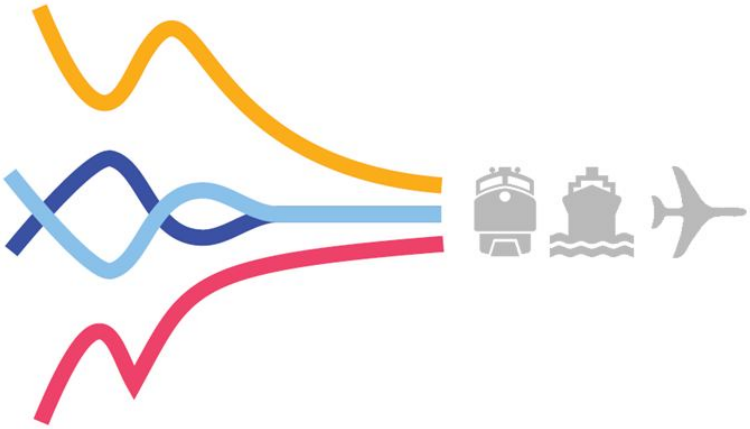
Australian Government
Australian Transport Safety Bureau

Emerging trends in Australian aviation safety

January – June 2015



ATSB Trend Monitoring

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Addendum

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Emerging trends in Australian aviation safety: January-June 2015

Introduction

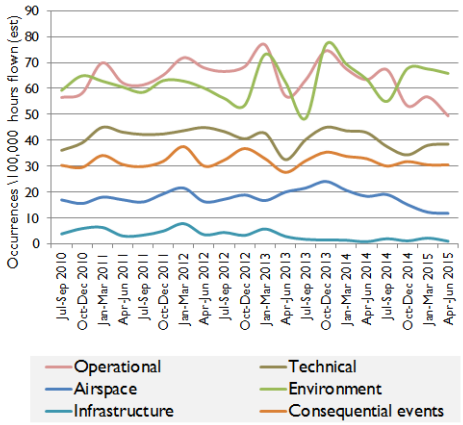
When aviation safety incidents and accidents happen, they are reported to the ATSB. The most serious of these are investigated, but most reports are used to help the ATSB build a picture of how prevalent certain types of occurrences are in different types of aviation operations.

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.

Proactive trend monitoring is a data-driven process, reviewing all occurrences to see if there are subtle changes that may point to a larger issue. Potential issues are then monitored by the ATSB, and shared with industry and other government agencies. Safety actions can then be taken by the most appropriate people to prevent these issues resulting in accidents. These trends can also point to the need for the ATSB to target particular types of occurrences for investigation.

This report summarises significant trends in Australian aviation from January to June 2015, and resultant safety action being taken to address these trends.

Safety occurrence reporting across all types of Australian aviation – last 5 years



Proactive trend monitoring methods

ATSB trend monitoring reviews the rate of reported aviation occurrences (per 100,000 departures or hours flown) biannually, 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, and general aviation.

Further analysis can show what aircraft models, operators, or locations account for most of the difference, 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 are solely due to a good reporting culture, sometimes because of changes to operations, aircraft, or regulations, and sometimes there is no apparent explanation.

In almost all cases, a significantly different occurrence rate to normal is due to something explainable, and something that does not pose an imminent risk to the safety of aircraft operators, passengers, or the public.

The ATSB continues to monitor all trends for several months to see if they return to normal.

Safety action may be appropriate when a trend has been identified, and can include:

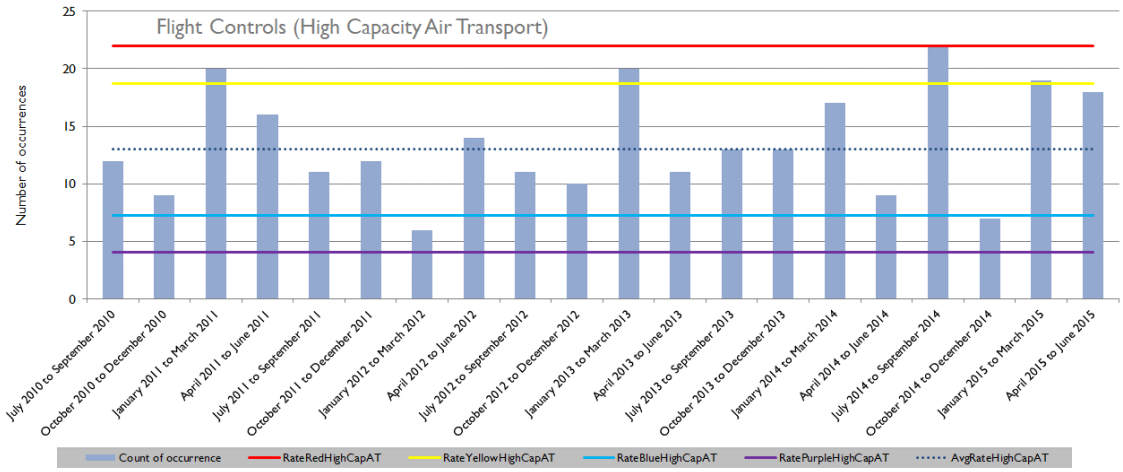
- contacting an operator or industry association for more information
- reporting the trend to the regulator (Civil Aviation Safety Authority) or to the air navigation services provider (Airservices Australia and/or Department of Defence) for further monitoring
- targeting occurrences for new ATSB investigations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

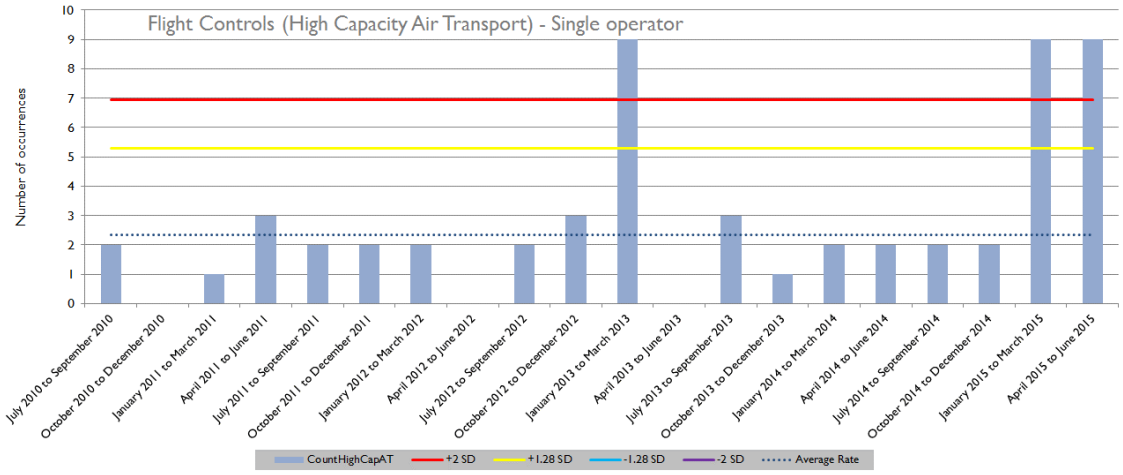
Significant trends

Technical / Systems / Flight controls – High capacity air transport

In the first 6 months of 2015 there were a total of 37 *Flight controls* occurrences reported to the ASTB for high capacity operations. Half of these occurrences (18) were reported by one operator – with more than a four-fold increase compared to the 5-year average.

All other airlines and operation types were relatively consistent with their 5-year averages. Further, the increase was not determined to be dependent upon location, aircraft type or season.





The probability of observing this level of increase (or greater) caused by random variation alone is remote – around 0.1 percent (two-tailed t-test). This indicates that the increase is most likely due to a systematic change.

The relative proportion of occurrences by aircraft type remained consistent across the reporting period. The increase in *flight controls* occurrences is probably not isolated to one aircraft type and is unlikely to be technical in nature. The increase is possibly due to a variation in reporting practices.

Of these 18 occurrences associated with the operator, around half were control surface 'warnings', with most concerning flaps. Of the remainder, most involved flaps that failed to extend or become stuck, or were specified as 'flap issues'.

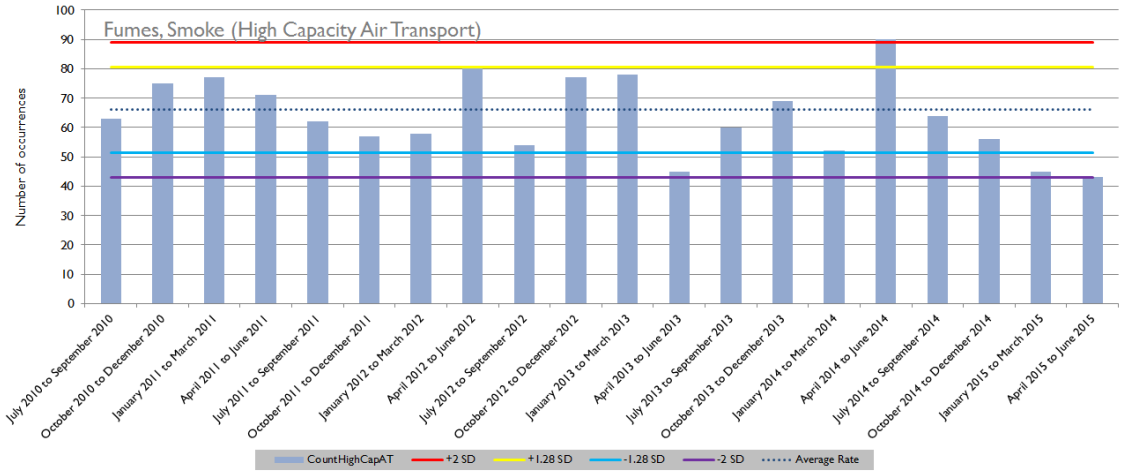
None of the 37 *flight controls* occurrences – including all operators – were classified as high risk according to the Event Risk Classification (ERC) matrix (see *High Risk Occurrence Not Investigated* section).

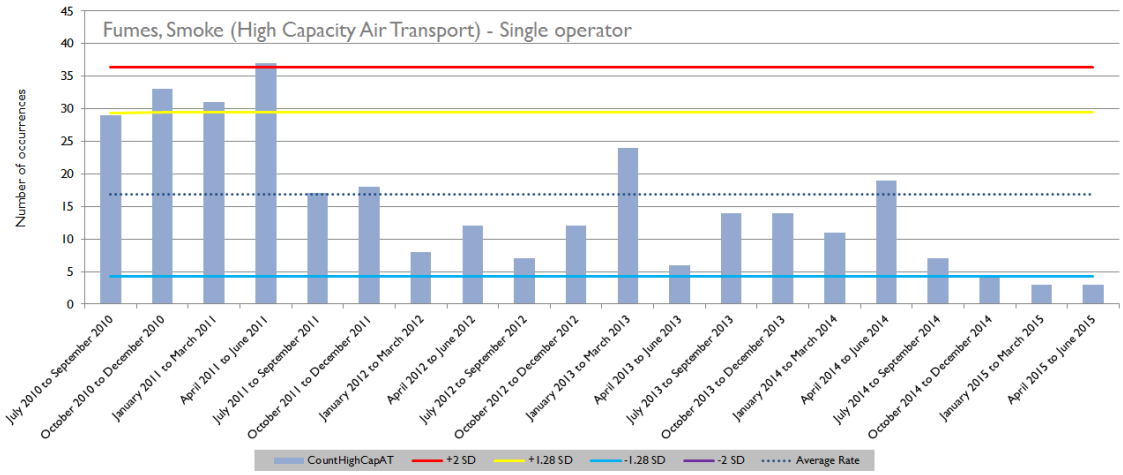
The ATSB is liaising with the operator to better understand the possible causes and implications for safety of this trend.

Operational / Fumes and smoke – High capacity air transport

The number of *fumes* and *smoke* occurrences reported to the ATSB between January-June 2015 in high capacity air transport was significantly lower than the 5-year average. One operator was the primary contributor to the decrease – reducing from an average of around 16.8 (Jul 2010-Dec 2014) to 3.0 (Jan-Jun 2015) occurrences per quarter.

All other airlines and operation types were relatively consistent with their 5-year averages. Further, the decrease was not determined to be dependent upon location or season.





None of the 88 *fumes* and *smoke* occurrences – including all operators – were classified as high risk according to the ERC matrix.

The same trends were identified individually for both *fumes* and *smoke* occurrences when analysed separately.

The operator reported to the ATSB several factors that contributed to this reduction in *fumes* and *smoke* occurrences, including:

- the retirement of older generation aircraft
- a reduction the number of flights
- modifications of some engines
- changes made to maintenance activities.

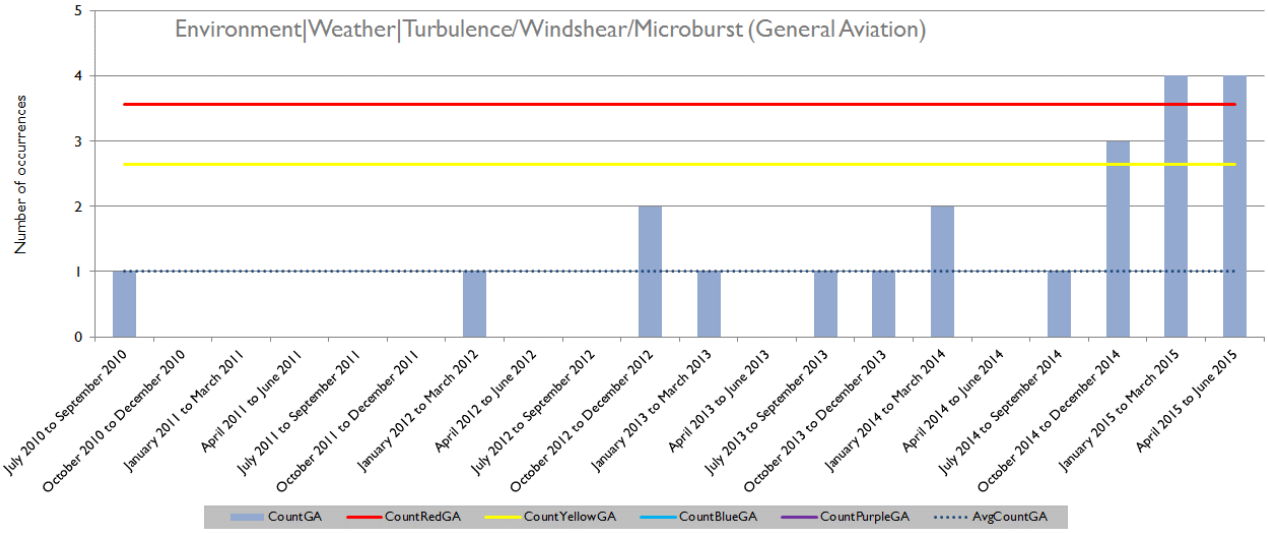
Environment / Weather / Turbulence, Windshear and Microburst – General Aviation

The number of *Turbulence/Windshear/Microburst* accidents and serious incidents involving general aviation aircraft reported to the ATSB between January-June 2015 was significantly greater than the 5-year average.

The number of *Turbulence/Windshear/Microburst* occurrences across all operation types has a significant seasonal trend which peaks in second quarter of the year – April-June 2015. However, the increase in the number of accidents and serious incidents for this occurrence type in general aviation is still significantly greater than a seasonally adjust 5-year average (over the same time period, there were 10 occurrences in total, including incidents). However, this number of occurrences was not significantly greater than the 5-year average and was not included in this report.

Four of the eight accident/serious incidents involved aircraft registered to RA-Aus. In contrast, in the previous five years, there were only three accidents/serious incidents involving RA-Aus aircraft. This is the main contributor to the increase in the trend and probably reflects a significant increase in the number of occurrences reported to the ATSB from RA-Aus more than an increase in actual number of occurrences.

Further, the increase was not determined to be associated with any location or operator.

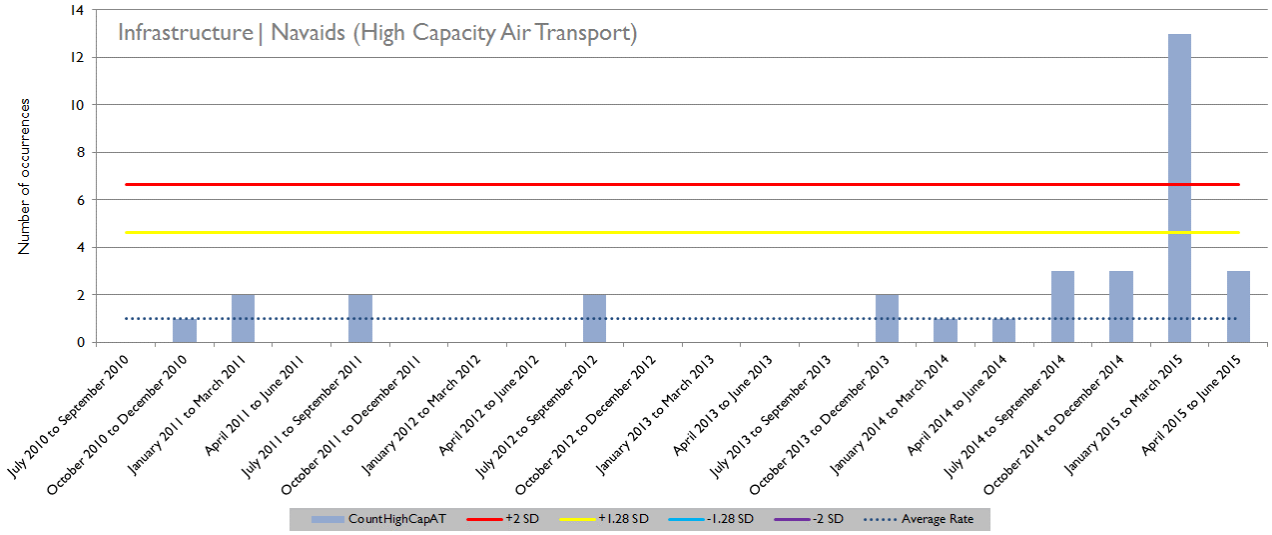


Of the six accidents and two serious incidents, seven occurred during approach to land, with the other occurring during take-off. All resulted in damage to the aircraft – six with substantial damage – and two resulted in minor injuries to the occupants. Four of the aircraft were operated privately, three were conducting flying training and the other was a sports aviation aircraft. Two were classified a high risk according to the ERC matrix and one was investigated by the ATSB (AO-2015-057).

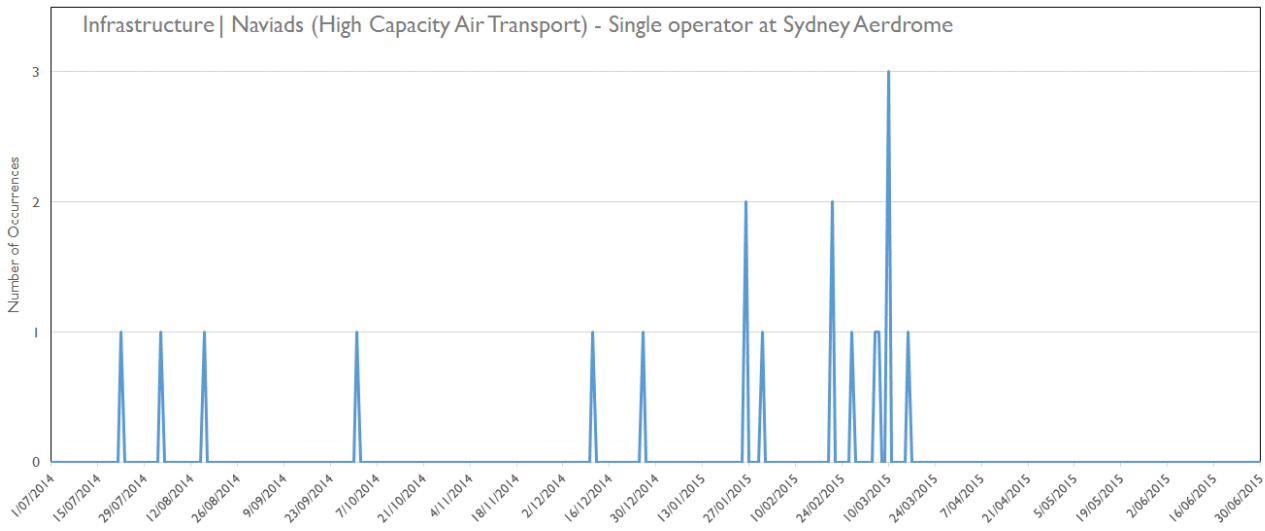
The ATSB is conducting ongoing review of these types of occurrences.

Infrastructure | Navigation aids – High capacity air transport

The Jan - Mar 2015 quarter had the highest number of reported *Infrastructure | Navaids* occurrences in the 5-year reporting period. Twelve of the 13 occurrences involved one operator landing at Sydney aerodrome using the GNSS Landing System (GLS). The GLS is an ILS replacement technology currently installed at Sydney, previously trialled by one operator, which is now available to all GLS equipped operators. For the majority of these occurrences the aircraft was operating under Visual Meteorological Conditions (VMC) with none resulting in missed approaches. All of these occurrences were classified by the ATSB as low risk with no 'accident' outcome and none were investigated.

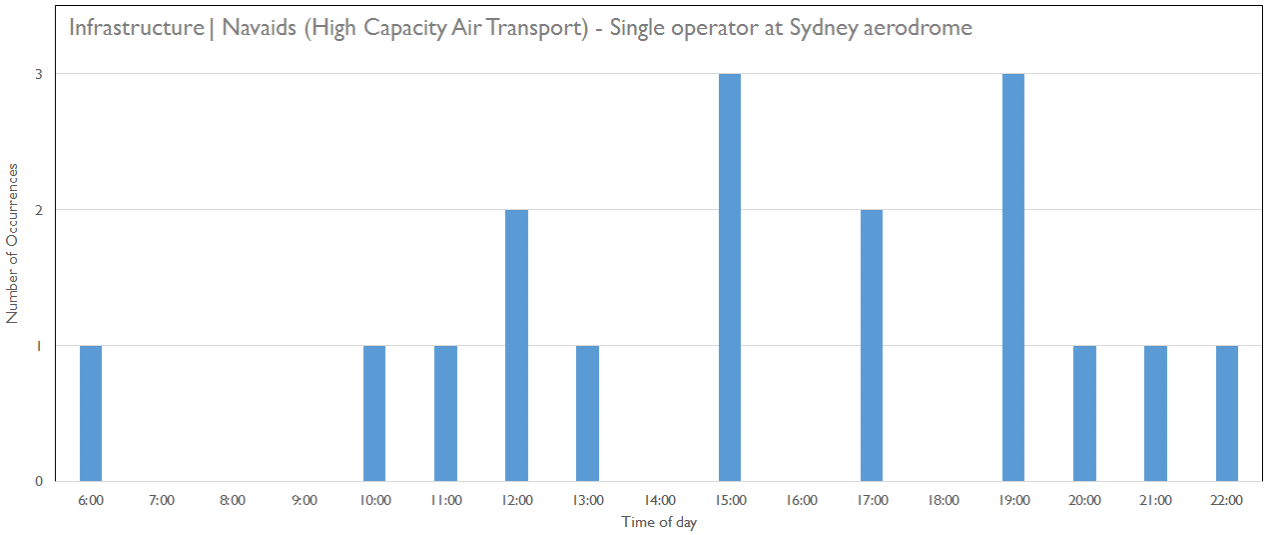


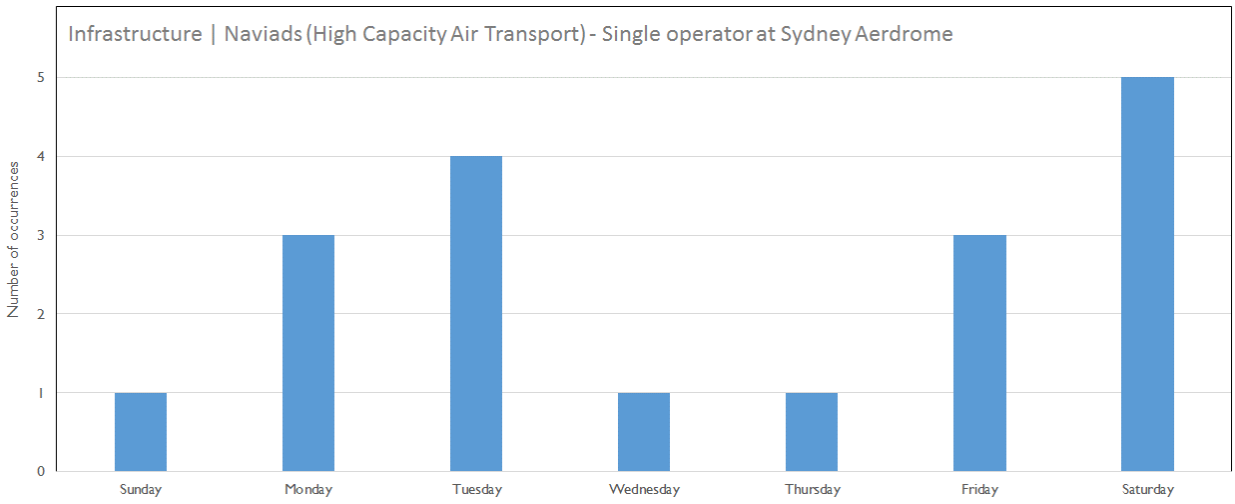
In the Apr - Jun 2015 quarter there were no reported *Infrastructure | Navaids* occurrences involving the GLS at Sydney aerodrome. March 2015 had the highest number of occurrences (6) with three of these occurring on the same day.



Due to the relatively low probability of one of these occurrences per day – around 13 per cent for March 2015 – for three occurrences to happen in the one day suggests that the fault is unlikely to be with the affected aircraft and is probably caused by a single source. This supports Airservices Australia's conclusion in the previous Trend Monitoring report (AR-2015-021) that indicated the cause was most likely radio frequency interferences of the GPS signal.

Over the reporting period, the disruption of the GLS was more likely to occur in the afternoon and on Monday, Tuesday, Friday and Saturday.





The ATSB will continue to monitor. However, the quarterly trend above suggests that these occurrences may now be reducing. Airservices is also aware of this issue.

High risk occurrences not investigated

All occurrences reported to the ATSB are risk rated using the Aviation Risk Management Solutions (ARMS) Event Risk Classification (ERC) framework.[1] The ERC methodology determines whether an occurrence could pose a low, medium, high, or very high risk to the safety of people and/or damage to the aircraft and property. The risk that is credibly posed by an occurrence is determined by answering two questions:

- 'If this event had escalated into an accident, what would have been the most credible accident outcome?'
- 'What was the effectiveness of the remaining barriers between this event and the most credible accident outcome?'

Most occurrences reported to the ATSB are unlikely to result in any type of accident. Those posing a high risk, even if they did not result in an accident, are usually investigated by the ATSB.

In the January-June 2015 period, the ATSB started 55 investigations into aviation occurrences, covering most high risk occurrences, accidents and serious incidents. In the same 6-month period, there were 37 high risk occurrences reported to the ATSB that were not investigated; two involving low capacity or charter aircraft, 13 involving general aviation aircraft and 22 involving gliders and recreational aircraft (two of which also involved a general aviation aircraft and are listed under the General aviation heading).

Low capacity air transport

- There was a near collision at Moorabbin Aerodrome Vic when an approaching Beech Aircraft B200 passed behind a departing Cessna 172. Airservices Australia are aware of the details of this occurrence. As a result and due to the limited scope for uncovering systematic safety issues, the ATSB did not investigate this occurrence (201501362).
- During descent to a Bulk carrier for a marine pilot transfer, the crew of a Bell 430 lost visual reference due to poor weather and conducted a return to Hay Point Helipad Qld. The ATSB did not investigate as the crew reacted in an appropriate way given the conditions and limited scope for uncovering any systemic issue (201505200).

General aviation (VH-registered)

The ATSB did not investigate the following high risk general aviation occurrences due to resource constraints, competing priorities and the limited scope for uncovering systemic safety issues.

- During approach, after conducting aerial mustering operations, 80 km south west of Mount Isa Aerodrome Qld, the pilot over-pitched the Robinson R22 helicopter and lost lift, resulting in a collision with terrain. The passenger suffered minor injuries and the helicopter was substantially damaged (201500022).
- During approach, while conducting private operations, at Farcombe Hall airstrip NSW, an amateur-built Lancair encountered windshear, landed hard and veered off the runway. The aircraft collided with a pile of timber and a parked aircraft resulting in substantial damage (201500796).
- While manoeuvring during aerial mustering operations, the pilot of a Robinson R22 lost directional control and collided with a dam at Brumby Station Qld resulting in substantial damage to the helicopter (201501056).

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[1] The methodology is from the report The ARMS Methodology for Operational Risk Assessment in Aviation Organisations (version 4.1, March 2010). ARMS is an industry working group set up 2007 in order to develop a new and better methodology for Operational Risk Assessments. It is a non-political, non-profit working group, with a mission to produce a good risk assessment methodology for the industry. The results are freely available to the whole industry and to anyone else interested in the concept.

- During cruise at 1,500 ft near Murwillumbah Aircraft Landing Area (ALA) NSW, the pilot of a Tecnam P92, conducting a training flight, observed a Cessna 152 in close proximity on a converging heading and took avoiding action (201501364).
- Near Moorabbin Aerodrome Vic, a Cessna 172 on a private flight descended below the lowest safe altitude resulting in ATC issuing several unacknowledged terrain safety alerts (201501675).
- During the approach near Archerfield Aerodrome Qld, a Beechcraft 76 on a training flight overflew a Cessna 172 in close proximity. The tower controller issued a traffic alert and the 172 pilot conducted an orbit to regain separation. Both the Cessna and Beechcraft crews reported not being aware of the other aircraft prior to the broadcast from ATC (201501822).
- While conducting aerial photography operations at Newcastle NSW, the crew of a McDonnell Douglas 500 helicopter observed a Cessna 182 approaching at a similar altitude and took avoiding action. The aircraft passed in close proximity. The crews of both aircraft advised transmitting their intensions on the CTAF but neither crew advised hearing any previous calls from the other aircraft (201501979).
- A Cessna 172, on a training flight, operating under Visual Flight Rules (VFR) departed Ballarat Aerodrome Vic in poor weather conditions and subsequently entered Instrument Meteorological Conditions (IMC). The crew climbed the aircraft clear of IMC and diverted to an airfield that was VMC (201502017).
- Two VFR Yakolev Yak-52 aircraft were flying in formation on a private flight, when one entered IMC and subsequently climbed above cloud. The crew of the second Yak-52 decided to climb through cloud in IMC to re-join the other aircraft and both aircraft diverted to Goulburn NSW. On arrival both aircraft descended through cloud in IMC before establishing in VMC below cloud (201502130).
- During cruise near Brisbane Airport, the crew of a Cirrus SR22 conducting aerial work observed a private Jabiru J170 in close proximity on a crossing track. The SR22 turned to avoid the J170 (201502368).
- Air traffic control reported that a Partenavia Costruzioni Aeronautiche P.68 aircraft on a training flight descended below the minimum safe altitude during approach near Tyabb ALA Vic, (201502774).
- During aerial mustering operations in a Robinson R22 helicopter 50 km south-west of Mt. Garnet Qld, clothing blew out the door and wrapped around the tail rotor. The aircraft collided with terrain resulting in serious injuries to the crew and the helicopter being destroyed (201503150).
- A Diamond Aircraft Industries DA40 aircraft on a training flight and operating under the VFR entered IMC near Parafield Aerodrome SA. Navigation assistance was sought by the crew and was provided by ATC (201504585).

Gliders, amateur-built aircraft, and (non-VH-registered) recreational aircraft

There were also several high risk occurrences that involved recreational aircraft registered with a recreational aviation administration organisation (RAAO), such as Recreational Aviation Australia (RA-Aus), the Australian Sport Rotorcraft Association (ASRA), or the Hang Gliding Federation of Australia (HGFA). The ATSB is currently not resourced to investigate (non-VH) recreational aviation accidents and sports aviation accidents involving VH-registered gliders or balloons, but ensures that in every accident the appropriate RAAO is informed to enable them to conduct their investigation if deemed necessary. The ATSB also uses the information from these reports to undertake trend analysis (such as in this report) and to form the basis of research and other analyses.

Australian Sports Rotorcraft Association (ASRA)

- During the cruise near Bribie Island Qld, a RAF 2000 gyrocopter lost power and the pilot conducted a forced landing on a beach. An inspection revealed the propeller drive belt had failed (201500079).

Hang Gliding Federation of Australia (HGFA)

- After turning upwind to return to the launching area at Port Kembla NSW, the Moyes Delta Gliders Litesport 5 hang-glider lost lift and landed hard resulting in minor damage. The pilot received serious injuries (201500012).
- After launch near Mount Borah NSW, the wing of an Air Design Rise2 collapsed resulting in the paraglider collided with terrain. The pilot was seriously injured (201500057).
- The pilot of a Moyes Delta Gliders Litesport was fatally injures resulting from a collision with terrain near Ben Nevis Vic (201500099).
- During the flight near Mount Hollowback Vic, the wing of a hang glider failed resulting in a collision with terrain. The pilot received serious injuries (201500141).
- The pilot of an AirBorne Australia Edge weight shift aircraft was seriously injured when then aircraft collided with water near Noosa Bar Qld (201501207).
- Two people were fatally injured when their weight shift aircraft – an AirBorne Australia Edge – collided with terrain near Dundee NSW (201501360).
- A Gradient s.r.o. Freestyle 2 powered paraglider collided with a house near Yanchep WA, resulting in fatal injuries to the pilot (201501373).
- At Bells Beach Vic, a Pro-Design Jalpa hang glider fell 25 metres onto rocks resulting in serious injuries to the pilot (201501436).
- After launching near Kilcunda Vic, an AirBorne Australia Fun hang glider encountered a strong wind gust resulting in a collision with terrain and serious injuries to the pilot (201501761).

Recreational Aviation Australia (RA-Aus)

- An amateur-built 'Conroy Fuselage/Steve Cohen Designed Wings' Pilatus ultralight collided with terrain and the pilot was fatally injured near Wollongong Aerodrome NSW (201500100).
- An Ausflight ULA Drifter A-503 ultralight collided with terrain near Abergowrie Qld resulting in substantial damage. The pilot and passenger received minor injuries (201500119).
- During the initial climb at Gawler ALA SA, the engine of an amateur built Sonex Aircraft Onex ultralight lost power and the pilot attempted to land back on the runway. At approximately 100 ft, the aircraft stalled and collided with terrain. The pilot received serious injuries and the aircraft was destroyed by post-impact fire (201500131).
- Two ultralight aircraft – an amateur built Thruster Aircraft Thruster and an Austflight ULA Drifter – collided mid-air near Donnington Airpark ALA Qld, resulting in fatal injuries to both pilots (201500222).
- A Cessna 162 landed nose-wheel first at Archerfield Aerodrome Qld. While attempting to conduct a missed approach, the pilot lost directional control and the aircraft collided with terrain resulting in substantial damage (201500400).
- During a practice forced landing approximately 50 km south-west of Pearce Aerodrome WA, an AirBorne Australia Edge weight shift aircraft struck a wire and subsequently collided with terrain. The aircraft was substantially damaged and the pilot received serious injuries (201501739).
- A Howard Hughes Engineering Sp2000s ultralight collided with the water near Dunwich ALA Qld resulting in fatal injuries to the pilot (201501958).
- During approach at Tooradin ALA Vic, an amateur built Morgan Aero Works Cheetah ultralight landed hard and bounced twice. The pilot attempted a missed approach, however, the left wing struck the ground and the aircraft departed the runway. The pilot was seriously injured and the aircraft was destroyed. An inspection revealed that foam used to secure the aileron had likely not been removed prior to the flight (201502291).

- An amateur built Fasterway Boss Limited S2 powered parachute collided with terrain resulting in fatal injuries to the pilot near Theodore ALA Qld (201502337).
- During the initial climb near Elwomple SA, the engine of an amateur-built Fisher Flying R-80 failed and the aircraft collided with terrain. The pilot received serious injuries and the aircraft was destroyed (201502480).
- During landing at Lethbridge airport Vic, a 'Zlin Aero/Savage' Savage Cub ultralight bounced, and the crew attempted a missed approach. The aircraft subsequently stalled and collided with the runway resulting in substantial damage (201502686).
- An AirBorne Australia Edge weight shift aircraft collided with terrain near Tyagarah ALA NSW resulting in the pilot sustaining fatal injuries (201502711).

About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and 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 that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.