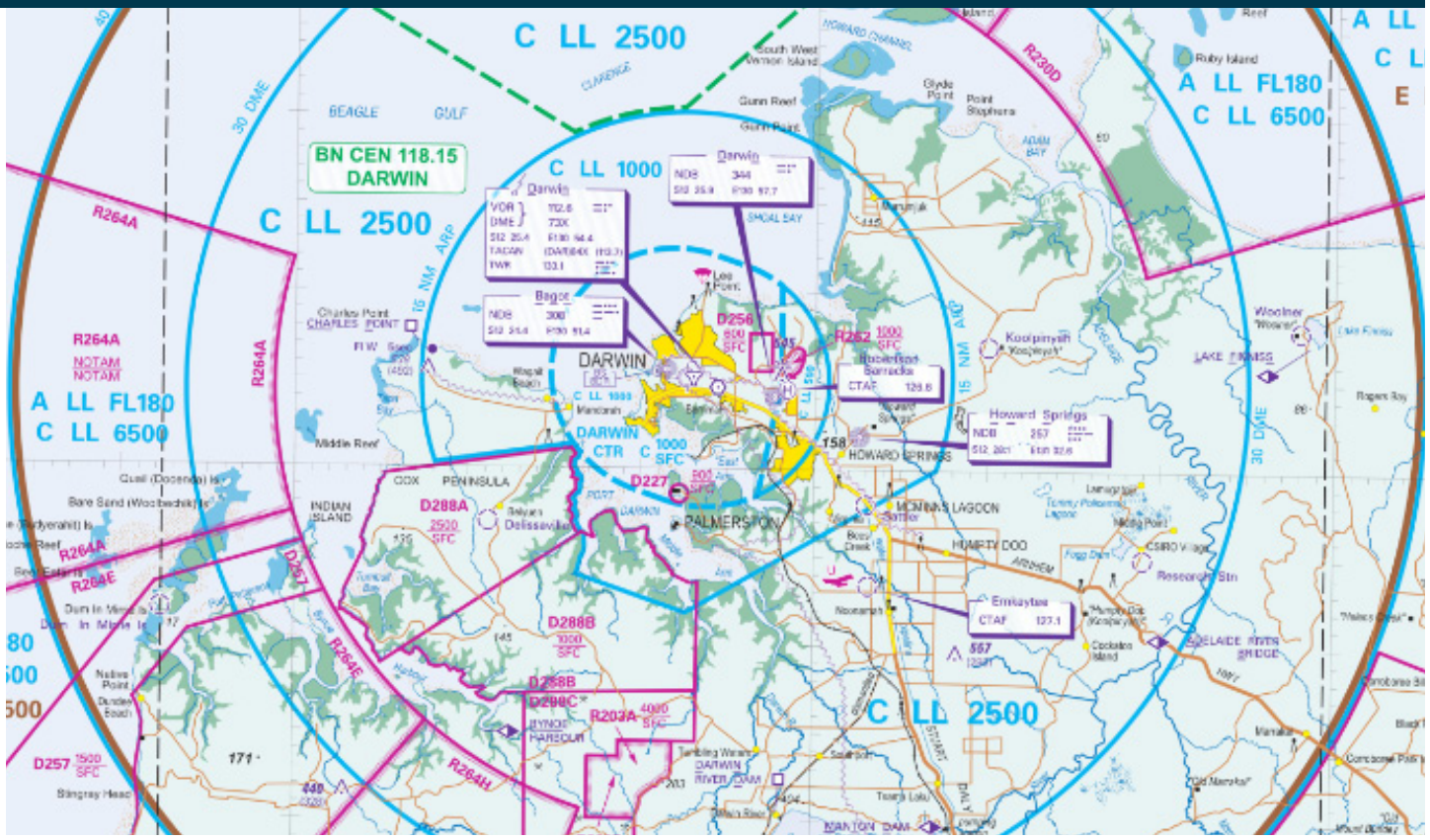
Australian Government
Australian Transport Safety Bureau

Airspace related event involving Boeing 737, VH-VOM

near Darwin, Northern Territory | 27 February 2014



Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2014-044
Final – 15 April 2016

Cover photo: Airservices Australia

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

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Addendum

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Safety summary

What happened

At 1253 Central Standard Time on 27 February 2014, a Boeing Company 737-8FE, registered VH-VOM (VOM), was radar vectored when outside controlled airspace, near Darwin, Northern Territory. Radar vectoring outside controlled airspace was not permitted, and may have brought VOM into conflict with aircraft that were unknown to air traffic control.

What the ATSB found

The ATSB found that weather in the Darwin area resulted in the majority of inbound aircraft diverting around storm cells. These diversions increased workload for the Approach East controller. The increased workload resulted in the controller using non-standard phraseology and not cancelling radar vectors prior to VOM leaving controlled airspace. Additionally, the flight crew of VOM had not reported ‘clear of weather’ as expected by the controller. This resulted in a lack of shared understanding between the flight crew and the controller.

What's been done as a result

Following this occurrence the Department of Defence introduced theoretical and simulator-based training to assist air traffic controllers to resolve unusual situations using clear communication and direction. The training reinforces positive and assertive control measures, skills that are especially necessary in high workload situations.

Safety message

This occurrence highlights that effective communication is essential for a shared understanding between flight crew and air traffic controllers. On this occasion, the use of non-standard phraseology by both parties resulted in different expectations and delay. Additionally, coordination between controllers is an essential component of their duties; however, this is not transmitted via radio. As a result, silence on an air traffic control frequency should not be interpreted by flight crew as an indicator of low workload for the controller.

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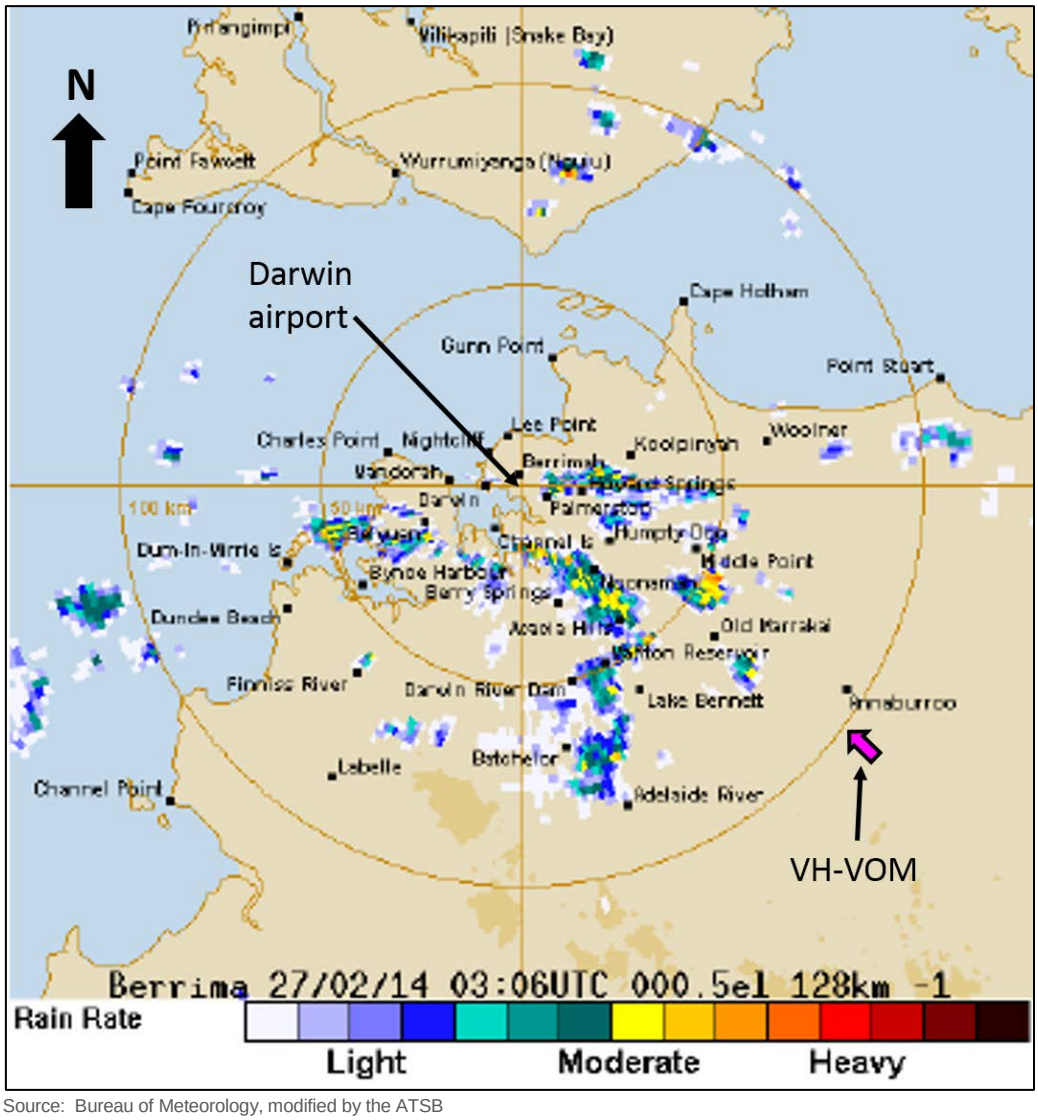
The occurrence

On 27 February 2014, a Boeing Company 737-8FE (737), registered VH-VOM (VOM), was being operated on a regular public transport flight from Sydney, New South Wales, to Darwin, Northern Territory. The arrival of the aircraft at Darwin coincided with the presence of a number of thunderstorms in the area (Figure 1).

In order to reduce the workload of the Approach controller associated with diverting arriving and departing aircraft around the storm cells, the air traffic control (ATC) approach unit responsible for the airspace within 40 NM (74 km) of the airport had split the airspace in to two control sectors. The division of airspace occurred along a line north-south through Darwin Airport, and each area (designated East and West) was under the control of separate Approach controllers operating on different radio frequencies.

Figure 1: Darwin weather radar picture at 1236 Central Standard Time[1] showing rainfall associated with thunderstorm cells. The approximate location of VOM at that time is indicated by an arrow showing direction of travel. The range rings are at 50 km (27 NM) and 100 km (54 NM)



Source: Bureau of Meteorology, modified by the ATSB

[1] Central Standard Time (CST) was Coordinated Universal Time (UTC) + 9.5 hours.

When the Approach East controller commenced their shift at 1230, the handover included details of four arriving aircraft in their airspace, and three arriving aircraft in the airspace under the jurisdiction of the Approach West controller. The majority of aircraft were not on their flight-planned track as they were diverting around storm cells. In addition to the arrivals, a number of aircraft departed Darwin during the development of this occurrence, including:

- Two aircraft heading to the south-east, through the airspace under the jurisdiction of the Approach East controller. These aircraft were tracking to air routes that were laterally separated from the tracks of aircraft inbound from that general direction.
- One aircraft that tracked to the north then returned to Darwin. This aircraft was instructed by the Approach East controller to hold overhead a visual point to the north of the airport for sequencing.
- Two aircraft heading to the north-east. One tracked low level and well clear of arriving traffic. The other tracked through the arrival track of an aircraft under the jurisdiction of the Approach East controller, requiring the controller to maintain a vertical standard between the two.

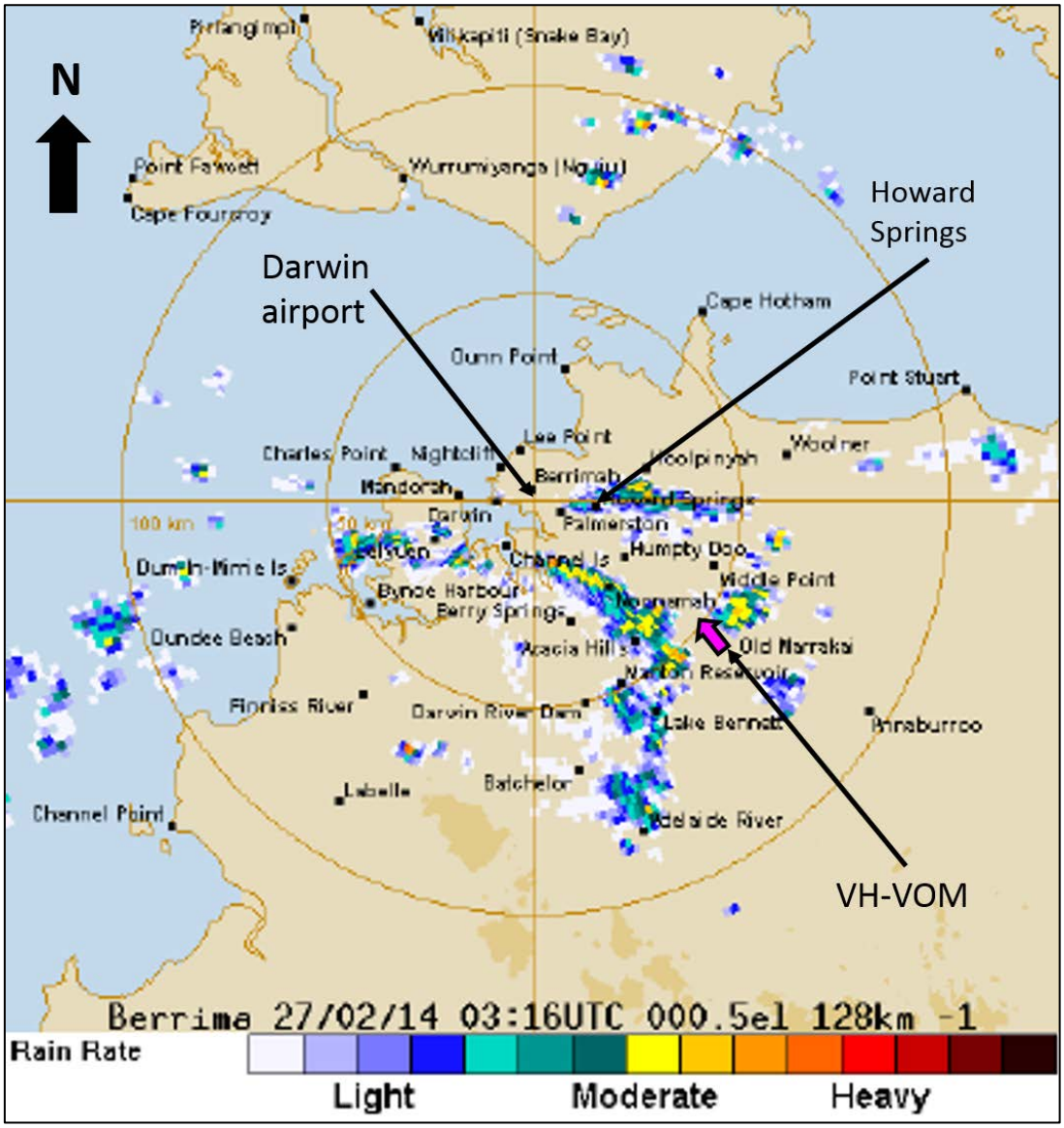
As a result of the traffic level, the workload for both controllers was relatively high.

At 1246, the Approach East controller advised the Tower controller of the landing sequence for runway 29. The sequence included six aircraft, with VOM fifth in the sequence. One other aircraft was also sequenced for runway 36, which crosses runway 29.

The weather on the day of the incident was typical for the Northern Australian wet season (see the section titled *Meteorological information*). The flight crews of the majority of aircraft in the Darwin area had been given approval by ATC to track around the storm cells. The crew of VOM intended to track for Howard Springs and then conduct an instrument landing system (ILS)[2] approach for runway 29 (Figure 2). Additionally, the flight crew of VOM had been approved to operate up to 5 NM (9 km) either side of their intended track to avoid the storms.

[2] A standard ground aid to landing, comprising two directional radio transmitters: the localizer, which provides direction in the horizontal plane; and the glideslope, for vertical plane direction, usually at an inclination of 3°. Distance measuring equipment or marker beacons along the approach provide distance information.

Figure 2: Darwin weather radar picture at 1246 showing the approximate location of VOM while avoiding storm cells



Source: Bureau of Meteorology, modified by the ATSB

The aircraft sequenced to land ahead of VOM on the ILS was considerably slower than VOM. To ensure separation between the aircraft on final for runway 29, at 1247 and with the aircraft 16 NM (30 km) south-east of Howard Springs, the Approach East controller cancelled the approach procedure issued to the flight crew of VOM and radar vectored (see the section titled *Controller responsibilities*) the aircraft right on to a heading of 360°. When the crew of VOM were issued with the radar vector, the preceding slower aircraft was 3 NM (6 km) east of Howard Springs and 14 NM (26 km) north-west of VOM, with a ground speed of 120 kt. At that time, VOM was indicating a ground speed of 260 kt.

The controller later reported that their intention had been for VOM to remain on the vector for only a short period of time. However, prior to cancelling the vector and clearing the aircraft direct to Howard Springs, at 1248 the flight crew of VOM requested a right turn heading 050° to avoid storm cells. The controller approved the diversion, instructing the flight crew to turn right on to a heading of 050° and asked them to report when they were 'clear of weather'. In response, they advised the controller that '…we're sitting in a big hole at the moment but there is weather out to the north of us and down to the south...'. The flight crew did not specifically advise the controller that the aircraft was clear of the storm cell.

Two minutes later, the flight crew of VOM requested to turn further right onto a heading of 100° to avoid weather. In response, the controller vectored the aircraft onto that heading. As VOM was heading away from Darwin, the controller changed the landing order of the aircraft arriving at Darwin. The aircraft that was to land after VOM was then re-sequenced ahead. Additionally, as VOM was tracking towards the edge of controlled airspace, 30 NM (56 km) east of Darwin, the Approach East controller advised the flight crew that their current track would shortly take the aircraft outside controlled airspace. When the controller asked the crew to advise their intentions, they stated that '… we'd like to come further right to join the ILS…', but again did not report clear of weather.

Airservices Australia (Airservices) is responsible for providing the flight information service (FIS)[3] and, workload permitting, the surveillance information service (SIS)[4] in the Class G airspace[5] adjacent to Darwin's controlled airspace. At about this time, the Darwin Approach Supervisor advised the Airservices controller who was responsible for those services that VOM was about to leave controlled airspace to the east. The Airservices controller responded that there was no known traffic outside controlled airspace.

At 1252, VOM left 5,500 ft on descent to 4,000 ft as the aircraft left controlled airspace east of Darwin, heading 100°. At that time, the Approach East controller did not advise the flight crew of the aircraft's position and any known traffic in the area. Additionally the crew were not advised that they were required to resume their own navigation (see the section titled *Controller responsibilities*).

Twenty seconds later, when VOM was about 31 NM (57 km) east of Darwin, the flight crew requested a right turn to head 180°. The controller initially issued the radar vector, but, realising that the aircraft was outside controlled airspace, immediately cancelled the radar heading. Shortly after, the flight crew resumed their own navigation and tracked south.

The flight crew later reported that, due to the extent of the storms, the aircraft would not have been clear of weather and able to manoeuvre unrestricted until about 30 to 35 NM (56 to 65 km) east of Darwin.

The flight crew then requested to climb the aircraft into controlled airspace; however, this was not available due to an aircraft in that area at 7,000 ft tracking towards Darwin. At 1254, and with the aircraft 36 NM (67 km) east of Darwin, the flight crew of VOM were issued a clearance to track direct to Howard Springs. VOM re-entered controlled airspace at 1255 and subsequently landed at Darwin Airport via runway 29 at 1309.

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[3] Flight information service (FIS): A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

[4] Surveillance information service (SIS): An on-request service provided to assist pilots of visual flight rules flights, within air traffic service surveillance system coverage in Class E and Class G airspace, to avoid other aircraft or to assist in navigation.

[5] Class G airspace: Uncontrolled airspace where aircraft operate without a clearance.

Context

Personnel information

The flight crew on VH-VOM (VOM) were appropriately licenced and held current medical certificates. A review of their recent sleep and work patterns identified no fatigue-related issues associated with the occurrence flight.

Darwin Approach was staffed by three Department of Defence (Defence) air traffic controllers, the:

- Supervisor
- Approach West controller
- Approach East controller.

Each controller was correctly endorsed and a review of their recent sleep and work patterns did not identify any fatigue-related issues. The Approach supervisor was also endorsed in both Approach East and West.

The Approach East controller was working part-time, predominately in an administrative role. The controller worked on-console sufficiently frequently to maintain the Defence controller recency requirements.

Airspace information

Defence was the controlling authority for the Class C airspace[6] within 40 NM (74 km) of Darwin Airport and below Flight Level (FL)[7] 180. Airservices Australia (Airservices) had jurisdiction for the adjacent airspace and both agencies liaised extensively to provide an air traffic service in the area. Defence controllers use the same control techniques as Airservices when controlling civil, or a combination of civil and military, aircraft.

Procedures in place at Darwin required the airspace to be split between Approach East and Approach West during periods of higher traffic levels. Splitting the airspace resulted in fewer aircraft on a controller's frequency, but could increase the need for coordination between those controllers. The procedures also required a supervisor be present when the airspace was split, to assist the controllers with coordination and sequencing.

The lowest levels of the controlled airspace to the east of Darwin that were controlled by the Darwin Approach East controller were:

- ground level from the airport to about 5 NM (9 km), then
- 1,000 ft from 5 NM to 15 NM (28 km)
- 2,500 ft from 15 NM to 30 NM (56 km)
- 6,500 ft from 30 NM to 40 NM (74 km).

The next controlled airspace step, with a lowest level of 8,500 ft out to 50 NM (93 km), was under the jurisdiction of Airservices.

The airspace below the steps was classified as Class G. Aircraft are, in certain circumstances, permitted to operate in Class G airspace without radio communication equipment or a transponder. Accordingly, there are limitations in the effectiveness of flight information services and surveillance information services in that airspace.

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[6] Class C airspace: Controlled airspace surrounding major airports. All aircraft require an air traffic control clearance for operations in this airspace.

[7] At altitudes above 10,000 ft in Australia, an aircraft's height above mean sea level is referred to as a flight level (FL). FL 180 equates to 18,000 ft.

Meteorological information

The wet season in the far north of the Northern Territory extends from about October to April. This is also when most of the region's hazardous aviation weather occurs. The wet season is characterised by cloudy conditions, lengthy periods of heavy rain, occasional thunderstorms and fresh to strong squally winds. During that period, aircraft regularly request track changes to avoid storm cells.

Controller responsibilities

Air traffic controllers are responsible for providing an air traffic service within the airspace under their jurisdiction. Such a service includes issuing clearances and information to prevent collision between aircraft and expediting and maintaining an orderly flow of traffic to and from the airport. The specific responsibilities of the Approach East and the Approach West controllers were dependent on the runway configuration in use at Darwin. When runway 29 was in use, the:

- Approach East controller was responsible for:
  - arriving aircraft within the eastern portion of Darwin's airspace
  - sequencing aircraft arriving from the western portion of Darwin's airspace
  - separating arriving aircraft within the eastern portion of Darwin's airspace with departing aircraft entering that airspace.
- Approach West controller was responsible for:
  - aircraft in the western portion of Darwin's airspace
  - separating departing aircraft within the western portion of Darwin's airspace with arriving aircraft entering that airspace
  - issuing departing aircraft that will enter the eastern portion of Darwin's airspace a separation-assured heading without prior coordination.

Further, procedures in place at Darwin stipulated that aircraft departing Darwin were to remain on the Approach West frequency as much as practicable.

The Approach East controller liaised with the Approach West and the Tower controllers to ensure the landing sequence was understood. Coordination was also required with the Airservices controllers responsible for the adjoining airspace.

The Approach Supervisor was responsible for, among other duties:

- supervising and coordinating the work of the Approach controllers
- planning traffic flow
- maintaining a constant liaison with the Tower supervisor regarding relevant weather information.

The Approach Supervisor who was responsible for monitoring controller workload on the day of the occurrence advised that they were aware that workload was high for the Approach East controller. They further stated that the traffic levels had built up quickly and, in response, they had taken on some of the controller's tasks, predominately coordination with other agencies and sequencing.

Radar vectoring

The provision of navigational guidance to an aircraft in the form of specific headings, based on the use of an air traffic surveillance system, is known as radar vectoring. However, unless an emergency situation existed, aircraft were not to be radar vectored in Class G airspace.

One reason a controller can vector an arriving aircraft is to establish an orderly landing sequence at the airport. When an aircraft is vectored by a controller, the responsibility for navigation and terrain clearance is transferred to the controller.

When issuing an initial vector, the controller should advise the flight crew of:

- the reason for the vector, unless that reason was obvious
- the extent of the vector in general terms
- a tracking expectation at the completion of the vector.

On completion of vectoring, specific phraseology is to be used by the controller to transfer responsibility for navigation and terrain clearance back to flight crew. This phraseology includes advice to the aircrew of the aircraft's position.

When aircraft leave controlled airspace, the controller is responsible for providing advice on other aircraft in the area. The other aircraft may either be observed, or known to be, in potential conflict with the aircraft leaving controlled airspace. The controller would be aware of aircraft in Class G airspace that had contacted them, or that were visible on their surveillance radar display. An additional source of information would be to liaise with the controller responsible for the provision of a flight information service (FIS) or a surveillance information service (SIS) in that area.

Flight crew responsibilities

Flight crew hold responsibility for the safe operation of their aircraft. On occasion, air traffic control assume responsibility for some aspects of flight, for example terrain clearance and navigation (see the section titled *Controller responsibilities*).

When a clearance is been requested by flight crew to deviate around weather, flight crew should advise air traffic control when the weather diversion is no longer required. This is done using the phrase 'clear of weather'. Where circumstances warrant, and no documented phraseology is deemed appropriate, flight crew should use clear and concise plain language to indicate their intentions.

Similar occurrences

A review of the ATSB database did not identify any similar occurrences.

Safety analysis

Introduction

Thunderstorms in the Darwin area resulted in the majority of inbound aircraft tracking around storm cells, increasing the workload for the flight crews and the air traffic controllers. The flight crew of VH-VOM (VOM) had requested heading changes to avoid the weather that resulted in the aircraft tracking away from Darwin Airport. Ultimately, the aircraft exited controlled airspace without the required cancellation of radar vectoring. The controller subsequently issued a radar vector to the flight crew of VOM while the aircraft was outside controlled airspace. The following analysis will examine the various factors that led to this occurrence.

Controller workload

While the number of aircraft on the Approach East frequency was not high, the majority were diverting around storm cells. These diversions increased the controller's workload as the arrival sequence became more complex and required increased levels of coordination. The situation was also exacerbated by a number of aircraft holding in the area.

The Approach East controller reported that their workload was higher than normal and that they were approaching their limit. As workload increased, the controller reported that they were spending additional time checking what they were doing, thus introducing a delay in communicating with flight crew. The supervising controller had recognised the controller's workload and was assisting primarily with coordination and sequencing.

High workload is associated with an increase in error rate, and can also adversely affect an individual's response to error (Harris, 2011 and Kantowitz & Casper, 1988). Time spent by a controller monitoring, but not communicating with, traffic was higher when dealing with 'peak levels of air traffic'. This suggests that monitoring the traffic created a higher cognitive load than would be expected (Kantowitz & Casper, 1988).

In this occurrence, it is likely that the high level of workload resulted in increased monitoring. This added to the level of workload for the Approach East controller and reducing their ability to plan. As VOM approached the airspace boundary, standard phraseology was not used to advise the aircrew of their position and to transfer responsibility for navigation and terrain clearance back to the flight crew. This was likely due to the higher cognitive load being experienced by the controller.

The flight crew subsequently requested a heading change 'due weather', despite the aircraft being outside of controlled airspace. This was the third such request from that crew and, combined with the already high workload, the controller inadvertently responded by issuing a radar vector.

Additionally, on two separate occasions, the Approach East controller started, but did not complete, transmissions to the flight crew of VOM. These clipped transmissions were, more than likely, unfinished due to workload associated with completing coordination with other controllers. That workload prevented the controller from seeking clarification on possible headings that would have been acceptable to the flight crew.

Flight crew expectation

Due to aircraft in the airspace controlled by the Approach East and Approach West controllers being on different frequencies, the flight crew of VOM were not aware of all of the traffic in the Darwin airspace. Additionally, the flight crew were unaware of the higher than normal level of coordination being undertaken at the time, as this was not transmitted over the radio. As a result, the flight crew had no way on knowing the full extent of the controller's workload.

When the flight crew of VOM acknowledged the Approach East controller's advice that the aircraft would be going outside controlled airspace on the crew-requested heading, the crew should have been advised by the controller:

- of the aircraft's position
- to resume their own navigation
- of any known traffic in the area.

In the absence of this information, the flight crew may not have understood the full implications of continuing on the crew-requested heading into uncontrolled airspace. That the flight crew requested another radar heading while outside controlled airspace supports this possibility.

The flight crew later reported that, following their request for vectors due weather, they expected that the aircraft would be vectored to commence the instrument landing system approach.

Controller expectation

When issuing the radar vectors to the flight crew of VOM to avoid the storms, and in accordance with documented requirements, the controller advised them to report clear of the weather. While the crew did respond to the controller advising of the surrounding weather, the controller was waiting for specific phraseology prior to facilitating the aircraft's approach to Darwin Airport. Without that report, the controller believed that the flight crew were actively involved in avoiding storm cells.

Further reinforcing the controller's belief was the flight crew's acceptance to leave controlled airspace on the heading that the crew had requested in order to avoid weather. If the flight crew had advised an acceptable heading or how much longer the current heading was required, that may have assisted the Approach East controller to vector the aircraft for the instrument landing system approach. That represented a missed opportunity for common understanding.

Controller proficiency

Conditions that exacerbate error rate under high workload include inexperience with a task (Harris, 2011). Though the Approach East controller was correctly endorsed, their primary duty was administrative. To maintain endorsement recency, a controller was required to perform air traffic duties for a minimum number of hours over a stipulated time period.

While the controller met the recency requirements, given they were conducting part-time duties as a controller, their exposure to the Approach environment was ad hoc. This exposure, compounded by the onset of the wet season, may have resulted in a higher error rate compared to colleagues that were more routinely exposed to busy traffic sequences.

At the time of this occurrence, the Department of Defence was developing a number of simulator packages to enable Darwin air traffic controllers to gain experience in unusual operations. These packages, which were introduced in 2015, also help controllers maintain their skills during the dry season in readiness for the increased workload and complexity often seen during the wet season.

Findings

From the evidence available, the following findings are made with respect to the airspace event involving Boeing 737, registered VH-VOM, near Darwin, Northern Territory on 27 February 2014. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing factors

- The non-standard phraseology used by the Approach East controller, just prior to VH-VOM going outside controlled airspace, did not emphasise that responsibility for navigation, terrain clearance and separation from other aircraft was being transferred to the flight crew.
- Despite the flight crew of VH-VOM providing an indication of the weather in the area, they did not comply with the requirement to specifically report ‘clear of weather’.
- A lack of a shared understanding between the flight crew of VH-VOM and the Approach East controller as to what was required from the other before the aircraft would be re-cleared to Darwin, delayed resolution and resulted in the aircraft exiting controlled airspace under radar vectors.
- While the Approach East controller met the Department of Defence recency requirements, working part-time in an administrative position limited their exposure to the tasks associated with controlling busy traffic sequences in adverse weather.
- A combination of the controller's recent and overall experience, traffic levels and the significant weather in the Darwin area, significantly increased their workload.
- The combination of the high workload and the previously issued vectors while VH-VOM was inside controlled airspace led to the controller inappropriately issuing a radar vector to an aircraft outside controlled airspace. This increased the risk of bringing VH-VOM into conflict with aircraft that were unknown to air traffic control.

General details

Occurrence details

Date and time:	27 February 2014 – 1253 CST	
Occurrence category:	Incident	
Primary occurrence type:	Airspace – Air Navigation Service Provider operational error	
Location:	near Darwin Airport, Northern Territory	
	Latitude: 12° 24.88' S	Longitude: 130° 52.60' E

Controller details

Proficiency details:	Fully endorsed controller, issued 8 November 2010
Endorsements:	Surface Movement, Tower, Approach and Planner
Ratings:	Approach control and Aerodrome control
Medical certificate:	Valid
Last proficiency review:	30 October 2013

Aircraft details

Manufacturer and model:	The Boeing Company, 737-8FE	
Year of manufacture:	2003	
Registration:	VH-VOM	
Operator:	Virgin Australia Airlines Pty Ltd	
Serial number:	33794	
Type of operation:	Air Transport High Capacity	
Injuries:	Crew – nil	Passengers – nil
Damage:	Nil	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- Department of Defence
- aircraft operator
- air traffic controllers involved in the incident
- flight crew of VH-VOM.

References

Harris, D 2011, *Human Performance on the Flight Deck,* Ashgate, Surrey, England.

Kantowitz, BH and Casper, PA 1988, Human Workload in Aviation. In EL Wiener and DC Nagal (Eds) *Human Factors in Aviation* (pp. 157–187), Academic Press Limited, London, England.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the involved air traffic controllers, the flight crew and operator of VH-VOM, the Department of Defence, Airservices Australia and the Civil Aviation Safety Authority.

Submissions were received from the flight crew and operator of VH-VOM, the Department of Defence and Airservices Australia. The submissions were reviewed and, where considered appropriate, the text of the draft report was amended accordingly.

Australian Transport Safety Bureau

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; 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 operations involving the travelling public.

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.

Purpose of safety investigations

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

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power 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 undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

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 safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

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Investigation

ATSB Transport Safety Report
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