training that is not backed up with a focus on systems-based risk management through standard procedures and systems by using all resources, such as the coastal vessel traffic service's capability • absence of coastal pilotage focused bridge simulator training to augment practical shipboard training.
Number	MI-2010-011-SR-049
Organisation	AMSA
Recommendation	The ATSB recommends that AMSA takes further safety action to address the safety issue with regard to the acquisition of local area knowledge, particularly in confined areas, and the use of electronic charting systems by pilots. Focused training and assessments in bridge simulators should be amongst the measures used to achieve competency levels appropriate for coastal pilots.
Released	24 October 2012
Final action	1 February 2016
Final action	AMSA advised ATSB as follows: As of the end of January 2016, 100 per cent of active AMSA-licensed coastal pilots had completed requisite electronic chart display and information system (ECDIS) training. The concept of coastal pilot training and continuing professional development (CPD) is an area that undergoes continual review, development and improvement. This is in consultation with pilots, pilotage providers and training institutions. AMSA intends to include discussion on the value of simulation training in the coastal pilotage context at the next Coastal Pilotage Training Working Group (CPTWG). Additionally, CPD will also be discussed as a high priority at CPTWG, noting that, as a level of self-regulation, CPD is being deliberated within representative pilotage societies—as highlighted at the October 2015 Pilotage and Port Logistics Conference in Sydney. AMSA has recently developed examination guidance information for trainee pilots, which includes relevant references to nautical publications, and resources that may assist with the relevant pilotage.

Marine—ATSB recommendations closed in 2015–16 (continued)

INVESTIGATION	MO-2014-001 SERIOUS INJURY ON BOARD THE PASSENGER SHIP *SEVEN SEAS VOYAGER*, SYDNEY, NSW, 1 FEBRUARY 2014
Safety issue	*Seven Seas Voyager*'s planned maintenance system (PMS) contained no information about waste incinerator ash grate replacement, a task that would have been regularly undertaken by different engineering staff since 2003. Therefore, in this respect, the shipboard procedures that documented requirements for the PMS had not been effectively implemented.
Number	MO-2014-001-SR-001
Organisation	Prestige Cruise Services
Recommendation	The ATSB recommends that Prestige Cruise Services take action to ensure that all shipboard repetitive non-routine maintenance activities are addressed and appropriately documented within the ship's planned maintenance system.
Released	23 January 2015
Final action	29 July 2015
ATSB response	The ship's planned maintenance system incinerator work order has been amended to provide specific instructions about the equipment's components. In addition, the revised monthly inspection routine for the incinerator will increase crew familiarity and understanding of the system and work requirements.

Table 12: Rail—ATSB recommendations closed in 2015–16

INVESTIGATION	RO-2012-006 COLLISION BETWEEN TWO ROAD-RAIL VEHICLES HAIG, WESTERN AUSTRALIA, 24 MAY 2012
Safety issue	The absence of a national standard that addresses the design, fitment and maintenance of rail guidance equipment and the safety performance for road-rail vehicles while on-rail, increases the risks associated with operating road-rail vehicles.
Number	RO-2012-006-SR-018
Organisation	Rail Industry Safety and Standards Board (RISSB)
Recommendation	The ATSB recommends that the Rail Industry Safety Standards Board continue to progress the timely development of a standard to address this safety issue.
Released	15 September 2014
Final action	15 June 2016
Final action	RISSB has published AS7502 Road Rail Vehicles

INVESTIGATION	RO-2013-008 LEVEL CROSSING COLLISION BETWEEN PASSENGER TRAIN AND SEMI-TRAILER NEAR LAKE CHARM, VICTORIA, 12 FEBRUARY 2013
Safety issue	There existed an inconsistency between the track speed used for crossing assessment and permitted train speeds. The ALCAM process used a train speed equal to the track line speed, whereas V/Line systems for evaluating driver behaviour permitted an exceedance of line speed by up to 10 km/h for short distances.
Number	RO-2013-008-SR-074
Organisation	VicTrack
Recommendation	The Australian Transport Safety Bureau recommends that VicTrack takes action to address the inconsistency that exists between the crossing assessment that assumes a train travelling at line speed, and the sighting that would be required for a train travelling at the 10 km/h greater speed that is procedurally permitted by the rail operator.
Released	7 October 2014
Final action	20 July 2015
Final action	The ALCAM Committee will issue advice to rail stakeholders supplying data into the ALCAM database that ‘Maximum Train Speed’ should be the highest allowed train speed at that location taking into account permanent speed restrictions or extreme grades.

Rail—ATSB recommendations closed in 2015–16 (continued)

INVESTIGATION	RO-2013-008 LEVEL CROSSING COLLISION BETWEEN PASSENGER TRAIN AND SEMI-TRAILER NEAR LAKE CHARM, VICTORIA, 12 FEBRUARY 2013
Safety issue	When the crossing was last surveyed under the ALCAM program, the measurement of the road angle resulted in an overestimate of the acute road-to-rail interface angle. The implication of overestimating the acute interface angle is that sighting deficiencies may be underestimated or not identified.
Number	RO-2013-008-SR-071
Organisation	VicTrack
Recommendation	The Australian Transport Safety Bureau recommends that VicTrack reviews its instructions for the measurement of road angle to assure that worst case sighting scenarios are identified.
Released	7 October 2014
Final action	20 July 2015
Final action	The ALCAM Committee will make changes to the Crossing Assessment Manual to highlight that surveyors are to base sighting distance measurement on a worst reasonable case vehicle path, and this advice will be included within the curriculum for future ALCAM field collection training.

INVESTIGATION	RO-2013-017 SAFEWORKING BREACH INVOLVING A LOCAL POSSESSION AUTHORITY, REVESBY, NEW SOUTH WALES, 10 JULY 2013.
Safety issue	There were non-compliances to the repeat back provision because it was viewed as onerous under certain Local Possession Authorities (LPAs). An opportunity exists to review rule non-conformance with the implementation of LPAs.
Number	RO-2013-017-SR-055
Organisation	Sydney Trains
Recommendation	The Australian Transport Safety Bureau recommends that Sydney Trains undertake further work to address this safety issue.
Released	19 September 2014
Final action	21 September 2015

Rail—ATSB recommendations closed in 2015–16 (continued)

Final action	Sydney Trains stated: The Manager Network Rules & Projects has listened to and reviewed audio recordings from 12 randomly selected LPAs in relation to the transaction between Train Controllers, Signallers and PPOs when requesting and authorising LPA's. He determined that in all instances a read back process was followed. However, the conversations were undertaken with varying levels of quality and accuracy. Sydney Trains' Network Operations Division has commenced a 'Safety Critical Communications Project', sponsored by the Director Operations and managed by the Manager Operations Compliance and Assurance. The aim of the project is to improving safety critical communications on the Network through more extensive monitoring, review and feedback to staff regarding safety critical communications. The project will also include a review of the existing Network Standard and Network Rules and Procedures relating to safety critical communications and an improved training and coaching regime. The focus of the project will be the reading back of safety critical communication and the training of Signallers and Train Controllers to take the lead in these conversations, especially in relation to prompting and leading the read back process. The Australian Transport Safety Bureau is satisfied that the action taken by Sydney Trains has adequately addressed the safety issue.

INVESTIGATION	**RO-2013-018 SAFEWORKING BREACHES INVOLVING ABSOLUTE SIGNAL BLOCKING AT BLACKHEATH ON 13 JUNE 2013, NEWCASTLE ON 13 JULY 2013 AND WOLLSTONECRAFT ON 17 JULY 2013**
Safety issue	The Sydney Trains regime for auditing worksite protection arrangements was not effective in identifying emerging trends or safety critical issues, when using Absolute Signal Blocking (ASB).
Number	RO-2013-018-SR-085
Organisation	Sydney Trains
Recommendation	The ATSB recommends that Sydney Trains undertake further work to ensure that future auditing of worksite protection arrangements is effective in identifying issues with the implementation and use of Absolute Signal Blocking as a method of safeworking.
Released	2 March 2015
Final action	23 September 2015

Rail—ATSB recommendations closed in 2015–16 (continued)

Final action	Sydney Trains provided extra detail on the worksite protection auditing, both undertaken and proposed, to address the recommendation RO-2013-018-SR-085. Three documents were attached in support of information in their response. In their response, Sydney Trains stated: Sydney Trains undertakes compliance audits of worksites within the rail corridor, specifically targeting the application of Absolute Signal Blocking (ASB) work on track method (where possible). As the audits are unannounced, and ASB does not require significant pre-notice, the audits will not always find ASB worksites. The audits are known as Application of Worksite Protection Audits and are conducted through onsite interviews, verification of worksite protection plans/pre-work briefs against Sydney Trains Network Rules and Procedures and other requirements under the Sydney Trains Rail Corridor Safety Program. Sydney Trains' Network Rules and Procedures, specifically the Work on Track Rules, prescribe the requirements for undertaking activities in the rail corridor and mandate the ways to plan for and achieve the separation of rail traffic from people working on or about track. The audits are undertaken two days per month and include randomly selected worksites, within the danger zone, on the Sydney Trains network. All worksites which are encountered by the audit team within the rail corridor are audited to assess the level of conformance to Sydney Trains Network Rules and procedures. A detailed audit checklist specifically aligned to the application of the criteria for ASB is utilised by the audit team in the field. The requirements for Coded ASB, currently under trial within Sydney Trains, will be incorporated into the audit checklist tool once the process is formally implemented into the Network Rules and Procedures. The audit schedule is determined and approved by Group Manager Quality Systems and the audit events are maintained through the Sydney Trains integrated audit management SharePoint site. The audit SharePoint site provides an overview of the audit program for Sydney Trains and provides complete visibility of audit programs for Sydney Trains. It provides detailed information about scope, type, location, auditor, etc. Audit schedule adherence is managed and governed by executive management through the organisational Visual Management Cell (VMC) process and SEQR Audit Working Group meetings. These audits commenced in April 2015. To date, a total of five Application of Worksite Protection Audits have been completed. The audit team encountered a total of 29 worksites which were undertaking various types of work within the rail corridor during this period. Five of the worksites were applying Absolute Signal Blocking (ASB) work on track method. There were six findings relating to ASB sites. With the exception of the non-conformance identified, all findings were actioned and fully closed out at the time of the audit by mentoring/coaching of the staff by the audit team's Rail Corridor Safety Program Mentor. The ATSB recognises Sydney Trains' continued action on the associated safety issue by way of implementing a Preliminary Worksite Protection Audit schedule. The ATSB is satisfied that this action taken by Sydney Trains adequately addresses this safety issue.

Rail—ATSB recommendations closed in 2015–16 (continued)

INVESTIGATION	RO-2013-026 DERAILMENT OF FREIGHT TRAIN 3XW4 NEWPORT, VICTORIA, 30 OCTOBER 2013
Safety issue	The Australian Rail Track Corporation (ARTC) response to the derailment on 11 September 2013 was ineffective and did not prevent a similar derailment at the same location on 30 October.
Number	RO-2013-026-SR-101
Organisation	ARTC
Recommendation	The ATSB recommends that ARTC takes safety action to enhance the effectiveness of its response to a derailment event to prevent a similar incident.
Released	13 January 2016
Final action	27 April 2016
Final action	Since the Newport derailment, ARTC has undertaken the following safety actions to address this safety issue: • A new position 'Area Safety Advisor' has been created and is located in Melbourne. This position will assist in the investigation of events in Melbourne and supplements other similar positions located in Adelaide and Newcastle. • Track management tasks and roles have been clarified. This includes more clearly defined responsibilities for the investigation of a derailment, the production of findings and management responsibilities for ensuring a derailment site is adequately repaired such that a repeat occurrence does not occur. • The introduction of a new system to track and review all incidents, improving the robustness of this process compared to that in place prior to the Newport derailment.

INVESTIGATION	RO-2014-007 DERAILMENT OF TRAIN 3WB3 NAMBUCCA HEADS, NEW SOUTH WALES, 14 MAY 2014
Safety issue	The Pacific National freight loading manual, and application of it, was ineffective at preventing load shift of rod-in-coil product.
Number	RO-2014-007-SR-036
Organisation	Pacific National Pty Ltd
Recommendation	The Australian Transport Safety Bureau recommends that Pacific National undertake further work to address the possibility that rod-in-coil product could shift during transit, thereby creating an undesirable condition that could affect the dynamic behaviour of the vehicle.
Released	23 September 2015
Final action	22 December 2015

Rail—ATSB recommendations closed in 2015–16 (continued)

Final action	Pacific National is carrying out/proposing to carry out the following actions: 1. Pacific National (PN) Assets and Infrastructure Services has engaged a consultant to conduct an audit of PN procedures and operational processes, relating to the development and implementation of the Freight Loading Manual (FLM). This analysis involved performing a gap analysis in relation to current steel loading processes. The key focus of this work is to review processes relating to steel services within and ex-Newcastle (Morandoo terminal). This will provide a good overview of the application of the FLM across all major loading locations. The scope of the work includes the interfaces and processes between customers, the Freight Loading Manual (Engineering) and the PN Operations group. The following specifics are within phase one of the work: • a study of the steel loading processes for Morandoo only • a review of the Freight Loading Manuals (FLMs) and guidelines • an inspection regime post–loading—how PN ensures compliance against the FLMs if work is undertaken by a third party • development of a load assessment tool • identification of any recommendations. 2. If further information can be obtained, PN will a complete the dynamic modelling and continue to identify the root cause determination. 3. Pacific National will continue to monitor the occurrence of rod in coil load shifts and investigate why these occur, with the aim being to reduce these occurrences.

INVESTIGATION	**RO-2014-021 INCIDENT INVOLVING ABSOLUTE SIGNAL BLOCKING, WARNERVALE, NEW SOUTH WALES, 24 NOVEMBER 2014**
Safety issue	There was a breakdown in the NCO handover process used at Morisset which resulted in ASB being granted to the Protection Officer at Warnervale without the exact location of trains being properly established, signals V8 and V6 being set back to stop and blocking facilities applied in accordance with Network Rule NWT 308.
Number	RO-2014-021-SR-021
Organisation	Sydney Trains
Recommendation	The ATSB recommends that Sydney Trains takes further action to expedite the implementation of safeguards and procedural safety enhancements where Absolute Signal Blocking is to be used for worksite protection.
Released	17 September 2015
Final action	14 September 2015
Final action	Sydney Trains stated: Sydney Trains agrees with safety recommendation RO-2014-021-SR-021. The safety action being undertaken to address this safety recommendation is the implementation of coded ASB. In order to fully implement coded ASB, rule changes and consultation are required. The development of the rules is underway and consultation will follow. At this time it is anticipated that coded ASB will be fully implemented by the end of March 2016.

Safety recommendations released in 2015–16

Table 13: Aviation—Safety recommendations released in 2015–16

INVESTIGATION	AO-2013-100 LANDING BELOW MINIMA DUE TO FOG INVOLVING B737S VH-YIR AND VH-VYK, MILDURA AIRPORT, VICTORIA, 18 JUNE 2013.
Safety issue	The automatic broadcast services do not have the capacity to recognise and actively disseminate special weather reports (SPECI) to pilots, thereby not meeting the intent of the SPECI alerting function provided by controller-initiated flight information service.
Number	AO-2013-100-SR-057
Organisation	Airservices Australia
Safety Recommendation	The ATSB recommends that Airservices Australia, as the safety issue owner, works in collaboration with the Bureau of Meteorology to instigate a system change which will reinstate the alerting function of SPECI reports currently not available through an Automatic Broadcast Service.
Released	31 May 2016

INVESTIGATION	AO-2013-226 IN-FLIGHT BREAK-UP INVOLVING DE HAVILLAND DH 82A TIGER MOTH, VH-TSG, 300 M EAST OF SOUTH STRADBROKE ISLAND, QUEENSLAND, 16 DECEMBER 2013
Safety issue	Over 1,000 parts were approved by the Civil Aviation Safety Authority for Australian Parts Manufacturer Approval using a policy that accepted existing design approvals without the authority confirming that important service factors, such as service history and life-limits, were appropriately considered.
Number	AO-2013-226-SR-044
Organisation	Civil Aviation Safety Authority
Safety Recommendation	The ATSB recommends that the Civil Aviation Safety Authority takes action to provide assurance that all of the replacement parts that were approved for Australian Parts Manufacturer Approval by the Regulatory Reform Program Implementation team in 2003 have appropriately considered important service factors, such as service history and life limits.
Released	21 January 2016

Aviation—Safety recommendations released in 2015–16 (continued)

INVESTIGATION	AO-2014-163 COLLISION WITH TERRAIN INVOLVING ONE DESIGN DR-107 VH-EGT, NEAR GOOLWA SA, 10 OCTOBER 2014
Safety issue	The Civil Aviation Safety Authority did not require builders of amateur-built experimental aircraft to produce a flight manual, or equivalent, for their aircraft following flight testing. Without a flight manual the builder, other pilots and subsequent owners do not have reference to operational and performance data necessary to safely operate the aircraft.
Number	AO-2014-163-SR-008
Organisation	Civil Aviation Safety Authority
Safety Recommendation	The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority takes safety action to address the lack of a requirement for builders of amateur-built experimental aircraft to produce a flight manual, or equivalent, for their aircraft following flight testing.
Released	14 April 2016

INVESTIGATION	AR-2013-107 ENGINE FAILURES AND MALFUNCTIONS IN LIGHT AEROPLANES: 2009 TO 2014
Safety issue	Thicker 7/16 inch diameter through-bolts, fitted to newer Jabiru engines and some retro-fitted engines, have had limited service to date to confirm early indications that they reduce this risk. Retro-fitting engines with thicker through-bolts has only been recommended for aircraft involved in flight training by JSB031 issue 3. Most light aircraft in service with Jabiru engines continue to use 3/8 inch diameter engine through-bolts which, even after upgrades in accordance with Jabiru service bulletins JSB031 issues 1 and 2, remain at an elevated risk of fracturing within the service life of the bolt, leading to an engine failure or malfunction in flight.
Number	AR-2013-107-SR-056
Organisation	Civil Aviation Safety Authority
Safety Recommendation	The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority continue to monitor the through-bolt failure rate of Jabiru engines to satisfy themselves of the reliability of the: • 7/16 inch diameter bolts • any other alternative produced to replace the existing 3/8 inch diameter through-bolt configuration (including newly developed through-bolts incorporating aspects to alleviate the effects of thermal expansion and damp resonant vibrations) to determine if these modifications have sufficiently reduced the risk of an engine failure or malfunction in Jabiru-powered aircraft.
Released	9 March 2016

Aviation—Safety recommendations released in 2015–16 (continued)

INVESTIGATION	AR-2013-107 ENGINE FAILURES AND MALFUNCTIONS IN LIGHT AEROPLANES: 2009 TO 2014
Safety issue	Thicker 7/16 inch diameter through-bolts, fitted to newer Jabiru engines and some retro-fitted engines, have had limited service to date to confirm early indications that they reduce this risk. Retro-fitting engines with thicker through-bolts has only been recommended for aircraft involved in flight training by JSB031 issue 3. Most light aircraft in service with Jabiru engines continue to use 3/8 inch diameter engine through-bolts which, even after upgrades in accordance with Jabiru service bulletins JSB031 issues 1 and 2, remain at an elevated risk of fracturing within the service life of the bolt, leading to an engine failure or malfunction in flight.
Number	AR-2013-107-SR-055
Organisation	Jabiru Aircraft
Safety Recommendation	The Australian Transport Safety Bureau recommends that Jabiru Aircraft Australia takes further safety action to ensure that all owners of Jabiru engines that have not been manufactured with new configuration 7/16 inch diameter through-bolts, or modified in accordance with Jabiru Service Bulletin JSB031-3 have access to, and are encouraged to upgrade to: • the 7/16 inch diameter through-bolt configuration, or • any other alternative produced to replace the existing 3/8 inch diameter through-bolt configuration (including newly developed through-bolts incorporating aspects to alleviate the effects of thermal expansion and damp resonant vibrations).
Released	9 March 2016

Table 14: Marine—Safety recommendations released in 2015–16

INVESTIGATION	MO-2014-008 ENGINE ROOM FIRE ON BOARD THE BULK CARRIER MARIGOLD, PORT HEDLAND, WA, 13 JULY 2014
Safety issue	The emergency response plans for a ship fire in Port Hedland did not clearly define transfer of control procedures for successive incident controllers from different organisations or contain standard checklists for their use.
Number	MO-2014-008-SR-040
Organisation	Western Australian Department of Fire and Emergency Services
Safety Recommendation	The ATSB recommends that the Department of Fire and Emergency Services takes action to address the safety issue with regard to transfer of control procedures for incident controllers from different organisations.
Released	20 April 2016

INVESTIGATION	MO-2014-008 ENGINE ROOM FIRE ON BOARD THE BULK CARRIER MARIGOLD, PORT HEDLAND, WA, 13 JULY 2014
Safety issue	The large size and weight of the ship firefighting cache made it difficult for the duty Port Hedland volunteer firefighter to transport it to the wharf.
Number	MO-2014-008-SR-043
Organisation	Western Australian Department of Fire and Emergency Services
Safety Recommendation	The ATSB recommends that the Department of Fire and Emergency Services takes action to address the safety issue with regard to transporting ship firefighting caches to wharves.
Released	20 April 2016
INVESTIGATION	**MO-2014-008 ENGINE ROOM FIRE ON BOARD THE BULK CARRIER MARIGOLD, PORT HEDLAND, WA, 13 JULY 2014**
Safety issue	Suitable atmospheric testing equipment was not available in Port Hedland to ensure safe entry to fire-affected spaces on board *Marigold*. Access to these areas was not controlled until 53 hours after the fire.
Number	MO-2014-008-SR-041
Organisation	Western Australian Department of Fire and Emergency Services
Safety Recommendation	The ATSB recommends that the Department of Fire and Emergency Services takes action to address the safety issue with regard to safe access to fire and smoke-affected shipboard spaces.
Released	20 April 2016

Marine—Safety recommendations released in 2015–16 (continued)

INVESTIGATION	MO-2014-008 ENGINE ROOM FIRE ON BOARD THE BULK CARRIER *MARIGOLD*, PORT HEDLAND, WA, 13 JULY 2014
Safety issue	The limited professional firefighting capability in Port Hedland restricted the ability to launch an effective response to the fire on board *Marigold*.
Number	MO-2014-008-SR-042
Organisation	Western Australian Department of Fire and Emergency Services
Safety Recommendation	The ATSB recommends that the Department of Fire and Emergency Services takes action to address the safety issue with regard to the professional firefighting capability in Port Hedland and other regional ports.
Released	20 April 2016

INVESTIGATION	MO-2014-008 ENGINE ROOM FIRE ON BOARD THE BULK CARRIER *MARIGOLD*, PORT HEDLAND, WA, 13 JULY 2014
Safety issue	*Marigold*'s Halon gas fixed fire suppression system for the engine room was not fully operational–probably as a result of inadequate maintenance. The multiple failures of the system at the time of the fire were not consistent with proper maintenance and testing.
Risk	Significant
Number	MO-2014-008-SR-035
Organisation	Korea Loading Company of Ship Management (KLCSM)
Safety Recommendation	The ATSB recommends that KLCSM takes action to address the safety issue with regard to the maintenance of ships' fixed fire suppression systems to ensure they are fully operational at all times.
Released	20 April 2016

INVESTIGATION	MO-2014-008 ENGINE ROOM FIRE ON BOARD THE BULK CARRIER *MARIGOLD*, PORT HEDLAND, WA, 13 JULY 2014
Safety issue	Port Hedland's emergency response teams did not use the ship's international shore fire connection. As a result *Marigold*'s fire main was not pressurised with water from ashore.
Number	MO-2014-008-SR-037
Organisation	Western Australian Department of Fire and Emergency Services
Safety Recommendation	The ATSB recommends that the Department of Fire and Emergency Services takes action to address the safety issue with regard to the appropriate use of international shore connections to pressurise ship fire mains when responding to shipboard fires.
Released	20 April 2016

Table 15: Rail—Safety recommendations released in 2015–16

INVESTIGATION	RO-2013-026 DERAILMENT OF FREIGHT TRAIN 3XW4 NEWPORT, VICTORIA, 30 OCTOBER 2013
Safety issue	The ARTC response to the derailment on 11 September 2013 was ineffective and did not prevent a similar derailment at the same location on 30 October.
Number	RO-2013-026-SR-101
Organisation	ARTC
Safety Recommendation	The ATSB recommends that ARTC takes safety action to enhance the effectiveness of its response to a derailment event to prevent a similar incident.
Released	13 January 2016

INVESTIGATION	RO-2014-001 DERAILMENT OF SYDNEY TRAINS PASSENGER TRAIN 602M NEAR EDGECLIFF STATION, SYDNEY, NSW, 15 JANUARY 2014
Safety issue	The lack of an appointed Officer in Charge of the incident site, prior to the arrival of an Incident Rail Commander, led to a fragmented response with no single employee having a recognised leadership role on site.
Number	RO-2014-001-SR-026
Organisation	Sydney Trains
Safety Recommendation	The ATSB recommends that Sydney Trains, through a revision to its Incident Management Framework, adopts the positive appointment of an Officer in Charge for Level 2, 3 & 4 incidents once they have been reported. This requirement and the functions of an Officer in Charge must be included in the training of all operational RMC staff and all positions which may be required to adopt this role.
Released	3 December 2015

INVESTIGATION	RO-2014-001 DERAILMENT OF SYDNEY TRAINS PASSENGER TRAIN 602M NEAR EDGECLIFF STATION, SYDNEY, NSW, 15 JANUARY 2014
Safety issue	Key staff had not been trained in Rail Resource Management.
Number	RO-2014-001-SR-025
Organisation	Sydney Trains

Rail—Safety recommendations released in 2015–16 (continued)

Safety Recommendation	The ATSB recommends that Sydney Trains revisits the recommendation from the Final Report of the Special Commission of Inquiry into the Waterfall Rail Accident Volume 2 viz: Customised human factors training for rail safety workers and management/ supervisory level staff based on contemporary Crew Resource Management (now RRM) principles and takes action to ensure that RRM training is rolled out to all employees as categorised in the recommendation and especially RMC staff, and that RRM is embedded into Sydney trains' training and certification processes. To assist in achieving this, it may be useful to benchmark RRM/CRM training and workplace application against both comparable rail operators and also against other high risk industries (such as aviation) both nationally and internationally.
Released	1 March 2016

INVESTIGATION	**RO-2014-005 FATALITY AT HEYINGTON RAILWAY STATION, TOORAK, VICTORIA, 22 FEBRUARY 2014**
Safety issue	As designed the traction interlock deactivated after a period of time. This allowed traction to be applied and the train to depart with the carriage doors open.
Number	RO-2014-005-SR-030
Organisation	Metro Trains Melbourne
Safety Recommendation	The ATSB recommends that MTM considers a modification of the traction interlock override system to incorporate additional risk mitigations.
Released	13 July 2015

INVESTIGATION	**RO-2014-005 FATALITY AT HEYINGTON RAILWAY STATION, TOORAK, VICTORIA, 22 FEBRUARY 2014**
Safety issue	The train door open/close indicator on the driver's control console was inadequate as a warning device once the traction interlock had deactivated.
Number	RO-2014-005-SR-031
Organisation	Metro Trains Melbourne
Safety Recommendation	The ATSB recommends that MTM considers incorporating an additional warning device to heighten driver awareness that the train doors have not closed, if automatic deactivation is retained.
Released	13 August 2015

Rail—Safety recommendations released in 2015–16 (continued)

INVESTIGATION	RO-2014-005 FATALITY AT HEYINGTON RAILWAY STATION, TOORAK, VICTORIA, 22 FEBRUARY 2014
Safety issue	Due to the curvature of the track, a wide gap existed between the platform and train at the Heyington Railway Station. There are several stations on the Melbourne metropolitan rail network where wide gaps exist between platform and train due to track curvature. These gaps pose a risk to passengers with respect to safe accessibility.
Number	RO-2014-005-SR-035
Organisation	Metro Trains Melbourne
Safety Recommendation	The ATSB recommends that MTM expedite their plans to introduce additional risk mitigation measures (such as instituted at Heyington Railway Station) at the platforms that have been identified as presenting higher risks from larger platform-carriage clearances.
Released	27 November 2015

INVESTIGATION	RO-2014-007 DERAILMENT OF TRAIN 3WB3 NAMBUCCA HEADS, NEW SOUTH WALES, 14 MAY 2014
Safety issue	The Pacific National freight loading manual, and application of it, was ineffective at preventing load shift of rod-in-coil product.
Number	RO-2014-007-SR-036
Organisation	Pacific National Pty Ltd
Safety Recommendation	The Australian Transport Safety Bureau recommends that Pacific National undertake further work to address the possibility that rod-in-coil product could shift during transit, thereby creating an undesirable condition that could affect the dynamic behaviour of the vehicle.
Released	23 September 2015

INVESTIGATION	RO-2014-014 DERAILMENT OF TRAIN 6DA2 NEAR MARRYAT, SOUTH AUSTRALIA, 26 JULY 2014
Safety issue	Contrary to the requirements of procedure IN-PRC-020, GWA had not established a list of specific locations known to have an increased likelihood of failure, such that particular attention may be applied in those locations during inspections.
Number	RO-2014-014-SR-034
Organisation	Genesee & Wyoming Aust Pty Ltd (GWA)

Rail—Safety recommendations released in 2015–16 (continued)

Safety Recommendation	The Australian Transport Safety Bureau recommends that Genesee & Wyoming Australia undertake further work to address the identification, assessment and recording of special locations on the GWA rail network, in accordance with GWA procedure IN-PRC-020.
Released	28 October 2015

INVESTIGATION	RO-2014-016 COLLISION BETWEEN V/LINE TRAIN 8280 AND MTM TRAIN 6502 AT ALTONA, VICTORIA, 22 AUGUST 2014
Safety issue	The marker lights on some MTM passenger trains do not meet the requirements of the standard for Railway Rolling Stock Lighting and Rolling Stock Visibility, AS/RISSB 7531.3:2007.
Number	RO-2014-016-SR-039
Organisation	Metro Trains Melbourne
Safety Recommendation	That Metro Trains Melbourne institute measures to ensure that the luminous intensity of marker lights of all passenger trains in their fleet meet a railway industry approved and accepted standard.
Released	2 February 2016

INVESTIGATION	RO-2014-016 COLLISION BETWEEN V/LINE TRAIN 8280 AND MTM TRAIN 6502 AT ALTONA, VICTORIA, 22 AUGUST 2014
Safety issue	The rules pertaining to passing a permissive signal at stop, place sole reliance on the train driver to provide separation between trains by line-of-sight observation. In the absence of any additional risk mitigation measures, this administrative control provides the least effective defence against human error or violations.
Number	RO-2014-016-SR-038
Organisation	Metro Trains Melbourne
Safety Recommendation	The ATSB recommends that Metro Trains Melbourne consider additional risk mitigation measures to maintain train separation, where the safeworking system allows permissive working.
Released	12 February 2016

Rail—Safety recommendations released in 2015–16 (continued)

INVESTIGATION	RO-2014-021 INCIDENT INVOLVING ABSOLUTE SIGNAL BLOCKING, WARNERVALE, NEW SOUTH WALES, 24 NOVEMBER 2014
Safety issue	There was a breakdown in the NCO handover process used at Morisset which resulted in ASB being granted to the Protection Officer at Warnervale without the exact location of trains being properly established, signals V8 and V6 being set back to stop and blocking facilities applied in accordance with Network Rule NWT 308.
Number	RO-2014-021-SR-021
Organisation	Sydney Trains
Safety Recommendation	The ATSB recommends that Sydney Trains takes further action to expedite the implementation of safeguards and procedural safety enhancements where Absolute Signal Blocking is to be used for worksite protection.
Released	17 September 2015

INVESTIGATION	RO-2015-005 WRONG RUNNING DIRECTION INVOLVING PASSENGER TRAIN 165-S MT DRUITT, NEW SOUTH WALES, 12 MARCH 2015
Safety issue	Sydney Trains' fatigue management processes were ineffective in identifying the fatigue impairment experienced by the driver.
Number	RO-2015-005-SR-004
Organisation	Sydney Trains
Safety Recommendation	The ATSB recommends that Sydney Trains take safety action to ensure that adequate strategies exist to safeguard against fatigue impairment of train crew called in on the stand-by roster.
Released	29 January 2016

INVESTIGATION	RO-2015-007 COLLISION BETWEEN FREIGHT TRAINS 2MP9 AND 2MP1 MILE END, SOUTH AUSTRALIA, 31 MARCH 2015
Safety issue	Vegetation and a low fence adjacent to the Mile End crossing loop partially obscured the view that the crew of train 2MP9 had of the empty flat wagons at the rear of train 2MP1.
Number	RO-2015-007-SR-008
Organisation	ARTC
Safety Recommendation	The ATSB recommends that the ARTC takes action to improve the sighting distances available within the Mile End crossing loop by removing unnecessary vegetation and other obstructions.
Released	16 December 2015

Rail—Safety recommendations released in 2015–16 (continued)

INVESTIGATION	RO-2015-015 DERAILMENT OF LOADED PACIFIC NATIONAL COAL SERVICE MB520 NEAR PANGELA, NEW SOUTH WALES, 28 AUGUST 2015
Safety issue	The wheel inspection processes and systems were not effective in detecting surface damage or cracks on the R4 wheel on wagon NHIH97081 prior to the wheel failure.
Number	RO-2015-015-SR-012
Organisation	Pacific National Pty Ltd
Safety Recommendation	The ATSB recommends that Pacific National take safety action to ensure that adequate wheel inspection standards and systems exist to safeguard against wheel failure.
Released	29 June 2016

Table 16: Marine—Safety advisory notices released in 2015–16

INVESTIGATION	MO-2014-003 ANCHOR DRAGGING AND CONTACT BETWEEN SHIPS, FREMANTLE ANCHORAGE, 8 MAY 2014
Safety issue	The International Association of Classification Societies (IACS) recommendation for having a means of slipping the anchor cable bitter outside the chain locker had not been provided on board Royal Pescadores. Further, the ship's classification society, ClassNK, does not consider that the IACS recommended slipping arrangement is necessary for reducing safety risk.
Number	MO-2014-003-SAN-020
Organisation	International Association of Classification Societies
Safety Advisory Notice	The ATSB advises the IACS that it should consider the safety implications of there being no requirement for its members to follow best practice with respect to anchor cable bitter end securing arrangements, consistent with IACS Recommendation No. 10, 1.2.2 (b).
Released	12 October 2015


ATSB

SECTION 6

FEATURE

ATSB research investigation on engine failures and malfunctions in light aeroplanes

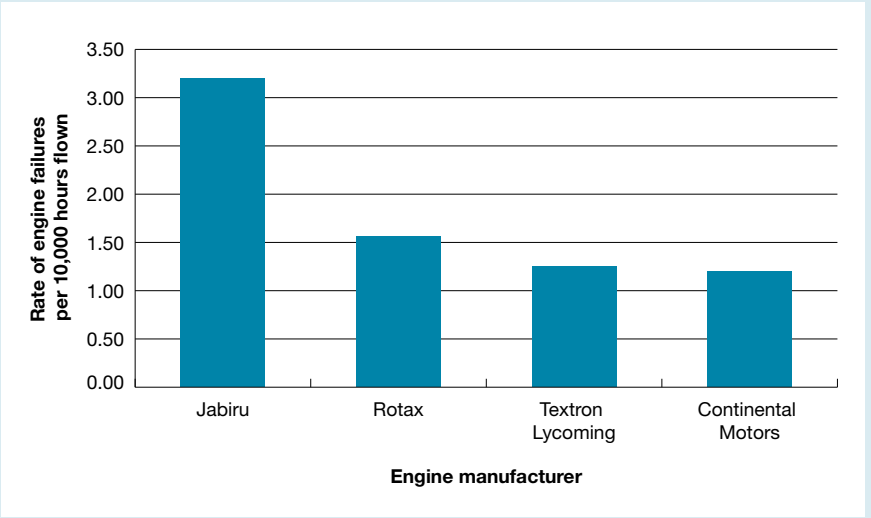
In 2012, regular aviation trend monitoring identified a significant increase in the number of light aircraft engine failures or malfunctions. To formally and more fully examine both the extent of and the contributing factors behind these observations, the ATSB initiated a research investigation to assess and compare engine failures and malfunctions in light aircraft.

The investigation included single-engine aeroplanes up to 800 kg maximum take-off weight (MTOW). The weight cut-off of 800 kg encompasses the Light Sport Aircraft (LSA) group of aircraft, which are typically under 600 kg MTOW. Although some of these aeroplanes are CASA VH-registered, the majority are registered with Recreational Aviation Australia (RAAus). Aircraft registered with either body could have a certified or uncertified aircraft engine and could be factory-built or amateur-built. As such, the ATSB examined occurrences of both VH-registered and RAAus registered aeroplanes, which were reported to the ATSB and/or RAAus between 2009 and 2014 and that the ATSB had classified as engine failures or malfunctions. Engine failures or malfunctions are only reportable matters to the ATSB, under the *Transport Safety Investigation Act 2003,* when they happen while the aircraft is boarded for flight.

Over the 6 year study period, between 2009 and 2014, 322 engine failures or malfunctions involving light aircraft were reported to the ATSB and/or RAAus. Aircraft powered by Jabiru engines were involved in the most engine failures or malfunctions, with 130 reported over the 6 years. This represents about one in ten aircraft powered by Jabiru engines in the study set, having reported an engine failure or malfunction. Reports from Rotax powered aircraft were the next most common (87, or one in 36), followed by aircraft with Lycoming (58, or one in 35) and Continental engines (28, or one in 35). When factoring in the hours flown for each of these engine manufacturers, aircraft with Jabiru engines had more than double the rate of engine failure or malfunction than any other manufacturer in the study set—3.21 failures per 10,000 hours flown. Additionally, when the yearly rates were examined, the rates of Jabiru engine failures or malfunctions was observed to increase over the 6 year study period. The rates were further divided into registration type (VH or RAAus) which showed a very similar pattern across the four main engine manufacturers—with Jabiru powered aircraft having the highest rates for all VH-registered and most RAAus registered aircraft.

Unlike the engines of other manufacturers in this study, which showed a wide distribution of failure mechanisms, nearly half of the Jabiru engine failures or malfunctions related to a fractured component. Engine through-bolt failures were the most commonly reported failure mechanism in Jabiru powered aircraft, with 21 through-bolt fractures reported between 2009 and 2014.

Figure 15: The rates of engine failure or malfunctions for the four primary engine manufacturers in the light aeroplane set of aircraft between 2009 and 2014



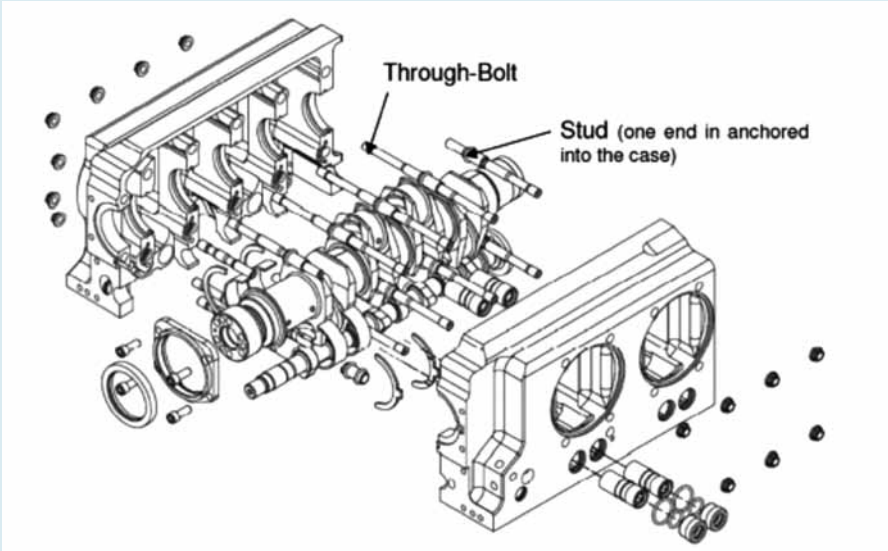
Taking into account the number of aircraft registered in the study period, through-bolt failures occurred in about one in 55 Jabiru powered aircraft. Although originally designed to be replaced after 1,000 hours, 19 through-bolts failed before the 1,000 hour mark, with seven failing before 500 hours.

For the set of engines analysed in this investigation, Jabiru engines are somewhat unique in their design. Conventionally, the crankcase is bolted together with separate bolts to those used to bolt the cylinders to the crankcase. In contrast, in Jabiru engines the same through-bolts, that hold the crankcase together, also fasten the cylinders to the block.

Jabiru Aircraft Pty Ltd has implemented a number of changes to address the though-bolt failures. These include updating the type of through-bolt nut, introducing a thicker (7/16 inch diameter) through-bolt and re-designing and testing a modified 3/8 inch diameter through-bolt, which can be retrofitted to older Jabiru engines. Despite these changes, at least four reported through-bolt failures involved engines with upgraded 3/8 inch diameter through-bolt nuts. However, to date, there have been no failures reported involving the newer 7/16 inch diameter through-bolts, which are used in currently manufactured engines (present in about 20 per cent of Jabiru engines). These newer 7/16 inch through-bolts appear to have improved the reliability of Jabiru engines, although future monitoring will provide more definite evidence.

FEATURE

Figure 16: Schematic showing the general layout of a Jabiru four cylinder engine



Source: Jabiru Aircraft PTY LTD service bulletin JSB031-3

The ATSB issued a safety recommendation to Jabiru Aircraft Australia. It recommends that further safety action is taken to ensure that all owners of Jabiru engines—that have not been manufactured with new configuration 7/16 inch diameter through-bolts, or modified in accordance with Jabiru Service Bulletin JSB031-3—have access to, and are encouraged to upgrade to, the 7/16 inch diameter through-bolt configuration (or any other alternative produced to replace the existing 3/8 inch diameter through-bolt configuration). This includes newly developed through-bolts incorporating aspects to alleviate the effects of thermal expansion and damp resonant vibrations.

The ATSB also recommended that CASA continue to monitor the through-bolt failure rate of Jabiru engines, to satisfy themselves of the reliability of the 7/16 inch diameter bolts and any other alternative produced to replace the existing 3/8 inch diameter through-bolt configuration. This will determine if these modifications have sufficiently reduced the risk of an engine failure or malfunction in Jabiru-powered aircraft.

The ATSB research investigation report, *Engine failures and malfunctions in light aeroplanes 2009–2014* (AR-2013-107), is available from the ATSB website at **www.atsb.gov.au**


OPEN

SECTION 7

Australian National Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Minister for Infrastructure and Transport

I have audited the accompanying annual financial statements of the Australian Transport Safety Bureau for the year ended 30 June 2016, which comprise:

- Statement by the Chief Commissioner and Chief Financial Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Cash Flow Statement; and
- Notes to and Forming Part of the Financial Statements.

Opinion

In my opinion, the financial statements of the Australian Transport Safety Bureau:

(a) comply with Australian Accounting Standards and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and

(b) present fairly the financial position of the Australian Transport Safety Bureau as at 30 June 2016 and its financial performance and cash flows for the year then ended.

Accountable Authority's Responsibility for the Financial Statements

The Chief Commissioner of the Australian Transport Safety Bureau is responsible under the *Public Governance, Performance and Accountability Act 2013* for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards and the rules made under that Act. The Chief Commissioner is also responsible for such internal control as is necessary to enable the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT
Phone (02) 6203 7300 Fax (02) 6203 7777

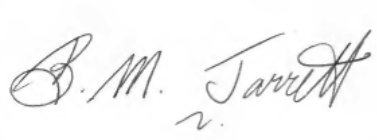
financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made by the Accountable Authority of the entity, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

In conducting my audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Australian National Audit Office



Brandon Jarrett
Executive Director

Delegate of the Auditor-General

Canberra
4 October 2016

Australian Government
Australian Transport Safety Bureau

STATEMENT BY THE CHIEF COMMISSIONER AND CHIEF FINANCIAL OFFICER

In our opinion, the attached financial statements for the year ended 30 June 2016 comply with subsection 42(2) of the Public Governance, Performance and Accountability Act 2013 (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Australian Transport Safety Bureau will be able to pay its debts as and when they fall due.

Greg Hood
Chief Commissioner

4 October 2016

Jason McGuire
Chief Financial Officer

4 October 2016

Statement of Comprehensive Income

for the period ended 30 June 2016

	Notes	2016 $'000	2015 $'000	Original Budget 2016 $'000
NET COST OF SERVICES				
Expenses				
Employee Benefits	1.1A	**(15,457)**	(15,563)	(14,536)
Suppliers	1.1B	**(94,001)**	(102,662)	(57,105)
Depreciation and amortisation	2.2A	**(834)**	(864)	(1,213)
Finance Costs	1.1C	**(8)**	(7)	(3)
Write-Down and Impairment of Assets	1.1D	**(23)**	(18)	-
Total expenses		**(110,323)**	(119,114)	(72,857)
Own-Source Income				
Own-source revenue				
Sale of Goods and Rendering of Services	1.2A	**28,856**	15,888	1,304
Other Revenue	1.2B	**10,758**	18,767	2,117
Total own-source revenue		**39,614**	34,655	3,421
Gains				
Other Gains	1.2C	**-**	1	-
Total gains		**-**	1	-
Total own-source income		**39,614**	34,656	3,421
Net (cost of)/contribution by services		**(70,709)**	(84,458)	(69,436)
Revenue from Government	1.2D	**68,218**	98,459	68,223
Surplus/(Deficit) attributable to the Australian Government		**(2,491)**	14,001	(1,213)

The above statement should be read in conjunction with the accompanying notes.

Statement of Financial Position

as at 30 June 2016

	Notes	2016 $'000	2015 $'000	Original Budget 2016 $'000
ASSETS				
Cash and Cash Equivalents	2.1A	**453**	821	561
Trade and Other Receivables	2.1B	**45,786**	50,605	16,030
Other Financial Assets	2.1C	**111**	76	3
Total financial assets		**46,350**	51,502	16,594
Non-financial assets				
Property, plant and equipment	2.2A	**1,130**	1,501	993
Computer Software	2.2A	**857**	991	4,085
Other Non-Financial Assets	2.2B	**155**	137	153
Total non-financial assets		**2,142**	2,629	5,231
Total assets		**48,492**	54,131	21,825
LIABILITIES				
Payables				
Suppliers	2.3A	**(17,242)**	(20,255)	(228)
Other Payables	2.3B	**(172)**	(914)	(1,317)
Total payables		**(17,414)**	(21,169)	(1,545)
Interest bearing liabilities				
Leases	2.4A	**(126)**	(91)	-
Total interest bearing liabilities		**(126)**	(91)	-
Provisions				
Employee Provisions	4.1A	**(4,391)**	(4,548)	(4,131)
Other Provisions	2.5A	**(74)**	(72)	(74)
Total provisions		**(4,465)**	(4,620)	(4,205)
Total liabilities		**(22,005)**	(25,880)	(5,750)
Net assets		**26,487**	28,251	16,075
EQUITY				
Contributed equity		**12,758**	12,031	12,915
Reserves		**278**	278	3,778
Retained surplus/(Accumulated deficit)		**13,451**	15,942	(618)
Total equity		**26,487**	28,251	16,075

The above statement should be read in conjunction with the accompanying notes.

Statement of Changes in Equity

for the period ended 30 June 2016

	Notes	2016 $'000	2015 $'000	Original Budget 2016 $'000
CONTRIBUTED EQUITY				
Opening balance				
Balance carried forward from previous period		**12,031**	11,282	12,197
Adjusted opening balance		**12,031**	11,282	12,197
Transactions with owners				
Contributions by owners				
Equity injection - Appropriations		**371**	555	371
Departmental capital budget		**356**	360	356
Other		-	(166)	(9)
Total transactions with owners		**727**	749	718
Closing balance as at 30 June		**12,758**	12,031	12,915
RETAINED EARNINGS				
Opening balance				
Balance carried forward from previous period		**15,942**	1,941	595
Adjusted opening balance		**15,942**	1,941	595
Comprehensive income				
Surplus/(Deficit) for the period		**(2,491)**	14,001	(1,213)
Total comprehensive income		**(2,491)**	14,001	(1,213)
Closing balance as at 30 June		**13,451**	15,942	(618)
ASSET REVALUATION RESERVE				
Opening balance				
Balance carried forward from previous period		**278**	278	3,778
Adjusted opening balance		**278**	278	3,778
Closing balance as at 30 June		**278**	278	3,778
TOTAL EQUITY				
Opening balance				
Balance carried forward from previous period		**28,251**	13,501	16,570
Adjusted opening balance		**28,251**	13,501	16,570
Comprehensive income				
Surplus/(Deficit) for the period		**(2,491)**	14,001	(1,213)
Total comprehensive income		**(2,491)**	14,001	(1,213)
Transactions with owners				
Contributions by owners				
Equity injection - Appropriations		**371**	555	371
Departmental capital budget		**356**	360	356
Other		-	(166)	(9)
Total transactions with owners		**727**	749	718
Closing balance as at 30 June		**26,487**	28,251	16,075

The above statement should be read in conjunction with the accompanying notes.

Accounting Policy

Equity Injections

Amounts appropriated which are designated as 'equity injections' for a year (less any formal reductions) and Departmental Capital Budgets (DCBs) are recognised directly in contributed equity in that year.

Cash Flow Statement

for the period ended 30 June 2016

	Notes	2016 $'000	2015 $'000	Original Budget 2016 $'000
OPERATING ACTIVITIES				
Cash received				
Appropriations		**73,307**	73,929	67,828
Sale of goods and rendering of services		**29,201**	5,601	1,304
Net GST received		**192**	1,010	-
Other		**187**	177	391
Total cash received		**102,887**	80,717	69,523
Cash used				
Employees		**(16,057)**	(14,981)	(14,536)
Suppliers		**(86,965)**	(65,277)	(54,986)
Borrowing costs		**(6)**	(5)	(1)
Other		**(187)**	(169)	-
Total cash used		**(103,215)**	(80,432)	(69,523)
Net cash from/(used by) operating activities		**(328)**	285	-
INVESTING ACTIVITIES				
Cash used				
Purchase of property, plant and equipment		**(100)**	(480)	(520)
Purchase of software		**(196)**	(435)	(207)
Total cash used		**(296)**	(915)	(727)
Net cash from/(used by) investing activities		**(296)**	(915)	(727)
FINANCING ACTIVITIES				
Cash received				
Contributed equity		**279**	915	727
Total cash received		**279**	915	727
Cash used				
Repayment of finance leases		**(23)**	(26)	-
Total cash used		**(23)**	(26)	-
Net cash from/(used by) financing activities		**256**	889	727
Net increase/(decrease) in cash held		**(368)**	259	-
Cash and cash equivalents at the beginning of the reporting period		**821**	562	561
Cash and cash equivalents at the end of the reporting period	2.1A	**453**	821	561

The above statement should be read in conjunction with the accompanying notes.

Budget Variances Commentary

The explanations provide a comparison of the original budget as presented in the 2015-16 Portfolio Budget Statements (PBS) to the 2015-16 final outcome as presented in accordance with Australian Accounting Standards for the Australian Transport Safety Bureau. The Budget is not audited.

Variances are considered to be 'major' based on the following criteria:
- the variance between budget and actual is greater than 10%: and
- the variance between budget and actual is greater than 2% of total expenses or total own source revenues: or
- the variance between budget and actual is below this threshold but is considered important for the reader's understanding or is relevant to an assessment of the discharge of accountability and to an analysis of performance of the agency.

In some instances, a budget has not been provided for in the PBS, for example non-cash items such as asset revaluations and sale of assets adjustments. Unless the variance is considered to be 'major' no explanation has been provided.

Explanations of major variances	Affected line items (and statement)
Search for Missing Malaysia Airlines Flight 370 (MH370) Decisions in relation to the search for missing Malaysia Airlines Flight 370 (MH370) had been made by the involved Governments after the time the PBS was published. Additional funding than previously announced has lead to the variance between the budget contained within the PBS and the actual outcome for the 2015-2016 financial year. During the year the ATSB received an additional $27.9 million in contributions and $8.0 million in resources received free of charge from other countries, thus contributing to the variances appearing between the actual outcome and budget.	Statement of Financial Performance: - Employee Benefits - Suppliers - Sale of Goods and Rendering of Services - Other Revenue Statement of Financial Position - Trade and Other Receivables - Suppliers - Other Payables - Retained surplus/(Accummulated deficit) Cash Flow Statement - Operating cash received - Appropriations - Operating cash used - Employees - Operating cash used - Suppliers
Asset Values During Original Budget Process During the original budget process the projected depreciation expense was based on a higher planned amount of capital purchases during the financial year. Due to the projected capital not being purchased during the year, variances within the related capital accounts have occurred.	Statement of Financial Performance: - Depreciation and amortisation Statement of Financial Position - Property, plant and equipment - Intangibles Cash Flow Statement - Investing cash used - Purchase of property, plant and equipment - Investing cash used - Purchase of software - Investing cash received - Contributed equity
Value of Intangible Assets An adjustment made to the value of Intagible Assets in the order of $3 million was reversed post the publication of the PBS.	Statement of Financial Performance: - Depreciation and amortisation Statement of Financial Position - Intangibles

Objectives of the Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an Australian Government controlled entity established by the *Transport Safety Investigation Act 2003 (TSI Act)*, as the national transport safety investigation agency. It is a not-for-profit entity. The ATSB's primary function is to improve aviation, marine and rail safety.

The ATSB is structured to meet the following outcome:

Outcome 1: Improved transport safety in Australia including through: independent, 'no blame' investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The continued existence of the ATSB in its present form and with its present programmes is dependent on Government policy and on continuing funding by the Parliament for the ATSB's administration and programmes.

The ATSB has no administered activities.

The Basis of Preparation

The financial statements are general purpose financial statements and are required by section 42 of the *Public Governance, Performance and Accountability Act 2013*.

The financial statements have been prepared in accordance with:

a) Public Governance, Performance and Accountability (Financial Reporting) Rule 2015 (FRR) for reporting periods ending on or after 1 July 2015; and
b) Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position. The financial statements are presented in Australian dollars.

New Accounting Standards

Adoption of New Australian Accounting Standard Requirements

ATSB has early adopted AASB 2015-7 Amendments to Australian Accounting Standards – Fair value disclosures of Not-for-profit public sector entities.

No new, revised, amending standards or interpretations that were issued prior to the sign-off date and are applicable to the current reporting period did not have a material effect, and are not expected to have a future material effect, on the entity's financial statements.

Future Australian Accounting Standard Requirements

The following new, revised, amending standards and interpretations were issued by the Australian Accounting Standards Board and have been assessed in the following table to see if they have a material impact.

Standard/ Interpretation	Application date for the entity[1]	Nature of impending change/s in accounting policy and likely impact on initial application
AASB 2015-2 Amendments to Australian Accounting Standards – Disclosure Initiative: Amendments to AASB 10	1 January 2016	Amendments to AASB 101 Presentation of Financial Statements will amend financial statement disclosures from 2016-17, encouraging entities to eliminate immaterial disclosures. Likely impact: Minimal

AASB 2015-6 Amendments to Australian Accounting Standards – Extending Related Party Disclosures to Not-for-Profit Public Sector Entities	1 July 2016	Extends the scope of AASB 124 Related Party Disclosures to include application by not-for-profit (NFP) public sector entities and includes implementation guidance for these entities. Likely impact: Minimal
AASB 15 Revenue from Contracts with Customers	1 January 2017	Changes to Revenue from Contracts with Customers will change aspects of the accounting treatment for all departmental revenue other than Gains and Revenues from Government. These revisions first apply in the 2017-18 financial statements, but will require retrospective adjustments for affected accounting treatments for the 2016-17 comparative disclosures. Likely impact: The likely impact is currently not known. Depending on the nature of the department's transactions, the new standard may have a significant impact on the timing of the recognition of revenue.
AASB 9 Financial Instruments	1 July 2017	Changes to the Financial Instruments standard will impact on classification and measurement of financial assets and liabilities of the entity. These revisions are first effective in 2018-19, but will require retrospective adjustments for the 2017-18 comparative disclosures. Likely impact: Minimal due to the value and type of the entity's financial assets and liabilities.

[1] The entity's expected initial application date is when the accounting standard becomes operative at the beginning of the entity's reporting period

Taxation

The entity is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST).

Events After the Reporting Period

There were no events subsequent to 30 June 2016 that had the potential to significantly effect the ongoing structure and financial activities of the ATSB.

1.1 Expenses

	2016 $'000	2015 $'000
1.1A: Employee Benefits		
Wages and salaries	**(11,668)**	(11,820)
Superannuation		
Defined contribution plans	**(847)**	(879)
Defined benefit plans	**(1,390)**	(1,288)
Leave and other entitlements	**(1,260)**	(1,326)
Separation and redundancies	**(207)**	(150)
Other employee expenses	**(85)**	(100)
Total employee benefits	**(15,457)**	(15,563)
1.1B: Suppliers		
Goods and services supplied or rendered		
Investigation services	**(87,747)**	(95,986)
Office rent	**(1,764)**	(1,749)
Information technology	**(1,435)**	(1,139)
Travel	**(769)**	(1,008)
Contracted Services	**(465)**	(868)
Services from the Department of Infrastructure and Regional Development	**(668)**	(414)
Training and conferences	**(221)**	(284)
Communications	**(204)**	(186)
Publications and printing	**(94)**	(122)
Legal	**(68)**	(173)
Consultants	**(16)**	(83)
Audit fees	**(49)**	(48)
Other	**(301)**	(404)
Total goods and services supplied or rendered	**(93,801)**	(102,464)
Goods supplied	**(92)**	(194)
Services rendered	**(93,711)**	(102,270)
Total goods and services supplied or rendered	**(93,801)**	(102,464)
Other suppliers		
Workers compensation expenses	**(200)**	(198)
Total other suppliers	**(200)**	(198)
Total suppliers	**(94,001)**	(102,662)

1.1 Expenses continued

	2016 $'000	2015 $'000
1.1C: Finance Costs		
Finance leases	**(6)**	(5)
Unwinding of discount	**(2)**	(2)
Total finance costs	**(8)**	(7)

Accounting Policy
All borrowing costs are expensed as incurred.

1.1D: Write-Down and Impairment of Assets		
Impairment on financial instruments	-	(4)
Impairment of property, plant and equipment	**(23)**	(14)
Total write-down and impairment of assets	**(23)**	(18)

1.2 Own-Source Revenue and gains

	2016 $'000	2015 $'000
Own-Source Revenue		
1.2A: Sale of Goods and Rendering of Services		
Rendering of services	**28,856**	15,888
Total sale of goods and rendering of services	**28,856**	15,888

Accounting Policy

Revenue from the sale of goods is recognised when:

a) the risks and rewards of ownership have been transferred to the buyer;
b) the entity retains no managerial involvement or effective control over the goods;
c) the revenue and transaction costs incurred can be reliably measured; and
d) it is probable that the economic benefits associated with the transaction will flow to the ATSB.

Revenue from rendering of services is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

a) the amount of revenue, stage of completion and transaction costs incurred can be reliably measured; and
b) the probable economic benefits associated with the transaction will flow to the ATSB.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the estimated total costs of the transaction.
Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any impairment allowance account. Collectability of debts is reviewed at the end of the reporting period. Allowances are made when collectability of the debt is no longer probable.

1.2B: Other Revenue		
Resources received free of charge		
Remuneration of auditors[1]	**48**	48
Other[2]	**10,710**	18,719
Total other revenue	**10,758**	18,767

[1] The ANAO does not provide any other services other than audit of Financial Statements.

[2] This balance is primarily comprised of resources received free of charge in support of the search for missing Malaysia Airlines Flight 370 (MH370).

Accounting Policy

Resources Received Free of Charge
Resources received free of charge are recognised as revenue when, and only when, a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense. Resources received free of charge are recorded as either revenue or gains depending on their nature.
Contributions of assets at no cost of acquisition or for nominal consideration are recognised as gains at their fair value when the asset qualifies for recognition, unless received from another non-corporate or corporate Commonwealth entity as a consequence of a restructuring of administrative arrangements.

1.2 Own-Source Revenue and gains - continued

	2016 $'000	2015 $'000
Gains		
1.2C: Other Gains		
Other	-	1
Total other gains	-	1

Accounting Policy

Sale of Assets
Gains from disposal of assets are recognised when control of the asset has passed to the buyer.

1.2D: Revenue from Government		
Appropriations		
Departmental appropriations	**68,218**	98,459
Total revenue from Government	**68,218**	98,459

Accounting Policy

Revenue from Government
Amounts appropriated for departmental appropriations for the year (adjusted for any formal additions and reductions) are recognised as Revenue from Government when the ATSB gains control of the appropriation. Appropriations receivable are recognised at their nominal amounts.

2.1 Financial Assets

	2016 $'000	2015 $'000
2.1A: Cash and Cash Equivalents		
Cash on hand or on deposit	**453**	821
Total cash and cash equivalents	**453**	821

Accounting Policy
Cash is recognised at its nominal amount. Cash and cash equivalents includes:
a) cash on hand; and
b) demand deposits in bank accounts with an original maturity of 3 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value.

2.1B: Trade and Other Receivables		
Goods and services receivables		
Goods and services	**59**	10,316
Total goods and services receivables	**59**	10,316
Appropriations receivables		
Appropriation receivable	**45,648**	40,289
Total appropriations receivables	**45,648**	40,289
Other receivables		
Statutory receivables	**79**	-
Total other receivables	**79**	-
Total trade and other receivables (gross)	**45,786**	50,605
Total trade and other receivables (net)	**45,786**	50,605
Trade and other receivables (net) expected to be recovered		
No more than 12 months	**45,786**	50,605
More than 12 months	-	-
Total trade and other receivables (net)	**45,786**	50,605
Trade and other receivables (gross) aged as follows		
Not overdue	**45,783**	41,312
Overdue by		
0 to 30 days	**3**	9,293
31 to 60 days	-	-
61 to 90 days	-	-
More than 90 days	-	-
Total trade and other receivables (gross)	**45,786**	50,605

Accounting Policy
Receivables
Trade receivables and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'receivables'. Receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

2.1C: Other Financial Assets		
Accrued Revenue	**111**	76
Total other financial assets	**111**	76
Other financial assets expected to be recovered		
No more than 12 months	**111**	76
More than 12 months	-	-
Total other financial assets	**111**	76

2.2 Non-Financial Assets

2.2A: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment and Intangibles

Reconciliation of the opening and closing balances of property, plant and equipment for 2016

	Plant and equipment $'000	Computer Software[1] $'000	Total $'000
As at 1 July 2015			
Gross book value	2,144	6,063	8,207
Accumulated depreciation, amortisation and impairment	(643)	(5,072)	(5,715)
Total as at 1 July 2015	1,501	991	2,492
Additions			
Purchase	100	-	100
Internally developed	-	196	196
Finance lease	159	-	159
Impairments recognised in net cost of services	(23)	-	(23)
Depreciation and amortisation	(504)	(330)	(834)
Other movements	(103)	-	(103)
Total as at 30 June 2016	1,130	857	1,987
Total as at 30 June 2016 represented by			
Gross book value	2,398	6,182	8,580
Accumulated depreciation, amortisation and impairment	(1,268)	(5,325)	(6,593)
Total as at 30 June 2016	1,130	857	1,987

1. The carrying amount of computer software included $335,000 purchased software and $522,000 internally generated

No indicators of impairment were found for any non-financial assets.

No property, plant and equipment and intangibles are expected to be sold or disposed of within the next 12 months.

Reconciliation of the opening and closing balances of property, plant and equipment for 2015

	Plant and equipment $'000	Computer Software $'000	Total $'000
As at 1 July 2014			
Gross book value	1,664	5,628	7,292
Accumulated depreciation, amortisation and impairment	(67)	(4,769)	(4,836)
Total as at 1 July 2014	1,597	859	2,456
Additions			
Purchase	480	420	900
Internally developed	-	15	15
Impairments recognised in net cost of services	(14)	-	(14)
Depreciation and amortisation	(571)	(293)	(864)
Other movements	9	(10)	(1)
Total as at 30 June 2015	1,501	991	2,492
Total as at 30 June 2015 represented by			
Gross book value	2,144	6,063	8,207
Accumulated depreciation, amortisation and impairment	(643)	(5,072)	(5,715)
Total as at 30 June 2015	1,501	991	2,492

Accounting Policy

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the statement of financial position, except for purchases costing less than $5,000 excluding GST, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located. This is particularly relevant to 'make good' provisions in relation to property leases taken up by the Department of Infrastructure and Regional Development properties and occupied by the ATSB where an obligation exists to restore the property to its original condition. As the property leases are held by the Department of Infrastructure and Regional Development, these costs are included in the value of the ATSB's Property, Plant and Equipment asset class with a corresponding provision for the 'make good' recognised

Depreciation

Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the ATSB using, in all cases, the straight-line method of

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

	2016	2015
Plant and equipment	10 years	10 years
Computer equipment	4 years	4 years
Office equipment	10 years	10 years

Impairment

All assets were assessed for impairment as at 30 June 2016. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs of disposal and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the entity were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

Intangibles

The ATSB's intangibles comprise of internally developed software for internal use and purchased software. These assets are carried at cost less accumulated amortisation and accumulated impairment losses. Intangibles are amortised on a straight line basis over their anticipated useful life and the default useful life is five years.

2.2 Non-Financial Assets continued		
2.2B: Other Non-Financial Assets		
Prepayments	**155**	137
Total other non-financial assets	**155**	137
Other non-financial assets expected to be recovered		
No more than 12 months	**143**	117
More than 12 months	**12**	20
Total other non-financial assets	**155**	137

2.3 Payables

	2016 $'000	2015 $'000
2.3A: Suppliers		
Accrued expenses	**(13,326)**	(10,662)
Trade creditors	**(3,916)**	(9,593)
Total suppliers	**(17,242)**	(20,255)
Suppliers expected to be settled		
No more than 12 months	**(17,242)**	(20,255)
More than 12 months	-	-
Total suppliers	**(17,242)**	(20,255)

Settlement was usually made within 30 days

2.3B: Other Payables		
Wages and salaries	**(82)**	(513)
Superannuation	**(8)**	(76)
Unearned income	**(82)**	-
Statutory payables	-	(325)
Total other payables	**(172)**	(914)
Other payables expected to be settled		
No more than 12 months	**(172)**	(914)
More than 12 months	-	-
Total other payables	**(172)**	(914)

Accounting Policy
Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

2.4 Interest Bearing Liabilities

	2016 $'000	2015 $'000
2.4A: Leases		
Finance Leases	**(126)**	(91)
Total leases	**(126)**	(91)
Leases expected to be settled		
Within 1 year		
Minimum lease payments	**(92)**	(92)
Future finance charges	**3**	1
Between 1 to 5 years		
Minimum lease payments	**(39)**	-
Future finance charges	**2**	-
Total leases	**(126)**	(91)

In 2016, finance leases existed in relation to office pool vehicles. The leases were non-cancellable and for fixed terms averaging 2.5 years, with a maximum of 3 years. The interest rate implicit in the vehicle leases averaged 4.46% (2015: 4.94%). The lease assets secured the lease liabilities. The ATSB guaranteed the residual values of all assets leased. There were no contingent rentals.

Accounting Policy
A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all the risks and rewards incidental to ownership of leased assets. An operating lease is a lease that is not a finance lease. In operating leases, the lessor effectively retains substantially all such risks and benefits.
Where an asset is acquired by means of a finance lease, the asset is capitalised at either the fair value of the lease property or, if lower, the present value of minimum lease payments at the inception of the contract and a liability is recognised at the same time and for the same amount. The discount rate used is the interest rate implicit in the lease. Leased assets are amortised over the period of the lease. Lease payments are allocated between the principal component and the interest expense.

2.5 Other Provisions

2.5A: Other Provisions

	Provision for restoration $'000	Total $'000
As at 1 July 2015	**(72)**	**(72)**
Unwinding of discount or change in discount rate	**(2)**	**(2)**
Total as at 30 June 2016	**(74)**	**(74)**
Other provisions expected to be settled		
No more than 12 months	-	-
More than 12 months	**(74)**	(72)
Total other provisions	**(74)**	(72)

The Department of Infrastructure and Regional Development (DOIRD) leases all premises that the ATSB occupies. The ATSB reimburses DOIRD for its portion of lease costs. There is currently 1 agreement (2015: 1 agreement) for the leasing of premises which have provisions requiring the ATSB (through DOIRD) to restore the premises to their original condition at the conclusion of the lease. The ATSB has made a provision to reflect the present value of this obligation.

3.1 Appropriations

3.1A: Annual Appropriations ('Recoverable GST exclusive')

Annual Appropriations for 2016

	Appropriation Act		*PGPA Act*				
	Annual Appropriation[1]	Advance to Finance Minister	Section 74 Receipts	Section 75 Transfers	Total appropriation	Appropriation applied in 2016 (current and prior years)	Variance[2]
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Departmental							
Ordinary annual services	68,223	-	39,160	-	107,383	(102,421)	4,962
Capital Budget	356	-	-	-	356	-	356
Other services							
Equity Injections	371	-	-	-	371	(279)	92
Total departmental	68,950	-	39,160	-	108,110	(102,700)	5,410

1. In 2015-16, an amount of $5,376 was quarantined as a result of the PSSAP Admin Fees, under section 51 of the PGPA Act.
2. A large portion of the $4.9 million variance is directly related to the search for missing Malaysia Airlines Flight 370 (MH370) and uncontrollable variables, such as weather. Other expenses in relation to the search for the missing aircraft have been slightly delayed, however the funds will be fully utilised in 2016-17.

Annual Appropriations for 2015

	Appropriation Act		*PGPA Act*				
	Annual Appropriation[1]	Advance to Finance Minister	Section 74 Receipts	Section 75 Transfers	Total appropriation[2]	Appropriation applied in 2015 (current and prior years)	Variance[3]
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Departmental							
Ordinary annual services	98,481	-	5,667	-	104,148	(79,626)	24,522
Capital Budget	360	-	-	-	360	(401)	(41)
Other services							
Equity Injections	555	-	-	-	555	(514)	41
Total departmental	99,396	-	5,667	-	105,063	(80,541)	24,522

1. In 2014-15, an amount of $22,000 was quarantined as a result of a communications functions savings measure, under section 51 of the PGPA Act.
2. In 2014-15, there was no adjustment that met the recognition criteria of a formal addition or reduction in revenue (in accordance with FRR Part 6 Div 3) but at law the appropriations had not been amended before the end of the reporting period.
3. As part of the 2014-2015 Portfolio Supplementary Additional Estimates budget process, the ATSB received an additional $29.577 million through Appropriation Bill 5. A large portion of the $24.4 million variance is directly related to the search for missing Malaysia Airlines Flight 370 (MH370) and uncontrollable variables, such as weather. Other expenses in relation to the search for the missing aircraft have been slightly delayed, however the funds will be fully utilised in 2015-16.

3.1B: Unspent Annual Appropriations ('Recoverable GST exclusive')

	2016	2015
	$'000	$'000
Departmental		
Appropriation Act (No. 2) 2013-14	**459**	459
Appropriation Act (No. 1) 2014-15	**262**	9,698
Appropriation Act (No. 2) 2014-15	**555**	555
Appropriation Act (No. 5) 2014-15	**-**	29,577
Appropriation Act (No. 1) 2015-16	**44,280**	-
Appropriation Act (No. 2) 2015-16	**92**	-
Cash	**453**	821
Total departmental	**46,101**	41,110

3.2 Net Cash Appropriation Arrangements

	2016 $'000	2015 $'000
Total comprehensive income /(loss) less depreciation/amortisation expenses previously funded through revenue appropriations	**(1,657)**	14,865
Plus: depreciation/amortisation expenses previously funded through revenue appropriation	**(834)**	(864)
Total comprehensive income - as per the Statement of Comprehensive Income	**(2,491)**	14,001

3.3 Cash Flow Reconciliation

3.3A: Cash Flow Reconciliation

	2016 $'000	2015 $'000
Reconciliation of cash and cash equivalents as per statement of financial position to cash flow statement		
Cash and cash equivalents as per		
Cash flow statement	**453**	821
Statement of financial position	**453**	821
Discrepancy	**-**	-
Reconciliation of net cost of services to net cash from/(used by) operating activities		
Net cost of services	**(70,709)**	(84,458)
Revenue from Government	**68,218**	98,459
Adjustments for non-cash items		
Depreciation/amortisation	**834**	864
Net write down of non-financial assets	**23**	14
Unwinding of discount	**2**	2
Other non-cash items	**-**	(166)
Movements in assets and liabilities		
Assets		
(Increase)/Decrease in net receivables	**5,269**	(34,458)
(Increase)/Decrease in accrued revenue	**(35)**	(73)
(Increase)/Decrease in prepayments	**(18)**	15
Liabilities		
Increase/(Decrease) in employee provisions	**(157)**	466
Increase/(Decrease) in suppliers payables	**(3,338)**	19,595
Increase/(Decrease) in other payables	**(417)**	25
Net cash from/(used by) operating activities	**(328)**	285

4.1 Employee Provisions

	2016 $'000	2015 $'000
4.1A: Employee Provisions		
Leave	**(4,391)**	(4,548)
Total employee provisions	**(4,391)**	(4,548)
Employee provisions expected to be settled		
No more than 12 months	**(1,838)**	(1,799)
More than 12 months	**(2,553)**	(2,749)
Total employee provisions	**(4,391)**	(4,548)

Accounting Policy

Liabilities for 'short-term employee benefits' (as defined in AASB 119 *Employee Benefits*) and termination benefits due within twelve months of the end of reporting period are measured at their nominal amounts.

The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

Other long-term employee benefits are measured as a net total of the present value of the defined benefit obligation at the end of the reporting period minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly.

Leave

The liability for employee benefits includes provision for annual leave and long service leave. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees of the ATSB is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimated salary rates that will be applied at the time the leave is taken, including the ATSB's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the Australian Government Shorthand Method outlined in the FRR for reporting periods ending on or after 1 July 2016. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Superannuation

The ATSB's staff are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS) or the PSS accumulation plan (PSSap).

The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported in the Department of Finance administered schedules and notes.

The ATSB makes employer contributions to the employees' superannuation scheme at rates determined by an actuary to be sufficient to meet the current cost to the Government. The ATSB accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June 2016 represents outstanding contributions for the final fortnight of the year.

4.2: Senior Management Personnel Remuneration

	2016 $	2015 $
Short-term employee benefits		
Salary	**(1,316,713)**	(1,258,085)
Allowances	**(5,429)**	(4,604)
Total short-term employee benefits	**(1,322,142)**	(1,262,689)
Post-employment benefits		
Superannuation	**(233,120)**	(214,475)
Total post-employment benefits	**(233,120)**	(214,475)
Other long-term employee benefits		
Annual leave	**(83,701)**	(81,601)
Long-service leave	**(28,259)**	(26,241)
Total other long-term employee benefits	**(111,960)**	(107,842)
Termination benefits		
Incentive Payments	**(107,809)**	-
Total termination benefits	**(107,809)**	-
Total senior executive remuneration expenses	**(1,775,031)**	(1,585,006)

The total number of senior management personnel that are included in the above table is 9 individuals (2015: 8 individuals).

5.1: Financial Instruments

	2016 $'000	2015 $'000
5.1A: Categories of Financial Instruments		
Financial Assets		
Loans and receivables		
Cash and cash equivalents	**453**	821
Trade and other receivables	**59**	10,316
Total loans and receivables	**512**	11,137
Total financial assets	**512**	11,137
Financial Liabilities		
Financial liabilities measured at amortised cost		
Trade creditors	**(3,916)**	(9,593)
Finance leases	**(126)**	(91)
Total financial liabilities measured at amortised cost	**(4,042)**	(9,684)
Total financial liabilities	**(4,042)**	(9,684)

Accounting Policy

Financial assets

The ATSB classifies its financial assets in the following categories:

a) cash and cash equivalents; and
b) loans and receivables.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Financial assets are recognised and derecognised upon 'trade date'.

Effective Interest Method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis except for financial assets that are recognised at fair value through profit or loss.

Receivables

Trade receivables and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'receivables'. Receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period.

Financial assets held at amortised cost - if there is objective evidence that an impairment loss has been incurred for loans and receivables or held to maturity investments held at amortised cost, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income.

Financial assets held at cost - if there is objective evidence that an impairment loss has been incurred, the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities. Financial liabilities are recognised and derecognised upon 'trade date'

Financial Liabilities at Fair Value Through Profit or Loss

Financial liabilities at fair value through profit or loss are initially measured at fair value. Subsequent fair value adjustments are recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest paid on the financial liability.

Other Financial Liabilities

Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs. These liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis.The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments through the expected life of the financial liability, or, where appropriate, a shorter period.

5.1: Financial Instruments continued

	2016 $'000	2015 $'000
5.1B: Net Losses on Financial Assets		
Receivables		
Impairment	-	(4)
Net losses on receivables	-	(4)
Net loss on financial assets	-	(4)
5.1C: Net Loss on Financial Liabilities		
Financial liabilities measured at amortised cost		
Interest expense	(6)	(5)
Net loss on financial liabilities measured at amortised cost	(6)	(5)
Net loss on financial liabilities	(6)	(5)

5.1D: Fair Value of Financial Instruments

	Carrying amount 2016 $'000	Fair value 2016 $'000	Carrying amount 2015 $'000	Fair value 2015 $'000
Financial Assets				
Cash and cash equivalents	**453**	**453**	821	821
Trade and other receivables	**59**	**59**	10,316	10,316
Total financial assets	**512**	**512**	11,137	11,137
Financial Liabilities				
Trade Creditors	**(3,916)**	**(3,916)**	(9,593)	(9,593)
Finance Leases	**(126)**	**(126)**	(91)	(91)
Total financial liabilities	**(4,042)**	**(4,042)**	(9,684)	(9,684)

5.1E: Credit Risk

The ATSB was exposed to minimal credit risk as loans and receivables were cash and trade receivables. The maximum exposure to credit risk was the risk that arises from potential default of a debtor. This amount was equal to the total amount of trade receivables (2016: $59,000 and 2015: $10,316,000).

The ATSB had assessed the risk of the default on payment and had allocated Nil in 2016 (2015: Nil) to an impairment allowance account.

The ATSB held no collateral to mitigate against credit risk.

Credit quality of financial assets not past due or individually determined as impaired

	Not past due nor impaired 2016 $'000	Not past due nor impaired 2015 $'000	Past due or impaired 2016 $'000	Past due or impaired 2015 $'000
Cash and cash equivalents	**453**	821	**-**	-
Trade receivables	**56**	1,023	**3**	9,293
Total	**509**	1,844	**3**	9,293

Ageing of financial assets that were past due but not impaired in 2016

	0 to 30 days $'000	31 to 60 days $'000	61 to 90 days $'000	90+ days $'000	Total $'000
Trade receivables	**3**	-	-	-	**3**
Total	**3**	-	-	-	**3**

Ageing of financial assets that were past due but not impaired in 2015

	0 to 30 days $'000	31 to 60 days $'000	61 to 90 days $'000	90+ days $'000	Total $'000
Trade receivables	9,293	-	-	-	9,293
Receivables for goods and services	9,293	-	-	-	9,293
Total	9,293	-	-	-	9,293

5.1: Financial Instruments continued

5.1F: Liquidity Risk

The ATSB's financial liabilities are trade payables and finance leases on office pool vehicles. Given the financial position of the ATSB and the source and nature of its future funding from the Government, the risk that the ATSB would be unable to meet its financial obligations to its creditors is significantly low.

Maturities for non-derivative financial liabilities in 2016

	On demand	within 1 year	between 1 to 2 years	between 2 to 5 years	more tban 5 years	Total
	$'000	$'000	$'000	$'000	$'000	$'000
Trade creditors	-	(3,916)	-	-	-	(3,916)
Finance Leases	-	(89)	(37)	-	-	(126)
Total	-	(4,005)	(37)	-	-	(4,042)

Maturities for non-derivative financial liabilities in 2015

	On demand	within 1 year	between 1 to 2 years	between 2 to 5 years	more than 5 years	Total
	$'000	$'000	$'000	$'000	$'000	$'000
Trade creditors	-	(9,593)	-	-	-	(9,593)
Finance Leases	-	(91)	-	-	-	(91)
Total	-	(9,684)	-	-	-	(9,684)

The entity had no derivative financial liabilities in either 2016 or 2015.

5.1G: Market Risk

The ATSB holds basic financial instruments which do not expose the entity to market risks, such as 'Currency risk' and 'Other price risk'.

Interest rate risk

The only interest bearing item on the statement of financial position were the finance leases on office pool vehicles. The leases were established at a fixed rate of interest and repayments do not fluctuate with movements in the market interest rates.

5.2 Fair Value Measurement

The following tables provide an analysis of assets and liabilities that are measured at fair value. The remaining assets and liabilities diclosed in the statement of financial position do not apply the fair value hierachy.
The different levels of the fair value hierarchy are defined below.

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at measurement date.
Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.
Level 3: Unobservable inputs for the asset or liability.

Accounting Policy
The ATSB deems transfers between levels of the fair value hierarchy to have occurred at the date of the event or change in circumstances that caused the transfer

5.2A: Fair Value Measurements, Valuation Techniques and Inputs Used

	Fair value measurements at the end of the reporting period			For Levels 2 and 3 fair value measurements	
	2016 $'000	2015 $'000	Category (Level 1, 2 or 3)	Valuation technique(s)[1]	Inputs used
Non-financial assets					
Other property, plant and equipment	**1,130**	1,501	Level 3	Depreciated replacement cost	Unobservable, not frequently traded in the marketplace. Data provided by valuers
Total non-financial assets	**1,130**	1,501			
Total fair value measurements of assets in the statement of financial position	**1,130**	1,501			

1. No change in valuation technique occurred during the period.

The highest and best use of all non-financial assets are the same as their current use.

Recurring and non-recurring Level 3 fair value measurements - valuation processes

The ATSB procured valuation services and relied on valuation models provided by the valuer. The ATSB currently engages an independent valuer on a 3 yearly basis. The valuers provided written assurance that the model developed is in compliance with AASB13. There was no revaluation undertaken during 2015-16.

5.2B: Reconciliation for Recurring Level 3 Fair Value Measurements

Recurring Level 3 fair value measurements - reconciliation for assets

	Non-financial assets			
	Other property, plant and equipment		Total	
	2016 $'000	2015 $'000	2016 $'000	2015 $'000
As at 1 July	**1,501**	1,597	**1,501**	1,597
Purchases	**259**	480	**259**	480
Impairments recognised in net cost of services	**(23)**	(14)	**(23)**	(14)
Depreciation/amortisation expense	**(504)**	(571)	**(504)**	(571)
Other movements	**(103)**	9	**(103)**	9
Total as at 30 June	**1,130**	1,501	**1,130**	1,501
Changes in unrealised gains/(losses) recognised in net cost of services for assets held at the end of the reporting period	-	-	-	-

6.1 Reporting of Outcomes

6.1A: Net Cost of Outcome Delivery

	Outcome 1		Total	
	2016	2015	**2016**	2015
	$'000	$'000	**$'000**	$'000
Departmental				
Expenses	**(110,323)**	(119,114)	**(110,323)**	(119,114)
Own-source income	**39,614**	34,656	**39,614**	34,656
Net cost of outcome delivery	**(70,709)**	(84,458)	**(70,709)**	(84,458)

SECTION 8

Management and accountability

The Commission

The ATSB is governed by a Commission, comprising a Chief Commissioner and three part-time Commissioners.

The Commission provides guidance on the selection of accidents and other safety incidents to be investigated. It also supports the ATSB in encouraging safety action ahead of final reports, thus reducing the need to issue safety recommendations.

The Commission operates within the corporate governance framework of the ATSB Commission Governance Manual, which is updated at Commission meetings when required. The manual sets out the Commission's legislative requirements, parliamentary and ministerial accountability, membership and functions, administrative policies and procedures and reporting obligations.

The Commission meets at least quarterly, and regularly deals with business electronically in accordance with its obligations under the TSI Act and its agreed policies.

All Commissioners participated in four meetings during 2015–16. The Commissioners also attended an annual planning session with senior management in March 2016.

Executive management

The ATSB Executive meets weekly to discuss strategic management issues and priorities. The ATSB Executive consists of the Chief Commissioner, the General Managers of Aviation Safety Investigations, Surface Safety Investigations and Strategic Capability, and the Program Director, Operational Search for MH370.

Audit Committee

The Audit Committee provides independent assurance and advice to the Chief Commissioner on the ATSB's risk management, internal controls, financial statements and legislative compliance. The Audit Committee is made up of an independent chair, an independent member and an ATSB management nominee. The Committee's quarterly meetings were held in October 2015 and February, April and June 2016.

The core work of the Committee during the year was to oversee and advise on:

- the annual Internal Audit Program for 2015–16
- ATSB's Risk Management, Fraud Control and Business Continuity Plans
- ATSB's Financial Statement preparations
- implementation of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) and the associated Rule
- the internal audit governance framework—including Audit Committee Charter, Internal Audit Charter and Internal Audit Strategic Plan 2014–17.

The Committee is also taking a key role in advising on the governance and financial management of the search for MH370.

The audit program for 2015–16 focused on assuring the ATSB's legislative compliance and performance against its core functions. The program included the following internal audits:

- TSI Act Section 32 powers
- Implementation of external review recommendations
- MH370 program health check.

Professional Committee

The Professional Committee provides for open communication on matters that affect the professional interests of ATSB staff in the workplace. The role of the Professional Committee is to:

- provide a forum for professional development, business improvement and related issues to be raised and discussed
- consider and develop recommendations for the Executive—including proposals from employees for improving the ATSB workplace
- explore opportunities for continuous improvement of our business processes, policies and procedures
- foster innovation and consistency in how the ATSB carries out its business.

The Professional Committee comprises 12 elected staff members, who met on three occasions during 2015–16.

Business planning and reporting

Each year, the ATSB develops an Annual Plan—consistent with the strategic direction provided through its Corporate Plan, which is published on the ATSB website. The Annual Plan incorporates the operational priorities, activities, deliverables and key performance indicators for the financial year.

The ATSB Annual Plan 2015–16 gave priority to:

- building capability and effectiveness—including the timeliness, and quality, of investigations and reports
- strengthening stakeholder relationships—including with other safety agencies
- commitment to safety research communication and education and promoting attention to risk areas identified through the SafetyWatch initiative
- regional and international engagement
- ongoing participation in the transport reform agenda
- sharing safety information
- focused safety research and data analysis
- maintaining preparedness for a major accident.

Performance reporting for the Annual Plan is contained in Section 3 of this annual report.

Risk management

Consistent with the PGPA Act, the ATSB's Risk Management Framework is an integral element of its governance, planning and management framework. Risk assessment and mitigation have been integrated into ATSB business practices, planning and performance reporting—at both corporate and business unit levels.

The ATSB is committed to a comprehensive, coordinated and systematic approach to the management of risk—directed towards supporting managers at all levels to anticipate and plan for risk, and to respond appropriately. For 2015–16, the ATSB concentrated its risk focus on the areas of service delivery, health and safety, security, financial/economic, compliance and reputation.

The ATSB Enterprise Risk Register and Management Plan and Risk Policy are reviewed regularly by the Commission, the Executive and the Audit Committee. Ongoing review of risk management planning ensures the ATSB is well-placed to achieve the objectives of its risk management policy and that risk management is consistently practiced across the agency.

Business Continuity Plan

The ATSB's Business Continuity Plan provides a framework to ensure the ATSB is well-placed to manage a business disruption, implement recovery processes and build business resilience.

In 2015–16, the ATSB continued to review and test its operational risk management processes and responses, which mitigate the impact of non-routine business disruptions. A testing exercise conducted in October 2015 demonstrated the management team's in-depth knowledge of the ATSB's service obligations, business operations and resource requirements in the event of a business disruption.

The Audit Committee regularly reviews the ATSB's business continuity operations.

Fraud control

In accordance with the PGPA Act, the ATSB has in place the ATSB Fraud Control Plan 2016–18.

The ATSB's fraud risk register is reviewed on a quarterly basis and continually monitored to minimise the incidence of fraud. This process is assisted through the development, implementation and regular assessment of its fraud prevention, detection, and response strategies.

The introduction of the *Public Interest Disclosure Act 2013* in January 2014, and the development of the ATSB policy and procedure for making a disclosure under the scheme, has complemented the ATSB's fraud management strategies. The ATSB's staff awareness program incorporates activities for existing and new staff.

The Audit Committee and Commission receive regular reports on fraud risks and the implementation of controls and treatments. The Committee, and the Commission, review the Fraud Control Plan to ensure the ATSB has appropriate processes and systems in place to capture, and effectively investigate, fraud-related information.

There were no allegations, or instances, of fraud reported within the ATSB during 2015–16.

Ethical standards

During the reporting period, the ATSB continued to demonstrate its commitment to the APS Values, Employment Principles and Code of Conduct by:

- highlighting the APS Values, Employment Principles and Code of Conduct in all selection criteria and recruitment processes for all ATSB positions
- including briefing information on the APS Values, Employment Principles and Code of Conduct in induction packages and training sessions
- promoting the APS Values, Employment Principles and Code of Conduct through individual performance management plans
- allowing employees to access information on ethical standards via the ATSB's intranet and the Australian Public Service Commission's (APSC) website
- developing Public Interest Disclosure policy and procedures
- ensuring that the ATSB's fraud control policy, allegations and investigations are dealt with in accordance with the Values and Code of Conduct, ensuring procedural fairness and natural justice.

Management of human resources

Over the past year, the ATSB's Organisational Development team has continued to focus on a range of workforce planning activities designed to position the agency to operate within a resource-constrained environment.

These activities included:

- embedding the strategic workforce plan, which outlines the ATSB's approach to meeting and maintaining its future workforce needs over the next 4 years, to ensure it has access to the skills and competencies necessary to function as a modern transport safety agency
- facilitating the mergers of several business areas designed to support greater alignment of functions and to reduce management overheads
- focusing on targeted areas for improvement that were identified through the 2015 Census report including remuneration, employment conditions, performance management, internal communications, career progression, flexible working arrangements and stress management
- implementing the new Corporate Plan which took effect on 31 August 2015.

Given the finite nature of ATSB human resources, representing an associated employee cost of approximately 65 per cent of the agency's current and projected budgets, it is imperative that strategies are developed and implemented to maximise the utilisation of these resources. Accordingly, the revised strategic workforce plan has been designed to cover a broad range of strategies including:

- reshaping the workforce
- developing a pool of capable staff
- attracting and retaining high quality staff
- building management and leadership capability

- fostering our culture and key principles
- addressing workforce risks
- increasing our core appropriations (out-years)
- creating tools to support a more systemic and rigorous workforce planning process.

Each of these strategies has been underpinned by a number of key activities that will be routinely reviewed through the Executive and Commission, and quality assured through the Audit Committee.

Over this reporting period, there has been a particular focus on addressing workforce risks and analysing the agency's ongoing capacity to maintain its primary objective, key functions and broader portfolio responsibilities. This is within the context of the ATSB having been subjected to successive reductions to its base appropriations, with further reductions projected over its forward estimates. This has resulted in a progressive reduction in the ATSB's core capabilities (staffing profile including specialist investigators) by about 25 per cent since it was established as an independent statutory authority in July 2009.

If the ATSB is unable to arrest this situation through increasing its core appropriations over the out-years, it will need to carefully consider which of its key functions and deliverables can be supported by a diminishing workforce. These challenges and associated risks have been identified through the ATSB's Corporate Plan.

Compounding this scenario, the ATSB also anticipates that a significant number of experienced investigators are likely to transition to retirement over the short-to-medium term. While the ATSB will implement a range of workforce planning strategies to mitigate the resulting loss of organisational knowledge and experience, people with skills and capabilities to replace these staff are in high demand and can often command a market premium beyond that which the ATSB is capable of remunerating.

Staffing profile

In accordance with our workforce planning projections, the ATSB's staffing profile has continued to decrease from 110 at the start of July 2015 to 103 at the end of June 2016. The associated staff turnover rate was approximately 13 per cent. Table 17 displays the ATSB staff numbers, by classification, as of 30 June 2016.

Table 17: ATSB staffing profile at 30 June 2016

SUBSTANTIVE CLASSIFICATION	FEMALE (FULL TIME)	FEMALE (PART TIME)	MALE (FULL TIME)	MALE (PART TIME)	NON-ONGOING	TOTAL
Statutory Office Holders		1	1	2		4
Senior Executive Service Band 1			3			3
EL 2	4	1	42	1	1	49
EL 1	8		10		3	21
APS 6	2	1	7			10
APS 5	8	1	3		1	13
APS 4	1		1		1	3
Total	**23**	**4**	**67**	**3**	**6**	**103**

This total is comprised of the following employment arrangements:

- 96 staff (representing all non-SES employees) covered by the Enterprise Agreement
- three SES employees covered by section 24(1) determinations, established in accordance with the ATSB's SES remuneration policy
- four Statutory Office Holders (representing the Commissioners) determined by the Remuneration Tribunal.

There are no other employment arrangements in place and there is no provision for performance pay.

This total comprises 86 staff based in Canberra, nine based in Brisbane, four based in Adelaide, three based in Perth and one in Sydney.

Indigenous employees

At 30 June 2015 and 30 June 2016, the ATSB had no ongoing or non-ongoing employees who identify as Indigenous.

Salary rates

Table 18 displays the salary rates supporting the above employment arrangements at 30 June 2016.

Table 18: ATSB salary rates at 30 June 2016

SUBSTANTIVE CLASSIFICATION	LOWER ($)	UPPER ($)
Statutory Office Holders	**As determined by the Remuneration Tribunal**	
SES1	200,860	227,401
EL 2	112,235	137,943*
EL 1	94,445	108,944*
APS 6	75,127	87,668*
APS 5	67,972	73,393
APS 4	60,886	66,161

* Maximums include Transport Safety Investigator and respective supervisor's salaries, representing a $1,924–$9,842 increase on standard APS6–EL2 rates.

Organisational culture

This has been another unsettling year for our employees—taking into account our resource constrained environment, a number of workforce restructures and a protracted bargaining process. Fortunately, though, it appears our enduring organisational culture, and underlying morale, have been able to weather another difficult period. As demonstrated by our agency's wellbeing indicators, derived from the 2016 staff census results, it is pleasing to see that our staff remain positive in terms of job roles, attachment to the agency, feelings of personal accomplishment, attitude towards managers, workplace safety and work-life balance—as evidenced by these census results:

- *I enjoy the work in my current job*—80 per cent positive
- *I feel a strong personal attachment to my agency*—82 per cent positive
- *My job gives me a feeling of personal accomplishment*—76 per cent positive
- *I have a good immediate supervisor*—80 per cent positive
- *My supervisor treats people with respect*—86 per cent positive
- *My supervisor is committed to workplace safety*—88 per cent positive
- *My agency genuinely cares about employees being healthy and safe at work*—78 per cent positive
- *How satisfied are you with your ability to access and use flexible working arrangements?* —85 per cent positive.

Conversely there are a number of results (trends) that have been identified as new and ongoing challenges, which have been captured within the revised strategic workforce plan and supporting implementation plan. They are as follows:

- *My workplace provides access to effective learning and development*—down to 67 per cent
- *Change is managed well in my agency*—down to 41 per cent

- *I am fairly remunerated for the work that I do*—stable at 55 per cent
- *I am satisfied with the opportunities for career progression in my agency*—up to 41 per cent.

Training and development

The ATSB, as a former Registered Training Organisation, awarded 15 Transport Safety Investigation Diplomas in 2015–16. At the same time the ATSB has continued to provide training opportunities for a broad range of industry-based personnel, through its highly regarded Human Factors, On-site safety and Aircraft Accident Investigation Fundamentals courses.

Unfortunately, as a consequence of further reductions in its staffing profile, the ATSB determined that it no longer had the necessary resources to maintain its status as a Registered Training Organisation. Accordingly, the ATSB relinquished this status on 18 March 2016. This was a particularly difficult decision given the ATSB had held this status for 13 consecutive years. It remains unclear as to how the ATSB will be able to gain formal qualifications for its investigation staff into the future. Ideally, pending increased funding, the ATSB would re-establish its status to deliver this highly sought-after and well-regarded qualification.

In terms of other professional development and industry awareness-type programs, the ATSB has been required to limit these opportunities due to its ongoing financial constraints. That acknowledged, approximately 10 per cent of staff were engaged in a range of tertiary studies, including:

- Diploma of Counselling
- Bachelor of Aviation Management
- Master of Business Administration
- Master of Arts (Investigation Management)
- Masters of Systems Engineering
- Master of Information System Security
- Masters of Project Management
- Post graduate research studies.

Purchasing

The ATSB purchases goods and services in accordance with the Commonwealth Procurement Rules (CPRs). These rules are applied through the Accountable Authority Instructions. The ATSB's procurement policies and processes have been developed to ensure that:

- it undertakes competitive, non-discriminatory procurements
- it uses resources efficiently, effectively, economically and ethically
- it makes all procurement decisions in an accountable and transparent manner.

Consultants

The ATSB engages consultants when it lacks specialist expertise, or when independent research, review or assessment is required. Consultants are typically engaged to:

- investigate or diagnose a defined issue or problem
- carry out defined reviews or evaluations
- provide independent advice, information or creative solutions to assist in the ATSB's decision making.

Before engaging consultants, the ATSB takes into account the skills and resources required for the task, the skills available internally and the cost effectiveness of engaging an external contractor. The decision to engage external contractors is made in accordance with the CPRs and relevant internal policies.

During 2015–16, one new consultancy contract was entered into involving total actual expenditure of $32,000. There were no ongoing consultancy contracts carried over from the 2014–15 year.

Annual reports contain information about actual expenditure on contracts for consultancies. Information on the value of contracts and consultancies is available from the AusTender website at **www.tenders.gov.au**

Australian National Audit Office access clauses

There were no contracts that did not provide for the Auditor-General to have access to the contractors' premises during 2015–16.

Exempt contracts

No contracts were exempted, on public interest grounds, from publication with AusTender during 2015–16.

Procurement initiatives to support small business

The ATSB supports small business participation in the Commonwealth Government procurement market. Small and Medium Enterprises (SME) and Small Enterprise participation statistics are available on the Department of Finance's website at **www.finance.gov.au**

The ATSB seeks to support SMEs, consistent with paragraph 5.4 of the Commonwealth Procurement Rules. It ensures that its communications are expressed in clear and simple language. Its finance system is set up to ensure prompt payments to all contractors and suppliers and it makes use of credit cards.

Legal services and expenditure

Paragraph 11.1(a) of the Legal Services Directions 2005, issued by the Attorney General under the *Judiciary Act 1903*, requires chief executives of departments and agencies to ensure that legal services expenditure is appropriately recorded and monitored. Chief executives must also

ensure that their agencies make records of their legal services expenditure for the previous financial year available by 30 October in the following financial year. The following amounts are exclusive of GST.

The expenditure on legal services for 2015–16 was $285,777.48, comprising:

- $70,842.52 on external legal services
- $214,934.96 on internal legal services.

External scrutiny and participation

Coronial inquests

The ATSB was not required to participate in any coronial inquests in 2015–16.

Other assistance to coroners

ATSB investigation: Collision with terrain—Piper PA-31P-350, VH-PGW, 6 km NW of Bankstown Airport, NSW, 15 June 2010 (AO-2010-043)

On 14 August 2015, Deputy State Coroner, Paul MacMahon, made findings following an inquest for a collision with terrain involving Piper PA-31P-350, VH-PGW, 6 km NW of Bankstown Airport, NSW on 15 June 2010. Both occupants of the aircraft were fatally injured. The ATSB was not required to attend the inquest.

The ATSB's investigation found that following the shut-down of the right engine, the aircraft's airspeed and rate of descent were not optimised for one engine inoperative flight. In addition, spectral analysis indicated it was unlikely that the left engine was being operated at maximum continuous power as the aircraft descended. As a result, the aircraft descended to a low altitude over a suburban area and the pilot was then unable to maintain level flight, which led to the collision with terrain.

Examination of the engines, propellers and governors and other aircraft components found no evidence of any pre-impact faults. However, the engine surging identified by the spectral analysis of radio transmissions during the flight was consistent with uneven fuel distribution to the cylinders.

The ATSB released its findings on 20 December 2012. The Coroner determined that the cause of death was from the effects of fire and inhalation of the products of combustion, which the pilot sustained when the aircraft suffered engine failure and, as a result, impacted with the ground and became engulfed in flames.

The ATSB's investigation report (AO-2010-043) is available on the ATSB website at **www.atsb.gov.au**

ATSB investigation: Helicopter winching accident involving Bell Helicopter Co. 412EP, VH-VAS, 19 km south-south-east of Mansfield, Victoria, 31 August 2013 (AO-2013-136)

On 4 September 2015, Victorian Coroner, Stella Stuthridge, made findings without an inquest for a helicopter winching accident involving Bell Helicopter Co. 412EP, VH-VAS, 19 km south-south-east of Mansfield, Victoria on 31 August 2013. The patient slipped out of the rescue strop and fell to the ground, sustaining fatal injuries.

The ATSB found that, due to the compressive nature of the rescue strop around the patient's chest, combined with the patient's weight and pre-existing medical conditions, the patient probably lost consciousness during the winch operation. While the rescue strop was serviceable at the time, it was not suitable for the patient and contributed to the fall from the strop following loss of consciousness.

The ATSB released its findings on 31 August 2013. The Coroner agreed with the ATSB's findings.

The ATSB's investigation report (AO-2013-136) is available on the ATSB website at www.atsb.gov.au

ATSB investigation: Loss of control and collision with terrain involving Cessna 182 VH-AUT, Hamilton Airport, Victoria, 23 September 2013 (AO-2013-163)

On 17 November 2015, Victorian Coroner, Peter Mellas, made findings without an inquest for a loss of control and collision with terrain occurrence involving Cessna 182 VH-AUT at Hamilton Airport, Victoria on 23 September 2013. The pilot was fatally injured.

The ATSB found that following an aborted landing during circuit training in dark night conditions, the solo student pilot lost control of the aircraft, resulting in a collision with terrain. There was insufficient evidence to determine the reason for the loss of control.

The ATSB released its findings on 23 September 2013. The Coroner agreed with the ATSB's findings.

The ATSB's investigation report (AO-2013-163) is available on the ATSB website at www.atsb.gov.au

ATSB investigation: Collision with terrain involving Cessna 182, VH-KKM, 19 km WSW of Mount Hotham Airport, Victoria, 23 October 2013 (AO-2013-186)

On 14 September 2015, Victorian Coroner, Ian Watkins, made findings without an inquest for a collision with terrain involving Cessna 182, VH-KKM, 19 km WSW of Mount Hotham Airport, Victoria on 23 October 2013. The pilot sustained fatal injuries.

The ATSB found that the Visual Flight Rules qualified pilot had minimal recent flying experience and had departed Moruya with less-than-visual meteorological conditions forecast along the planned route. It was very likely that these conditions were encountered shortly after passing Mount Hotham Airport, while flying over the Alpine National Park. From the evidence available it was likely that the pilot encountered reduced visibility to the extent that terrain avoidance could not be assured, resulting in the aircraft colliding with terrain in controlled flight.

The ATSB released its findings on 23 October 2013. The Coroner agreed with the ATSB's findings.

The ATSB's investigation report (AO-2013-186) is available on the ATSB website at www.atsb.gov.au

ATSB investigation: Collision with terrain involving a Lancair Legacy, VH-ICZ, Shepparton Airport Victoria on 25 October 2013 (AO-2013-193)

On 23 October 2015, Victorian Coroner, Ian Watkins, made findings without inquest for a collision with terrain involving a Lancair Legacy, VH-ICZ at Shepparton Airport, Victoria on 25 October 2013. The pilot and passenger on board were fatally injured.

The ATSB found that shortly after take-off, and for reasons which could not be determined, the aircraft entered a steep climb. It then, likely, entered an aerodynamic stall and began a descending right turn that continued until the aircraft collided with terrain.

The ATSB released its findings on 25 October 2015. The Coroner agreed with the ATSB's findings.

The ATSB's investigation report (AO-2013-193) is available on the ATSB website at **www.atsb.gov.au**

Civil proceedings

The ATSB initiated proceedings in the Federal Court against a rail operator who claimed Legal Professional Privilege in response to the ATSB's use of coercive information gathering powers for an investigation. The matter was settled prior to the hearing with the rail operator providing the documents sought.


CANON

APPENDICES

Appendix A: Other mandatory information

Work health and safety

The ATSB's Work Health and Safety Committee was established consistent with the obligations under the *Work Health and Safety Act 2011* (WHS Act). The Committee has 10 elected Health and Safety Representatives and met on four occasions during 2015–16. The Committee continues to report to the ATSB Commission and Executive on a quarterly basis.

The Committee consists of Health and Safety Representatives (HSRs) from each of the ATSB's work areas and also includes management representatives.

The main activities undertaken this year by the Work Health and Safety Committee include:

- research and testing of heat trackers while working on accident sites
- research into hazards relating to the storage and transportation of damaged lithium batteries
- research, development and consultation around guidelines for the use of all respirators and personal protective equipment.

ATSB staff members continue to express confidence in the agency's ongoing commitment to provide a safe workplace, as demonstrated by the following staff census results:

- *The people in my work group are committed to workplace safety*—93 per cent positive
- *My supervisor is committed to workplace safety*—88 per cent positive
- *My agency genuinely cares about employees being healthy and safe at work —85 per cent positive*
- *My agency supports employees who are injured or become ill due to work — 83 per cent positive.*

During 2015–16, one compensation claim was submitted and accepted by Comcare. There were no reportable incidents under the WHS Act.

In terms of other wellbeing indicators, approximately six per cent of staff accessed the employee assistance program (EAP) and the unscheduled absence rate per full time employee has risen slightly from 12.9 days to 13.6 days. This rise and overall high use of unscheduled absence can be explained (offset) by a number of known longer term return to work programs.

Advertising and market research

The ATSB did not conduct any advertising campaigns during 2015–16 and did not incur any expenses with advertising, market research, polling, direct mail or media advertising agencies.

Ecologically sustainable development and environmental performance reporting

(section 516A of the Environment Protection and Biodiversity Conversation Act 1999)

The ATSB is fully committed to the principles of Ecologically Sustainable Development. The nature of its work as Australia's national transport safety investigator—with a focus on the investigation of transport accidents, research into transport safety and dissemination of safety information—means that the ATSB's commitment is expressed through its day-to-day activities within its offices.

The ATSB operates under the Energy Efficiency in Government Operations (EEGO) policy and through its sub-lease office accommodation arrangements with Department of Infrastructure and Regional Development, the ATSB's environmental management system complies with ISO 14001:2004, the international standard for environmental management systems. The system is focused on ATSB's office-based activities in Canberra. Initiatives are applied at Regional office premises where appropriate.

The ATSB has contracted out its data centres to private providers, with the result that servers and ICT infrastructure are located outside ATSB premises. This produced a significant saving in energy use. The ATSB has limited its energy use through various initiatives that focus on improving the energy efficiency of the property portfolio, for example:

- operating a virtualised IT server environment
- ensuring that desktop IT equipment uses energy saving policies—such as automatic turn-off for monitors, and hard drives, after periods of inactivity
- reducing the number of printers in the network
- setting each printer default to (mono) black and double-sided printing
- using photocopy paper containing 60 per cent recycled paper for internal use
- actively recycling paper waste
- promoting the separation of general waste into recyclable and non-recyclable items before disposal
- promoting video conferencing as an alternative to travel, where practicable
- using motion-sensor lighting in offices
- reducing the effect of direct sunlight on air-conditioning systems by installing blinds or tinting where appropriate.

Grant programs

The ATSB did not administer any grant programs during 2015–16.

Changes to disability reporting in annual reports

Since 1994, no-corporate Commonwealth entities have reported on their performance as policy adviser, purchaser, employer, regulator and provider under the Commonwealth Disability Strategy. In 2007–08, reporting on the employer role was transferred to the Australian Public Service Commission's *State of the Service Report* and the *APS Statistical Bulletin*. These reports are available on ASPC's website at **www.apsc.gov.au**. From 2010–11, entities have no longer been required to report on these functions.

The Commonwealth Disability Strategy has been overtaken by the National Disability Strategy 2010–2020, which sets out a ten year national policy framework to improve the lives of people with disability, promote participation and create a more inclusive society. A high level two-yearly report will track progress against each of the six outcome areas of the strategy and present a picture of how people with disability are faring. The first of these progress reports was published in late 2014, and can be found at **www.dss.gov.au**

Freedom of Information

The following information explains how to request access to documents held by the ATSB under the *Freedom of Information Act 1982* (FOI Act). It also explains what records the ATSB holds, and what arrangements the ATSB has in place for outside participation.

Entities to the FOI Act are required to publish information to the public as part of the Information Publication Scheme (IPS). This requirement is in Part II of the FOI Act and has replaced the former requirement to publish a section 8 statement in an annual report. Each agency must display, on its website, a plan showing what information it publishes in accordance with the IPS requirements.

Detailed information about the FOI Act is available via the Office of the Australian Information Commissioner website **www.oaic.gov.au** and the Federal Register of Legislation website **www.legislation.gov.au**

How to lodge a request for information

Information about how to make an application under the FOI Act can be found on the ATSB's website at **www.atsb.gov.au**

A request for access to documents made under the FOI Act must:

- be in writing
- state that the request is an application for the purposes of the FOI Act
- provide enough information to enable the document(s) sought to be identified
- give details of how notices under the FOI Act may be sent (for example, by providing an electronic address).

Submission of FOI requests, or enquiries about access, should be directed to:

Freedom of Information Coordinator
Australian Transport Safety Bureau PO Box 967
CIVIC SQUARE ACT 2608

Phone: +61 2 6274 6488
Fax: + 61 2 6247 3117
Email: **FOI-ATSB@atsb.gov.au**

Charges

There are no application fees payable to lodge an FOI request. The ATSB may impose a charge for the work involved in providing access to document(s) required through a request under the FOI Act. These charges are imposed in accordance with the FOI Act and the *Freedom of Information (Charges) Regulations 1982*. These charges may relate to the time spent searching for and retrieving relevant document(s), decision-making time, photocopying and other costs. The FOI Act also provides that the first 5 hours of decision-making time is waived. The applicant will be notified as soon as possible of an estimate of the charges associated with processing of the request. The request will not be processed until the applicant responds to such notification.

In some circumstances, charges associated with the processing of the request may be remitted. Should the applicant wish to seek remission of the charges, the criteria considered by the ATSB include whether:

- payment of the charges, or part of the charges, would cause financial hardship to the applicant or a person on whose behalf the application was made
- giving access to document(s) is in the general public interest, or in the interest of a substantial section of the public.

The applicant would need to contact the ATSB in writing, or by email, to explain why they meet the criteria, or to inform the agency of overall circumstances which justify non-payment of charges. Requests for the remission of the charges should be forwarded to the Freedom of Information Coordinator.

It may not be possible to obtain access to all the documents sought in an FOI request. Access is limited by exemptions, such as Section 38—secrecy provisions of the FOI Act.

It is important to note that the ATSB is required to perform its functions under Section 12AA of the TSI Act. A significant amount of information gathered by the ATSB during the course of its investigations is defined as restricted information under Section 3 of the TSI Act, and access to such information is exempt from release under subparagraph 38(1)(b)(i) of the FOI Act.

Freedom of Information activity in 2015–16

The ATSB received 20 new requests for access to documents under the FOI Act in 2015–16. Table 19 provides details of ATSB Freedom of Information activity for 2015–16.

Table 19: Freedom of Information activity

ACTIVITY IN 2015–2016	NUMBERS
Requests	
On hand at 1 July 2015 (A)	1
New requests received (B)	20
Requests withdrawn (C)	13
Requests transferred in full to another agency (D)	0
Requests on hand at 30 June 2016 (E)	4
Total requests completed at 30 June 2016 (A+B-C-D-E)	4
Action on requests	
Access in full	0
Access in part	3
Access refused	1
Access transferred in full	0
Request withdrawn	13
Response times (excluding withdrawn)[4]	
0–30 days	1
31–60 days	3
61–90 days	0
90+ days	0

4 These statistics cannot be compared directly with the deadlines set in the *Freedom of Information Act 1982*, as the FOI Act provides for extensions of time to allow for consultation with third parties, negotiation of charges and other issues.

Internal review	
Requests received	0
Decision affirmed	0
Decision amended	0
Request withdrawn	0
Review by Office of the Australian Information Commissioner	
Applications received	1
Administrative Appeal Tribunal (AAT) review of FOI decisions	
Applications received	0

Records the ATSB holds

The ATSB holds records such as:

- human and financial resource management records
- briefing papers and submissions prepared for ministers, parliamentary secretaries, parliamentary committees, the Cabinet and the Executive Council (most of these are classified documents)
- business papers, briefing notes and meeting records for committees, and conferences, in which the ATSB services or participates
- documents prepared by international agencies
- documents relating to the development of legislation
- internal administration documents
- internal treaties, memoranda of understanding and international conventions
- legal documents, including legislation, contracts, leases and court documents
- maps and other geographical information
- ministerial responses to parliamentary questions, interdepartmental and general correspondence and papers
- policy documents, recommendations and decisions
- registers of documents, agreements and approvals
- statistics and databases
- technical standards, guidelines, specifications, charts, photographs, drawings and manuals
- accident and incident investigation and notification records.

To view a list of manuals, and other documents the ATSB uses when making decisions or recommendations that affect the public, visit the ATSB website at **www.atsb.gov.au**

Under 8C of the FOI Act, exempt matter is not required to be published. The ATSB reserves the right to delete exempt matter from its information prior to providing access.

To find out more about the types of personal information the ATSB holds, please refer to the ATSB Privacy Policy on the ATSB website at **www.atsb.gov.au**

For further information, please contact ATSB either by telephone on 1800 020 616, or by email at **atsbinfo@atsb.gov.au**

Functions and decision-making powers

The ATSB's functions are detailed in Section 12AA of the TSI Act and are further described throughout this report.

Certain officers exercise decision-making powers under portfolio legislation and other matters. These responsibilities are set out in the Administrative Arrangements Order (AAO) for the Commonwealth of Australia and relate to transport safety, including investigations.

For a complete and up-to-date copy of the AAO, visit **www.dpmc.gov.au**

To assist ATSB employees in exercising their powers appropriately, and enable access to their decision-making authorities, the ATSB uses an intranet site which allows employees to access delegations online. It also allows employees to check information about the powers and authorities assigned under the legislation set out in the AAO, and by laws such as the *Public Governance, Performance and Accountability Act 2013* and *the Public Service Act 1999*. Powers delegated under the TSI Act are recorded on the back of identity cards for all investigators.

Arrangements for outside participation

The ATSB consults widely to gain the views of its stakeholders and clients about future policy directions and program delivery. This includes consulting with other Australian state and territory government departments and agencies, as appropriate, and with foreign governments —particularly in the context of transport safety investigations. For particular policy issues, the ATSB may also contact a very broad range of stakeholders.

Appendix B: Entity Resource Statement 2015–16

		ACTUAL AVAILABLE APPROPRIATION 2015–16 $'000 (A)	PAYMENTS MADE 2015–16 $'000 (B)	BALANCE REMAINING 2015–16 $'000 (A) – (B)
ORDINARY ANNUAL SERVICES[1]				
Departmental appropriation[2]		149,241	103,232	46,009
Total		**149,241**	**103,232**	**46,009**
Total ordinary annual services	**A**	**149,241**	**103,232**	
OTHER SERVICES[3]				
Departmental non-operating				
Equity injections		371	279	92
Total		**371**	**279**	
Total other services	**B**	**371**	**279**	
Total net resourcing and payments for the Australian Transport Safety Bureau		**149,612**	**103,511**	

1 Appropriation Act (No.1) 2015–16 and Appropriation Act (No. 5) 2015–16. This includes prior year departmental appropriation and section 74 Retained Revenue Receipts.

2 Includes an amount of $0.356m in 2015–16 for the Departmental Capital Budget. For accounting purposes this amount has been designated as 'contributions by owners'.

3 Appropriation Act (No.2) 2015–16.

Expenses for Outcome 1

Outcome 1: Improved transport safety in Australia including through: independent 'no blame' investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

	BUDGET* 2015–16 $'000 (A)	ACTUAL EXPENSES 2015–16 $'000 (B)	VARIATION 2015–16 $'000 (A) – (B)
PROGRAMME 1.1: AUSTRALIAN TRANSPORT SAFETY BUREAU			
Departmental expenses			
Departmental appropriation[1]	69,527	98,708	(29,181)
Expenses not requiring appropriation in the Budget year	3,330	11,615	(8,285)
Total for Programme 1.1	**72,857**	**110,323**	**(37,466)**
Total expenses for Outcome 1			
AVERAGE STAFFING LEVEL (NUMBER)	**2014–15**	**2015–16**	
	106	105	

* Full year budget, including any subsequent adjustment made to the 2015–16 Budget at Additional Estimates.

[1] Departmental Appropriation combines Ordinary annual services (Appropriation Act Nos. 1 and 5) and Retained Revenue Receipts under section 74 of the PGPA Act 2013.

Appendix C: Glossary

Accident	An investigable matter involving a transport vehicle occurs when: • a person dies, or suffers serious injury, as a result of an occurrence associated with the operation of a vehicle • the vehicle is destroyed, or seriously damaged, as a result of an occurrence associated with the operation of the vehicle • any property is destroyed, or seriously damaged, as a result of an occurrence associated with the operation of the vehicle.
Accident Investigation Commission (AIC)	The Papua New Guinea Government institution responsible for the investigation of safety deficiencies in aviation transport.
Aerial work	Aircraft operations—including ambulance and emergency medical services, agriculture, mustering, search and rescue, fire control and survey and photography.
Agricultural operations	Operations involving the carriage and/or spreading of chemicals, seed, fertiliser or other substances for agricultural purposes—including the purposes for pest and disease control.
Airworthiness Directive	A notification to owners, and operators, of certified aircraft that a known safety deficiency with a particular model of aircraft, engine, avionics or other system exists and must be corrected. If a certified aircraft has outstanding airworthiness directives that have not been complied with the aircraft is not considered airworthy.
Amateur-built aircraft	Aircraft not built in a factory but for the user's personal use or recreation. May include ultra-light, original design, plans built, kit built or experimental aircraft.
AMSA	Australian Maritime Safety Authority
ARTC	Australian Rail Track Corporation
ATSB safety action	Formal activities conducted by the ATSB to initiate safety action by relevant organisations to address a safety issue. Includes safety recommendations and safety advisory notices.
AUV	Autonomous underwater vehicle
Australian Accredited Representative	An Australian representative who is appointed in the case of safety occurrences involving Australian registered aircraft outside Australian territory, normally an ATSB investigator.
Blood-borne pathogen	A blood-borne agent causing disease that can be spread by blood contamination.
CASA	Civil Aviation Safety Authority
Catastrophic accident	Sudden disastrous investigable matter involving a transport vehicle.

Charter	Operations that involve the carriage of cargo or passengers, but do not involve scheduled flights. The lack of scheduled flights, and fixed departure and arrival points, distinguishes charter operations from RPT operations.
Collective	The collective pitch control, or collective lever changes, the pitch angle of all the main rotor blades at the same time, independent of their position. Therefore, if a collective input is made, all the blades change equally. The result is that the helicopter increases or decreases its total lift derived from the rotor.
Commercial air transport	High capacity regular public transport (RPT) flights, low capacity RPT flights, charter flights and medical transport.
Complex investigations	Investigations rated at level 1, 2, or 3 in accordance with the ATSB's rating system.
Contributing safety factor	A safety factor that, if it had not occurred or existed at the relevant time, then: • the occurrence would probably not have occurred • adverse consequences associated with the occurrence would probably not have occurred or have been as serious • another contributing safety factor would probably not have occurred or existed.
COAG	Council of Australian Governments
Critical safety issue	Associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation, unless corrective safety action has already been taken.
CVR (black box)	Cockpit Voice Recorder
Defined Interstate Rail Network (DIRN)	The DIRN comprises over 10,000 route kilometres of standard gauge interstate track linking the capital cities of mainland Australia.
Directly Involved Party (DIP)	Those individuals or organisations that were directly involved in a transport safety occurrence or may have influenced the circumstances that led to an occurrence. This also includes those whose reputations are likely to be affected following the release of the investigation report.
ETOPS	Extended Twin Operations—a rule that allows twin-engine airliners to fly long-distance routes that were previously off-limits to twin-engine aircraft. There are different levels of ETOPS certification. Each one allows aircraft to fly on routes that have a certain amount of flying time from the nearest suitable airport.
Fatal accident	A transport accident in which at least one fatality results within 30 days of the accident.
Fatality/Fatal injury	Any injury acquired by a person involved in a transport accident which results in death within 30 days of the accident.
Flight data recorder (black box)	A recorder placed in an aircraft for the purpose of facilitating the investigation of an aircraft accident or incident.

Flying training	Flying under instruction for the issue or renewal of a licence, rating, aircraft type endorsement or any other type of flying aimed at upgrading an individual's flight qualification—including solo navigation exercises conducted as part of a course of applied flying training, or check and training operations conducted by RPT operators.
General aviation (GA)	General aviation covers: • aerial work operations (including aerial agriculture, aerial mustering, search and rescue, and aerial survey) • flying training • private aviation • business and sports (including gliding) aviation—VH, or foreign-registered.
Hours flown	Calculated from the time the wheels start, with the intention of flight, to the time the wheels stop after completion of the flight.
Human factors	Human factors is the multi-disciplinary science that applies knowledge about the capabilities and limitations of human performance to all aspects of the design, operation, and maintenance of products and systems. It considers the effects of physical, psychological and environmental factors on human performance in different task environments—including the role of human operators in complex systems.
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
Immediately reportable matter	A serious transport safety matter that covers occurrences such as: • accidents involving death • serious injury • destruction or serious damage of vehicles or property • when an accident nearly occurs.
Incident	An occurrence, other than an accident, associated with the operation of a transport vehicle that affects, or could affect, the safety of operation.
ITSAP	The Australian Government's Indonesia Transport Safety Assistance Package
JACC	Joint Accident Coordination Centre
LSA	Light sport aircraft
LOSA	Loss of separation assurance
Less complex investigations	Those rated at level 4 or level 5 under the ATSB's rating scheme.
MAIFA	Marine Accident Investigators Forum In Asia
Minor injury	An injury sustained by a person, in an accident, that was not fatal or serious and does not require hospitalisation.
Multi-modal	Across the three modes of transport covered by ATSB: aviation, marine and rail.

National Transportation Safety Committee (NTSC)	Indonesian Government institution responsible for the investigation of safety deficiencies in aviation, maritime and land transport.
Occurrences—accidents and incidents	Occurrences are reportable matters—either an immediately reportable matter (IRM) or routine reportable matter (RRM). They comprise accidents, serious incidents and incidents.
ONRSR	Office of the National Rail Safety Regulator
Other aerial work	Other aerial work includes: • operations conducted for the purposes of aerial work other than 'flying training' and 'agricultural operations' • operations classified as other aerial work—including aerial surveying and photography, spotting, aerial stock mustering, search and rescue, ambulance, towing (including glider, target and banner towing), advertising, cloud seeding, fire-fighting, parachute dropping and coastal surveillance.
Other safety issue	Associated with a risk level regarded as unacceptable unless it is kept as low as reasonably practicable. Where there is a reasonable expectation that safety action could be taken in response to reduce risk, the ATSB will issue a safety recommendation to the appropriate agency when proactive safety action is not forthcoming.
PIF	Post-impact fire
Pilotage	Use of licensed coastal pilots to guide ships through designated areas.
Portfolio Budget Statements (PBS)	These statements explain the provisions of the Appropriation Bills (Budget Bills), that is, where the appropriate funds are going to be spent.
Private/business	Private flying is conducted for recreational or personal transport. Business flying refers to the use of aircraft as a means of transport to support a business, or profession, without the aircraft revenue directly.
PGPA Act	*Public Governance Performance and Accountability Act 2013*
RAAus	Recreational Aviation Australia
Recreational aviation	Aircraft being used for recreational flying that are registered by a recreational aviation administration organisation.
REEFVTS	Great Barrier Reef and Torres Strait Vessel Traffic Service. A coastal Vessel Traffic Service which has been put in place by the Australian and Queensland Governments to improve safety and efficiency of vessel traffic, as well as to protect the environment.
Regular public transport (RPT)	Refers to aircraft that transport passengers, and/or cargo, according to fixed schedules and fixed departure/arrival points, in exchange for monetary reward. These services can be further divided into low and high capacity aircraft: • low capacity RPT—an RPT aircraft that provides a maximum of 38 passenger seats, or a maximum payload no greater than 4,200 kg • high capacity RPT—an RPT aircraft that provides more than 38 passenger seats, or a maximum payload greater than 4,200 kg.

REPCON	The aviation confidential reporting scheme.
REPCON Marine	The marine confidential reporting scheme.
Reportable safety concern	Any matter that endangers or could endanger a transport vehicle.
Safety action	The things that organisations and individuals do, in response to the identification of safety issues, in order to prevent accidents and incidents. There are two main types: • ATSB safety action • Non-ATSB safety action.
Safety advisory notice	Formal advice by the ATSB to an organisation, or relevant parts of the aviation industry, that it should consider the safety issue and take action where it believes it is appropriate. A safety advisory notice is a 'softer' output than a safety recommendation and is used for less significant safety issues—when the available evidence is more limited or when the target audience is not a specific organisation.
Safety factor	An event or condition that increases safety risk—something that increases the likelihood of an occurrence and/or the severity of the adverse consequences associated with an occurrence.
Safety issues	A safety factor which can reasonably be regarded as having the potential to adversely affect the safety of future operations and • is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or • is characteristic of an operational environment at a specific point in time.
Safety recommendation	ATSB safety recommendations are formal recommendations from the ATSB to an organisation for it to address a specific safety issue. They focus on stating the problem (i.e. the description of the safety issue.) They do not identify specific solutions for reducing risk.
SAR	Search and rescue
SATCOM	Satellite communication
Serious incident	An incident involving circumstances indicating an accident nearly occurred.
Serious Injury	An injury which is sustained by a person in an accident and involves one or more of the following: • requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received • results in a fracture of any bone (except simple fractures of fingers, toes, or nose) • involved lacerations which cause severe haemorrhage, nerve, muscle or tendon damage • involves injury to any internal organ • involves second or third degree burns, or any burns affecting more than five per cent of the body surface • involves verified exposure to infectious substances or injurious radiation.

Short investigation	Short, factual, office-based investigations, of less complex safety occurrences rated at level 5 under the ATSB's rating scheme.
SIIMS	Safety Investigation Information Management System
SOLAS	Safety of Life at Sea
SPAD	Signal passed at danger
Spectral analysis	Detailed analysis of the pilot's radio transmissions, background engine sounds and warnings.
Sports Aviation	Aircraft excluded from the RPT, GA or military aircraft categories—including ultralights, glider, hang gliders, rotorcraft and balloon aviation. Most, if not all, sport aviation craft are registered with various sporting bodies rather than with the Civil Aviation Safety Authority (CASA), although exceptions to this rule occur. Sports aviation also includes parachute operations and acrobatics. Sports aviation in this report does not include Australian non-VH registered aircraft.
STAR	Standard arrival route
Statutory agency	A body, or group of persons, declared by an Act to be a Statutory Agency for the purposes of the *Public Service Act 1999*.
Systemic failure	A breakdown in the system as a whole.
Transport safety matter	As defined by the *Transport Safety Investigation Act 2003*, these matters consist of occurrences in which: • the transport vehicle is destroyed • the transport vehicle is damaged • the transport vehicle is abandoned, disabled, stranded or missing in operation • a person dies as a result of an occurrence associated with the operation of the transport vehicle • a person is injured or incapacitated as a result of an occurrence associated with the operation of the transport vehicle • any property is damaged as a result of an occurrence associated with the operation of the transport vehicle • the transport vehicle is involved in a near accident • the transport vehicle is involved in an occurrence that affected, or could have affected, the safety of the operation of the transport vehicle • something occurred that affected, is affecting, or might affect transport safety.
TSI Act	*Transport Safety Investigation Act 2003*
ULB	Underwater locator beacon

Appendix D: List of requirements

PGPA RULE REF	DESCRIPTION	REQUIREMENT	PAGE
17AI	Letter of transmittal	Mandatory	iii
17AJ(a)	Table of contents	Mandatory	iv
17AJ(b)	Alphabetical index	Mandatory	199
17AJ(c)	Glossary of abbreviations and acronyms	Mandatory	188
17AJ(d)	List of requirements	Mandatory	194
17AJ(e)	Details of contact officer	Mandatory	vii
17AJ(f)	Entity's website address	Mandatory	vii
17AJ(g)	Electronic address of report	Mandatory	ii
Review by Accountable Authority			
17AD(a)	A review by the accountable authority of the entity	Mandatory	2
	Summary of significant issues and developments	Suggested	3
	Overview of the entity's performance and financial results	Suggested	2
	Outlook for the next reporting period	Suggested	4
	Significant issues and developments for the portfolio	Suggested for portfolio agencies	N/A
Overview of the entity			
17AE(1)(a)(i)	A description of the role and functions of the entity.	Mandatory	8–13
17AE(1)(a)(ii)	A description of the organisational structure of the entity.	Mandatory	14–18
17AE(1)(a)(iii)	A description of the outcomes and programmes administered by the entity.	Mandatory	19
17AE(1)(a)(iv)	A description of the purposes of the entity as included in corporate plan.	Mandatory	8
17AE(1)(b)	An outline of the structure of the portfolio of the entity.	Portfolio departments–mandatory	N/A

PGPA RULE REF	DESCRIPTION	REQUIREMENT	PAGE
17AE(2)	Differences in the outcomes and programmes from any Portfolio Budget Statement, Portfolio Additional Estimates Statement or other portfolio estimates statement.	If applicable, mandatory	N/A
Report on the performance of the entity			
17AD(c)(i); 16F	Annual performance statement in accordance with paragraph 39(1)(b) of the Act and section 16F of the Rule.	Mandatory	26–27
17AF(1)(a)	A discussion and analysis of the entity's financial performance.	Mandatory	46
17AF(1)(b)	A table summarising the total resources and total payments of the entity.	Mandatory	47
17AF(2)	Discussion of any significant changes in financial results, the cause of any operating loss, response to and actions taken in relation to the loss; and any matter that may have a significant impact on the entity's future operation or financial results.	If applicable, mandatory	46
Management and Accountability			
Corporate governance			
17AG(2)(a)	Information on compliance with section 10 (fraud systems)	Mandatory	168
17AG(2)(b)(i)	A certification by accountable authority that fraud risk assessments and fraud control plans have been prepared.	Mandatory	iii
17AG(2)(b)(ii)	A certification by accountable authority that appropriate mechanisms for preventing, detecting incidents of, investigating or otherwise dealing with, and recording or reporting fraud that meet the specific needs of the entity are in place.	Mandatory	iii
17AG(2)(b)(iii)	A certification by accountable authority that all reasonable measures have been taken to deal appropriately with fraud relating to the entity.	Mandatory	iii
17AG(2)(c)	An outline of structures and processes in place for the entity to implement principles and objectives of corporate governance.	Mandatory	166
17AG(2)(d) –(e)	A statement of significant issues reported to Minister under paragraph 19(1)(e) of the Act that relates to non-compliance with Finance law and action taken to remedy non-compliance.	If applicable, mandatory	N/A

PGPA RULE REF	DESCRIPTION	REQUIREMENT	PAGE
External scrutiny			
17AG(3)	Information on the most significant developments in external scrutiny and the entity's response to the scrutiny.	Mandatory	175
17AG(3)(a)	Information on judicial decisions and decisions of administrative tribunals and by the Australian Information Commissioner that may have a significant effect on the operations of the entity.	If applicable, mandatory	N/A
17AG(3)(b)	Information on any reports on operations of the entity by the Auditor-General (other than report under section 43 of the Act), a Parliamentary Committee, or the Commonwealth Ombudsman.	If applicable, mandatory	N/A
17AG(3)(c)	Information on any capability reviews on the entity that were released during the period.	If applicable, mandatory	N/A
Management of human resources			
17AG(4)(a)	An assessment of the entity's effectiveness in managing and developing employees to achieve entity objectives.	Mandatory	169–170
17AG(4)(b)	Statistics on staffing	Mandatory	171
17AG(4)(c)	Information on any enterprise agreements, individual flexibility arrangements, Australian workplace agreements, common law contracts and determinations under subsection 24(1) of the *Public Service Act 1999*.	Mandatory	171
17AG(4)(c)(i)	Information on the number of SES and non-SES employees covered by agreements etc identified in paragraph 17AG(4)(c).	Mandatory	171
17AG(4)(c)(ii)	The salary ranges available for APS employees by classification level.	Mandatory	172
17AG(4)(c)(iii)	A description of non-salary benefits provided to employees.	Mandatory	171
17AG(4)(d)(i)	Information on the number of employees at each classification level who received performance pay.	If applicable, mandatory	171
17AG(4)(d)(ii)	Information on aggregate amounts of performance pay at each classification level.	If applicable, mandatory	171
17AG(4)(d)(iii)	Information on the average amount of performance payment, and range of such payments, at each classification level.	If applicable, mandatory	171

PGPA RULE REF	DESCRIPTION	REQUIREMENT	PAGE
17AG(4)(d)(iv)	Information on aggregate amount of performance payments.	If applicable, mandatory	171
Assets management			
17AG(5)	An assessment of effectiveness of assets management where asset management is a significant part of the entity's activities.	If applicable, mandatory	N/A
Purchasing			
17AG(6)	An assessment of entity performance against the *Commonwealth Procurement Rules*.	Mandatory	173
Consultants			
17AG(7)(a)	A summary statement detailing the number of new contracts engaging consultants entered into during the period; the total actual expenditure on all new consultancy contracts entered into during the period (inclusive of GST); the number of ongoing consultancy contracts that were entered into during a previous reporting period; and the total actual expenditure in the reporting year on the ongoing consultancy contracts (inclusive of GST).	Mandatory	174
17AG(7)(b)	A statement that "*During [reporting period], [specified number] new consultancy contracts were entered into involving total actual expenditure of $[specified million]. In addition, [specified number] ongoing consultancy contracts were active during the period, involving total actual expenditure of $[specified million]*".	Mandatory	174
Australian National Audit Office access clauses			
17AG(8)	Absence of provisions in contracts allowing access by the Auditor-General.	If applicable, mandatory	N/A
Exempt contracts			
17AG(9)	Contracts exempted from publication on AusTender	If applicable, mandatory	174
Small business			
17AG(10)(a)	A statement that "*[Name of entity] supports small business participation in the Commonwealth Government procurement market. Small and Medium Enterprises (SME) and Small Enterprise participation statistics are available on the Department of Finance's website.*"	Mandatory	174

PGPA RULE REF	DESCRIPTION	REQUIREMENT	PAGE
17AG(10)(b)	An outline of the ways in which the procurement practices of the entity support small and =medium enterprises.	Mandatory	174
17AG(10)(c)	If the entity is considered by the Department administered by the Finance Minister as material in nature—a statement that "*[Name of entity] recognises the importance of ensuring that small businesses are paid on time. The results of the Survey of Australian Government Payments to Small Business are available on the Treasury's website.*"	If applicable, mandatory	N/A
Financial statements			
17AD(e)	Inclusion of the annual financial statements in accordance with subsection 43(4) of the Act.	Mandatory	132–163
Other mandatory information			
17AH(1)(a)(i) and 17AH(1)(a)(ii)	Statement regarding the conduct of advertising campaigns during the reporting period.	If applicable, mandatory	180
17AH(1)(b)	Grant programs	If applicable, mandatory	181
17AH(1)(c)	Outline of mechanisms of disability reporting, including reference to website for further information.	Mandatory	182
17AH(1)(d)	Website reference to where the entity's Information Publication Scheme statement pursuant to Part II of FOI Act can be found.	Mandatory	182
17AH(1)(e)	Correction of material errors in previous annual report	If applicable, mandatory	N/A
17AH(2)	Information required by other legislation	Mandatory	180–186

Subject Index

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