Australian Government
Australian Transport Safety Bureau

Coordination and communication breakdown during aerial firefighting operations

near Tenterfield, New South Wales, on 31 October 2023

ATSB Transport Safety Report
Aviation Occurrence Investigation (Systemic)
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Acknowledgement of Country and Traditional Owners

The Australian Transport Safety Bureau acknowledges the traditional owners of country throughout Australia, and their continuing connection to land, sea and community. We pay our respects to them and their cultures, and to elders both past and present.

Investigation summary

What happened

On 31 October 2023, several active fires were burning in the Tenterfield area of New South Wales (NSW). By that afternoon, up to 21 NSW Rural Fire Service (RFS) aircraft, including 3 large air tankers and their lead plane (birddog) were deployed to the area to assist with fire control. Concurrently, Queensland (Qld) Fire and Emergency Services (QFES) had deployed aerial assets to an adjacent fireground on the NSW/Qld border.

The crews of the NSW RFS birddog and the large air tankers reported multiple incidents of being unable to communicate and coordinate with other aircraft at the firegrounds. Multiple occurrences of unsafe aircraft proximity were also reported.

What the ATSB found

The ATSB identified that as the fire activity increased in the early afternoon, the state operations controller (SOC) proactively dispatched 3 large air tankers to the region without a target and without coordinating with the local incident management team to ensure they could be effectively integrated into the existing local incident plan. The SOC likely assumed that the large air tankers would be coordinated by the air attack supervisor (AAS) in the Tenterfield area when they arrived. However, most likely due to the communication breakdown, the AAS was not aware the air tankers were inbound. Further, when they arrived, the AAS was about to depart the fireground for fuel and did not advise the incoming Birddog AAS (dispatched with the large air tankers) of the known traffic in the area.

The ATSB also identified that the NSW RFS had inadequate guidance to ensure there was consideration given to the continuity of aerial supervision if the AAS was required to depart the fireground. There was also no mechanism to assess whether increased aerial supervision was required when aircraft numbers and/or fire complexity increased.

In addition, the NSW RFS had no procedure to ensure that fire common traffic advisory frequencies (Fire-CTAFs) were reliably known by state air desk personnel. As a result, when the 3 large air tankers were dispatched to the area, they were provided with incomplete Fire-CTAF information.

In combination, this resulted in the large air tankers having no target information, incomplete traffic information and operating on the incorrect frequency. Additionally, NSW RFS and QFES were operating in proximity on the NSW/Qld border with, initially, no communication or coordination.

The ATSB also identified safety issues associated with the inconsistent understanding within the NSW RFS state air desk of the threshold required to action task rejection procedures when safety concerns were raised. Also as there was no procedure for implementing a temporary restricted area, there was an increased risk of an air proximity event with aircraft not associated with firefighting operations.

What has been done as a result

Following the events that occurred near Tenterfield on 31 October 2023, the NSW RFS introduced extensive systemic-level safety improvements to its operations.

This included the introduction of a policy to ensure that pilots in command of large air tankers receive a briefing from the incident management team regarding incident strategy prior to departure. It has also developed new procedures for state air desk and incident management team (IMT) liaison, and structured communication loops between the IMT and air attack supervisors.

Further, NSW RFS has issued a directive that requires regular assessment of operational complexity, environmental conditions and the number of aircraft dispatched to a fireground to ensure that aerial supervision arrangements remain appropriate.

Issues around the implementation of a temporary restricted area (TRA) and recording Fire-CTAF information have also been addressed.

In addition, the National Aerial Firefighting Centre (NAFC) developed the national cross-border airspace management guideline (released in January 2024), which involved all jurisdictions. This guideline established common procedures for frequency alignment, air desk-to-air desk liaison, cross-border tasking triggers, and shared TRA/TFR activation.

Refer to the section titled *Safety issues and actions* for a full list of proactive safety actions taken.

Safety message

As noted by the National Aerial Firefighting Centre, aerial firefighting is a critical capability for the management and suppression of bushfires in Australia. To effectively achieve this, multiple aircraft are flown at low altitudes and varying airspeeds, often in challenging environmental conditions. This creates a high-risk environment, which requires a continued focus on risk mitigation.

As previously identified in ATSB investigation AO-2020-007 (*Collision with terrain involving Lockheed Martin EC-130Q, N134CG 50 km north-east of Cooma-Snowy Mountains Airport (near Peak View), New South Wales, on 23 January 2020*), at a large fireground it is likely there will be personnel and assets from multiple organisations and jurisdictions interacting. In this scenario, non-standard procedures and practices may result in unforeseen risks emerging. It is therefore critically important for tasking agencies to take the lead, with the support of stakeholders, in developing the quality and safety standards they require for the firefighting effort to mitigate operational risks.

Further, the adoption of robust systems for managing risk by the tasking agency provides an additional layer of defence, above that provided by each aircraft operator. This also ensures that one aspect of the operation does not compromise another. This may include the development of procedures to support decision-making processes rather than personnel having to exercise judgement based on their experience, skills and knowledge. This includes tasking decisions, task rejection procedures, and minimum aerial supervision requirements.

Contents

The occurrence

Introduction

Aerial firefighting is a critical capability for the management and suppression of bushfires in Australia. To effectively achieve this, multiple aircraft often operate together over inhospitable terrain at low altitudes and varying airspeeds with reduced visibility from smoke. This hazardous environment 'requires an enduring focus on training, compliance, and risk mitigation' (National Aerial Firefighting Centre (NAFC), 2021).

After firefighting operations in the Tenterfield area of New South Wales (NSW) on 31 October 2023, the ATSB received multiple reports of proximity incidents between firefighting aircraft dispatched to the area and initiated an investigation, including a detailed review of the flight data (see the section titled *Recorded data*).

Following interviews with key personnel, a review of communications, dispatch and communication procedures, and written submissions from operators involved on the day, the ATSB identified several risks associated with communications and coordination between the state air desk and the incident management team and between the state air desk and the aircraft dispatched to the fireground. As such, these risks became the focus of the investigation. The proximity incidents were considered consequential to these risks.

Background

In the days leading up to 31 October 2023, extreme fire weather,[1] critically dry fuels, and multiple simultaneous fire escalations combined across the Tenterfield, Inverell, and Glen Innes Severn Local Government Areas (LGA). The NSW Rural Fire Service (NSW RFS) advised this created one of the most challenging operational environments encountered during the 2023 fire season.

By midday on 31 October, the RFS State Operations Centre reported 93 active incidents across NSW, including 77 bush and grass fires, with 25 still to be contained. There were also 6 concurrent Section 44[2] bushfire emergency declarations, one of which covered the Inverell/Tenterfield LGAs.

To meet these escalating demands, 617 personnel, 167 appliances, 39 heavy plant units and 45 aircraft were deployed across the state. Despite this, resourcing remained critical.

The Tenterfield LGA recorded 10 active fires, many of which escalated during the afternoon under the influence of strong winds and critically dry fuels. By evening, 6 fires had reached Emergency Warning level, and 8 Emergency Alerts were issued, including for new ignitions, such as the Christies fire on the NSW/Qld border.

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1 The Australian Fire Danger Rating System uses a combination of weather forecasting and information about vegetation that could fuel a fire, to provide an indication of the consequences of a fire, if one was to start. The ratings are medium, high, extreme and catastrophic. Extreme indicates dangerous fire conditions.

2 Section 44 of the *Rural Fires Act (1997)* allows the commissioner to take charge of bush firefighting operations and bush fire prevention in any part of NSW.

The key fires in the LGA included:

- Benders Creek Fire – made significant afternoon runs, jumped the New England Highway (closing the road), and escalated to Emergency Warning with a Seek Shelter message.
- Sawyers Creek Fire – breached containment, crossed the Bruxner Highway and threatened properties west of Tenterfield.
- Frost Road Fire – escalated from Watch and Act to Emergency Warning during the day as it crossed Woodside Road and threatened the Sunnyside area.
- Ogilvie Drive Fire (Tabulam) – crossed the Clarence River, destroyed several structures and forced Emergency Alerts for downstream communities.
- Christies Fire (Jennings/Wallangarra) – ignited in Queensland, crossed into NSW and impacted the towns of Wallangarra (Queensland) and Jennings (NSW), resulting in property losses, power outages, and residents sheltering in place under direct fire impact.

An incident management team (IMT) (see the section titled *Incident management team*) had been established at Glen Innes, NSW, to coordinate firefighting activities in the region. There were many roles involved in the NSW RFS response; for simplicity, only the most relevant roles applicable on the day, in the regions involved, are discussed in this report.

The IMT included an incident controller (IC), responsible for the overall fire management, an air operations manager (AOM), responsible for coordination of aviation resources, and 2 air attack supervisors (AAS) (see the section titled *Air attack supervisor*) operating in helicopters over the firegrounds, conducting tactical aircraft coordination.

As part of the daily morning briefing at the IMT, aerial crews deployed to the Tenterfield area were advised that there were 3 fire common traffic advisory frequencies (Fire-CTAFs)[3] (see the section titled *Fire common traffic advisory frequencies)* and were provided the corresponding boundaries in use that day (Figure 1). These frequencies were allocated to help with communication in anticipation of the high number of aircraft expected to be operating in the area. The Fire-CTAFs in operation were the:

- northern area containing Jennings (118.65)
- southern area containing Tenterfield (123.65)
- western area (124.45).

Although the 3 Fire-CTAFs had been issued by the NSW RFS state air desk (SAD) (see the section titled *State air desk*) in Sydney the previous evening, the personnel manning the SAD on the morning of 31 October 2023 were only aware of the southern Tenterfield Fire-CTAF (123.65).

[3] The NSW RFS was allocated discrete radio frequencies, which it could assign to fire grounds.

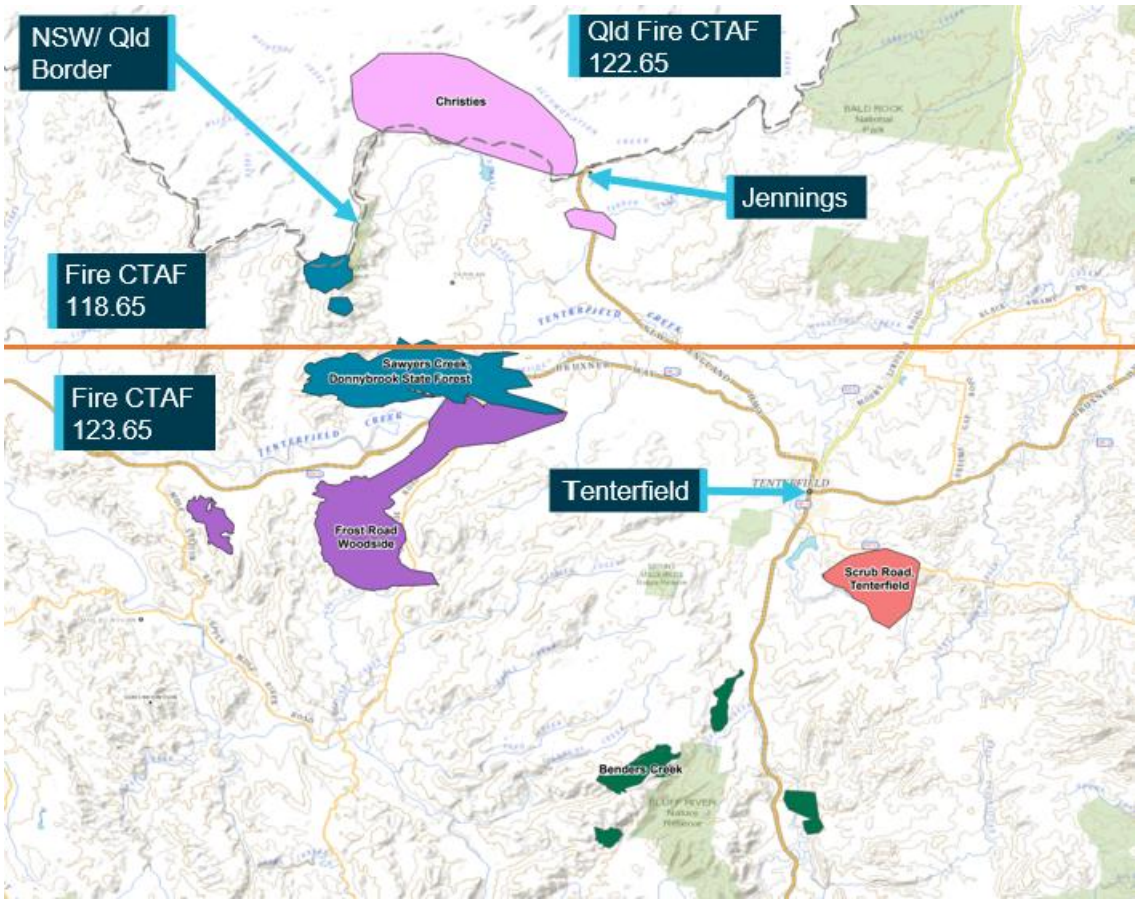
Figure 1: Map of NSW Fire-CTAFs in the Tenterfield area on 31 October 2023

Source: NSW RFS, annotated by the ATSB

In total, there were up to 18 aerial assets deployed by the NSW RFS to the region throughout the morning.[4] The AAS in Firebird 254 (FB254), a Eurocopter AS350, was assigned to the area encompassing Fire-CTAF 123.65 and was primarily focused on 2 fires west of Tenterfield – Frost Road (purple section in Figure 2) and Donnybrook State Forest (blue section in Figure 2). They were coordinating up to 14 aerial assets, including single engine air tankers (SEATs) and helicopters.

[4] There was some discrepancy between flight data and aircraft-related documentation, noting that aircraft operating at low altitudes may not have appeared on data sources. Additionally, throughout the afternoon, different aircraft entered and exited the area assessed by the ATSB. As such, the exact number of aircraft in a particular area changed throughout the day.

Figure 2: Zoomed in map of active fires released at 1600



Note: Fire mapping data was only provided at 4-hour intervals. There was no imagery provided for 1400. The above map was released at 1600; and was indicative of fire activity between 1400–1500 – the NSW RFS personnel on the ground were not aware of the extent of the fire at Christies.

Source: NSW RFS annotated by the ATSB

While not associated with the proximity events of the day, a second AAS was operating in a helicopter, callsign Firebird 279 (FB279), around 27 km north-east of Tenterfield at a fireground near Ogilvie (Figure 1). They were operating on the northern Fire-CTAF (118.65) coordinating 2 helicopters at the Ogilvie fire. That AAS later reported that they could not hear any radio transmissions being made later in the day, when aircraft were operating in the Jennings area, most likely due to terrain shielding.

In the late morning and early afternoon, a forecast wind change occurred, and the fires to the west of Tenterfield made a faster than anticipated run towards the town and the airport. This increased the workload for personnel in the IMT, specifically the AOM, as there was a possibility that the Tenterfield air base, where major RFS assets were based, would come under threat from the fire. The AAS was also allocating assets to try to contain this fire to the west of the main highway.

At 1329, during a teleconference[5] between the operations control centre in Sydney and the IC at Glen Innes, the IC advised there was a new fast-moving grass fire in the Scrub Road area (red section in Figure 2) with 20–30 properties under threat. They advised they had one aircraft and 2 ground firefighting units but no other resources available to

[5] Teleconference calls between the state operations centre and the Glen Innes IMT were recorded.

fight this fire. In response, the NSW RFS state operations controller (SOC) (see the section titled *State operations controller*) advised that one large air tanker (LAT),[6] already operational, could be diverted to the area. They also advised there was a possibility a second LAT could be made available, and that the IC could consider using those assets and reprioritising other assets already at the fire, if deemed necessary, which the IC noted.

Approximately 20 minutes later, without further consultation with the IC or personnel at the IMT, the SOC ordered the dispatch of 3 LATs – callsigns Bomber 210, Bomber 164 and Bomber 132, and a lead aircraft (Birddog 123)[7] to the Tenterfield area. The SOC advised the IC in a second conference call when discussing the Frost Road (purple section in Figure 2) and Donnybrook (blue section in Figure 2) fires that 'we have 3 LATs that have been tasked to you in Tenterfield, and I understand the AAS is liaising with the AOM in the IMT'. The IC did not conduct any further follow up with the AOM regarding the LATs.

The LATs and Birddog crews were (verbally) dispatched to the Scrub Road fire by the state air desk in Sydney and were provided with the southern area Fire-CTAF of 123.65. As the 2 adjacent Fire-CTAFs were not known to the state air desk, the LATs and Birddog crews were not advised of these. In addition, they were not provided with specific target information but were instructed to coordinate with the AAS in FB254 upon their arrival. The Birddog AAS reported that they were also not verbally informed that Bomber 132 had been tasked to the fire (although this was included in the tasking information, the tasking information could not be downloaded in flight).

Shortly after, the state air desk operations manager (SADOM) sent a text message via mobile phone to the Glen Innes AOM advising that 3 LATs had been dispatched. However, the text message did not include an estimated time of arrival for the LATs or any intended targets. Although it was common practice for the AOM to pass details of arriving aircraft to the AAS, they could not specifically recall doing so, and the AAS in FB254 later reported being unaware that the LATs had been dispatched.

Bomber 164 and Birddog 123 departed from Dubbo, NSW, and Bomber 210 departed from Coffs Harbour, NSW, at about the same time. During their flights, dispatch details were received, however due to the lack of internet reception at altitude, this could not be downloaded. About 30 minutes later, Bomber 132 departed from Richmond, NSW. The Birddog crew were in communication with the Bomber 164 crew on the NSW RFS assigned LAT frequency (130.55). Birddog 123 also communicated with Bomber 210 via the LAT CTAF[8] on Bomber 210's arrival.

Concurrently, the QFES was conducting firefighting operations at the 'Christies' fire. The NSW AOM and AAS were aware that these fires had been burning for several days and were aware QFES would be managing these fires. However, they had not considered

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6 Large air tanker (LAT): multi-engine aircraft that carries up to 15,000 L of water or fire retardant. Often converted from large cargo, passenger or military aircraft.

7 Birddog 123 was a small jet aircraft (Cessna 525 Citation) used to assess the fireground, determine the best flightpath, lead the air tankers across the fireground and show them where to drop with a smoke generator. It was crewed by a pilot and an air attack supervisor (LAT AAS).

8 LAT CTAF is a discrete frequency used by the LATs.

the implications for their operations of aerial assets operating on the Queensland (Qld) side of the border.

At 1400,[9] the Christies fire started to threaten the Wallangarra/Jennings area on the border of Qld and NSW. QFES continued to refer to this fire as the 'Christie's' fire, with NSW RFS referring to this fire as the 'Jennings' fire. Neither agency initially recognised that this was the same fire. Subsequently, QFES dispatched 6 aircraft, including a large air tanker, to the border area. These aircraft were operating on a different QFES assigned Fire-CTAF, 122.65.

There was no coordination between the NSW RFS and QFES regarding border operations at that time, and so NSW RFS personnel (SAD and the IMT) were unaware these aircraft had been dispatched.

Birddog 123 arrived at the Scrub Road fire, broadcasting on the 123.65 Fire-CTAF, at around 1450. The Birddog AAS contacted the AAS in FB254, who, unaware that the birddog and LATs had been dispatched, was about to depart the Frost Road fireground to refuel. Prior to departing, they told the Birddog AAS they could head north of the Donnybrook fire, where a new fire had just started to develop and was running toward the Jennings township, and find a target. A review of flight data confirmed that FB254 was on the ground at Tenterfield Airport between 1454 and 1504.

Bomber 164 and Bomber 210 arrived around 7 minutes after the Birddog, which was about an hour after the AOM was advised via text message that they had been dispatched. The Birddog AAS advised the ATSB that to ensure separation with aircraft at the fireground, Bomber 164 and Bomber 210 were kept about 28 km to the west and south-west of the fireground, not lower than 6,000 ft above ground level (AGL).

The FB254 AAS reported that, following refuelling at Tenterfield Airport, the helicopter was tasked to assist with a report of ground crews under threat from fire. A review of flight data confirmed that shortly after becoming airborne again, FB254 movements were consistent with a search and rescue pattern around 19 km south of the Scrub Road fire. While the AOM could not specifically recall tasking FB254 to assist the ground crews, they advised it was likely they had tasked them, as they were responsible for tasking aerial assets to respond to triple 0 calls or requests from ground crews.

The Birddog AAS reported that they attempted contacting other aircraft in the area around the Scrub Road fire and made a couple of low runs with the intention of putting a retardant line to protect 2 properties on the southern edge of this fire. Once satisfied the area was suitable, they contacted the crew of Bomber 210, advising them to enter the area, and briefed them accordingly. However, the Birddog AAS reported that as Bomber 210 was on their final run to drop their retardant, they received a call from personnel within the IMT advising them not to drop the retardant and instead move further north towards Jennings to targets of higher priority. The ATSB could not verify when the Birddog was instructed to go north, or who issued that instruction.

Neither the IMT personnel nor the FB245 AAS advised the Birddog AAS that the Jennings area was operating on a different Fire-CTAF. Therefore, when the Birddog and

[9] NSW RFS was operating on Eastern Daylight-saving Time, while Qld aircraft were operating on Eastern Standard Time, which was one hour behind NSW. Unless stated otherwise, all times in the report have been converted to Eastern Daylight-saving Time.

the LATs headed north towards Jennings, they remained on 123.65 instead of 118.65, which was being utilised by other aircraft in the Jennings area on the NSW side of the border (Figure 3).

Figure 3: Aerial traffic in the Tenterfield area at 1500

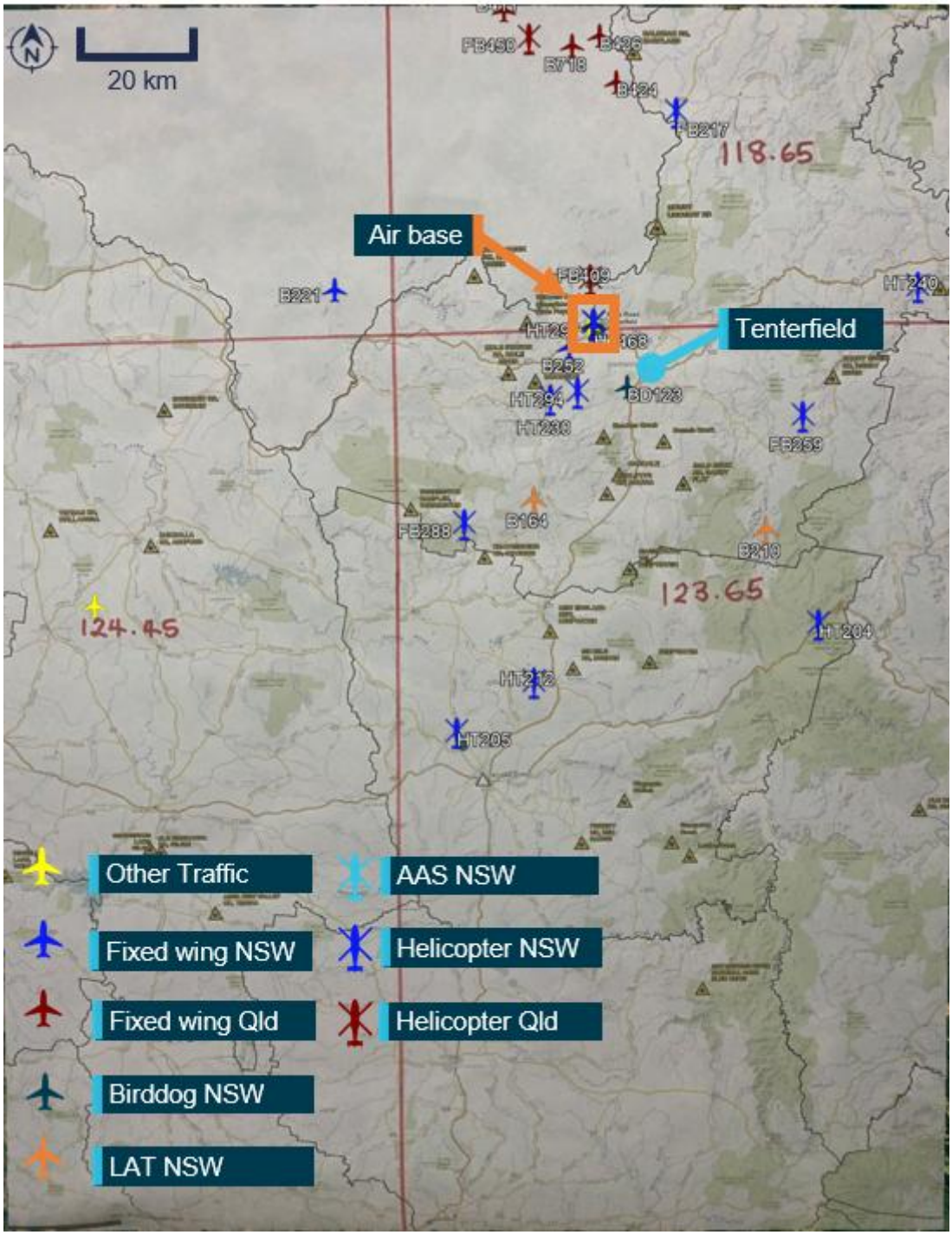

Image shows aircraft active in the specified area between 1455 and 1505. A 10-minute duration was used noting some only transmit positional information at a rate of 2 minutes, and with low level work some transmissions may not be captured. 5 aircraft were identified as being on an airfield (FB254 (AAS), Cessna 182 (private), HT297, HT468 and FB717).

Source: NSW RFS map, data from ADSB and NAFC, annotated by the ATSB

Over the next hour, Bomber 210, Bomber 164 and Birddog 123 (operating on their discrete frequency) transited in and out of the northern Fire-CTAF 118.65, with the

Birddog AAS also using the 123.65 Fire-CTAF. They also entered the Qld Fire-CTAF (122.65), unaware they were on a different frequency to other aircraft operating in this area. The LATs and Birddog crews reported multiple proximity events with other aircraft, citing other flight crews not communicating and not being visible on TCAS,[10] as the primary reasons for these events (see Transponder analysis).

Birddog 123 reported that they contacted the SAD multiple times on their mobile phone throughout the afternoon, advising of difficulty identifying and contacting aircraft in the area. In response, the SAD provided the Birddog with mobile telephone numbers for the pilots assigned to the fireground so that the Birddog could contact them directly. Confirmation of the Fire-CTAFs in use did not occur during these telephone calls.

Personnel on the SAD had access to flight tracking software Tracplus,[11] which was used as a strategic situational awareness tool. It was not actively monitored and was not used to assess airspace congestion. Despite that, the SAD operations manager viewed Tracplus and noticed that the airspace appeared congested, and that Qld aircraft were operating in proximity to NSW RFS aircraft on the border.

That observation prompted contact with the Qld SAD at 1525 (NSW time) to advise of NSW aerial operations taking place near the border. However, unaware of the northern Fire-CTAF in use, initially only Fire-CTAF 123.65 was relayed to the Qld SAD. In response, the Qld SAD advised the NSW SAD that Qld aircraft were operating on Fire-CTAF 122.65. There was no evidence that that information was passed to any NSW RFS personnel at the firegrounds.

Around 1530, Bomber 132 arrived at the fireground, and the crew contacted the Birddog 123 AAS. Until then, the Birddog AAS was unaware that the third LAT had been dispatched. There were no reports of proximity events involving Bomber 132 and it largely held at a higher altitude to the west of the fireground, due to having significant endurance and no specific targets allocated.

At around 1600, the Glen Innes AOM advised the NSW SAD that there were 3 Fire-CTAFs in use, and provided the specific frequencies.

Subsequently, the NSW SAD relayed that information to the Qld SAD, to enable QFES aircraft to coordinate with NSW RFS aircraft on 118.65. However, the Fire-CTAF information was not passed to the 3 LATs and Birddog already at the fireground.

Shortly afterwards, while operating near Jennings, the pilot of Birddog 123 detected the QFES Birddog (125) on TCAS. By chance Birddog 125 was a company aircraft, and the 2 pilots knew each other personally. The pilot of Birddog 123 was therefore able to contact the other pilot by mobile telephone. During the subsequent discussion between them, it became clear that there were aerial assets, including LATs, operating at fires on either side of the border.

The pilot of Birddog 123 reported that they subsequently advised the NSW RFS SAD that conditions were dangerous due to a lack of coordination and communication. Additionally, after the LATs completed their drops – one effective, one partially effective,

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[10] TCAS: traffic collision avoidance system is a form of aircraft airborne collision avoidance system. It uses transponders which operate independently of ground-based equipment, to provide advice to flight crews on potential conflicting aircraft.

[11] Tracplus: used satellites to track aircraft and relay their position and other associated data every 3 minutes.

and one ineffective – the Birddog AAS advised the NSW RFS LAT coordinator and SOC that they would not be returning to the fireground until communication issues were resolved.

This was not recognised as a task rejection (see the section titled *Task rejection procedures*) by either the large air tanker tasking coordinator (LATCO) or the SOC. As such, no records were made of the conversation and neither the LATCO nor the SOC took any action to ensure the communication concerns were addressed. Additionally, the safety concerns were not passed on to aircraft already at the fireground, nor the subsequent Birddog and LAT crew dispatched to the fire approximately one hour later.

Context

Personnel from multiple agencies were involved in the firefighting operations in the Tenterfield area on 31 October 2023. These included the New South Wales (NSW) Rural Fire Service (RFS), NSW National Parks and Wildlife Service and pilots and air crew of various aircraft operators contracted to NSW RFS. Later in the afternoon, as fires on the Queensland side of the border converged with fires in NSW, personnel from Queensland Fire and Emergency Services (QFES) were also involved.

New South Wales Rural Fire Service

The NSW RFS was the lead agency for fighting bushfires in NSW. They worked closely with other agencies to respond to a range of emergencies, including:

- bush and grass fires
- bushfire mitigation
- structure fires
- search and rescue (SAR)
- motor vehicle accidents
- storm response in rural districts.

The RFS was primarily made up of volunteers, with paid staff members managing day-to-day operations, incident management teams (IMTs) and operational support, among other roles. There were many roles involved in the RFS emergency management response; for clarity, only those roles applicable on the day are discussed below.

State operations centre

When required, the multi-agency, statewide response to large bushfire emergencies was overseen and coordinated by the state operations centre, located at NSW RFS headquarters in Sydney.

State operations controller

The state operations controller (SOC), located in the state operations centre, maintained overall command of the firefighting effort across the state, and allocated resources as needed.

State air desk

The state operations centre also contained the state air desk (SAD), which was the state level multi-agency team responsible for coordination of aircraft operations. When activated, the SAD provided ‘advice, dispatch services and logistical support in response to a request for aviation resource/s in accordance with available information and contractual arrangements’. The 2 key positions for aerial assets were the:

- state air desk operations manager (SADOM), who was responsible for ensuring that aircraft and aviation support resources were dispatched and coordinated to incidents. The SADOM was to maintain ‘a strategic overview to ensure the safe, effective and efficient management of aerial and logistical support assets’.
- large air tanker tasking coordinator (LATCO) who coordinated ‘the tasking of LAT resources on days of heightened fire danger/activity in consultation with the state operations controller’.

The NSW RFS advised that the scale of activity on 31 October 2023 placed the NSW RFS State Operations Centre and SAD under significant pressure.

Personnel in the State Operations Centre were required to manage high levels of incident reporting, resourcing requests, and inter-agency coordination across 6 concurrent Section 44 declarations. This included prioritising the movement of out-of-area strike teams, coordinating logistics for remote firegrounds and supporting Incident Management Teams (IMTs) that were themselves under strain.

The SAD also faced exceptional demand as numerous firegrounds across northern NSW required aviation support simultaneously.

Incident management team

The coordination and management of a regional response to fires and other incidents was undertaken through an IMT located in proximity to the fires. The IMT for the fires in the Tenterfield area on the day was established at Glen Innes, NSW. Personnel at the IMT were responsible for management of all firefighting activities including:

- answering triple 0 fire calls for the area and deploying assets to respond to those calls
- coordinating ground crews
- coordinating aerial assets
- managing all logistics for aerial and ground crews, including fuel, food and breaks.

Incident controller

At the IMT, the incident controller (IC) had overall command of all ground and aerial firefighting activities in their allocated region.

The Glen Innes IC's intent on the day, outlined in an incident action plan,[12] was to hold fires within proposed containment lines, monitor fire progression and protect assets on the eastern and southern sides of the fire. The IMT was managing 10 separate fires in the Tenterfield area on 31 October 2023.

Air operations manager

The IC relied on the air operations manager (AOM) to coordinate all aerial activities, as the AOM had more specific training in aerial firefighting. NSW RFS procedures stated that an:

> AOM shall be activated during a major incident and/or when five or more aircraft are required in relation to an incident.

The incident AOM advised that they worked closely with the air attack supervisor (AAS), located overhead the fireground, to ensure they had enough resources, and to ensure the employed strategy was working. During interviews after the event, both the AOM and AAS stated that they had sufficient aerial assets on the day to fight the fires, and the addition of LATs did not assist the task.

[12] Incident action plan (IAP): a document used to define and communicate the incident objectives, strategies and resources, and other information relevant to the control of an incident.

The AOM assessed that due to the:

- fire complexity
- number of aviation assets dispatched to the region
- available resources in the centre

they 'were completely task saturated on the day'.

The AOM had been involved in firefighting for over 20 years and, after obtaining extensive experience in many different areas, had trained and qualified in the AOM role in 2018. They advised this was one of the busiest shifts they had encountered. The SADOM later reported that the IMT was 'certainly busy', and in hindsight 'we should have got them more resources'.

Air attack supervisor

The AAS was a tactical command position, controlling the overall firefighting strategy for aircraft at a fireground. They ensured that aerial operations were consistent with procedures and the incident action plan. This included maintaining communications and providing intelligence about the fires to relevant IMT personnel and organising aircraft at the fireground. NSW RFS procedures stated 'an AAS should be considered where there were 2 or more aircraft' and was required 'when there are 3 or more aircraft operating on the one incident'.

While all aircraft assigned to a fireground were ultimately responsible for their own separation, using 'see-and-avoid' principles, the AAS was required to:

> brief pilots, in the air and on the ground, on specific assignments including identification of ground personnel, hazards, tactical information, and communication links; and to ensure safety standards were maintained at all times.

On the incident day, the number and mix of helicopters, small and large aeroplanes and the convergence of different fire fronts presented a complex aerial firefighting operation.

The AAS in FB254 was managing:

- Donnybrook fire – 4 single engine air tanker (SEATs) aeroplanes – 3 of which were floatplanes collecting water from a nearby lake and 1 returning to Tenterfield for loading, along with 1 firebombing helicopter
- Frost Road fire – several firebombing helicopters working with ground crews
- south-east of Tenterfield – 2 helicopters collecting intelligence on the fire conditions.

These aircraft were geographically separated and, where applicable, a stack was applied, with:

- established exit and entry points so that all aircraft working on a fire were operating in the same direction
- entry and exit lanes at different altitudes
- standard radio communication procedures to ensure separation
- different aircraft types assigned different altitudes.

The AAS had extensive firefighting experience and had been performing the AAS role for around 23 years. The AAS self-assessed that they were not overloaded, stating that while it was busy, they were not at saturation point and it was not the worst fireground

they had experienced. The AOM also assessed that the AAS was managing their workload well and no evidence was identified that the AAS lost situation awareness. Further, there were no reports of any communication or separation issues prior to the arrival of the LATs.

Operational procedures

The RFS maintained a suite of documents, which detailed the procedures for managing aerial firefighting. The 2 primary documents for air tanker operations were the:

- interagency aviation standard operating procedures, which outlined the basic procedure for all air tanker operations
- NSW RFS operating guidelines for air tanker operations (operating guidelines), which provided further details specifically for the LAT program.

Additional procedures and forms were contained in the operational management procedures, incident management procedures and the air attack supervisor manual.

Aerial supervision

Supervision continuity

The NSW RFS procedures contained no information on ensuring continuity of the AAS role when the AAS was required to depart the fireground for rest or to refuel. The AAS, and others interviewed, described that if the AAS was required to depart, they would leave aircraft strategically separated, and they would also ask a senior pilot to 'keep an eye on things' while they were gone.

The United States Department of Agriculture (US Forest Service) advised the ATSB that, while not documented, where an AAS needed to depart (for fuel or a scheduled rest break), a replacement AAS would be pre-arranged to ensure an adequate handover. If no replacement was available, they would reduce either the complexity of the aerial firefighting strategy, or the number of aircraft at the fireground.

Number of aircraft under supervision

The NSW RFS procedures also contained no information on a maximum number of aircraft to be controlled by one AAS nor information on specific trigger points on when to review the ongoing supervision arrangements.

The US National Wildfire Coordinating Group document, Standards for Aerial Supervision, stated:

> There is no way to define an exact trigger point for adjusting, downsizing, or completely suspending aviation operations. The factors listed below should be evaluated to determine whether additional Aerial Supervision resources are needed or tactical/logistical missions need to be modified/suspended.
>
> - Complexity of aviation operations
> - Communications
> - Topography
> - Firefighter and public safety
> - Poor visibility
> - Wind/turbulence

- Fire behaviour
- Aircraft performance
- Aircraft incident/accident.

NSW RFS released a memo after this fire activity, which stated:

> the SAD is to liaise regularly with the Air Operations Manager (AOM) and AAS responsible for 3 or more aircraft to confirm aerial supervision arrangements remain appropriate. In particular, consideration should be given to the allocation of additional AAS platforms' taking into account:
>
> ▪ the number of aircraft tasked
>
> ▪ the number of fires burning and their proximity to each other
>
> ▪ size of the area of operations
>
> ▪ other complexities such environmental factors (e.g. weather, visibility).

Birddog operation

When LATs were dispatched to a fire, they would generally be accompanied by a separate birddog aircraft. In those circumstances, a LAT air attack supervisor (LAT AAS) in the birddog aircraft coordinated the LAT movement with the incident AAS. Their role included briefing the LAT crew on the specific assignment, identifying hazards, tactics and managing communications with the incident AAS.

The NSW RFS air tanker guidelines indicated that an incident AAS was pivotal to LAT operations, stating:

> the Incident AAS is to ensure all incident aircraft are advised of the proposed air tanker mission and agreed airspace and communication arrangements are established.
>
> Prior to the Birddog arriving over the fire, the Incident AAS will identify and assign an altitude following discussion with the Birddog.
>
> The Incident AAS aircraft will orbit at this level and operate as a communication link between the ground crews and Birddog while maintaining a strategic overview and coverage of the operation.
>
> This will allow the Birddog aircraft to focus on mission objectives and coordinating the air tanker(s).

The guidelines further stated that:

> When an Incident AAS is not established at an Incident, the LAT AAS will assume the Incident AAS roles and responsibilities.

The RFS advised that this model adapted supervisory functions to available resources, fleet composition, and the dynamic nature of domestic fireground operations.

In contrast, the Western Australia (Department of Fire and Emergency Services) LAT guidelines stated that:

> In the absence of a Primary AAS during fuel cycles, etc. the BDOG [birddog] AAS is not permitted to undertake duties conducted by the Primary AAS. An arriving LAT shall not enter the stack or the ‘holding area’ until permission is given by the Primary AAS PIC.

Large air tanker dispatch approval procedures

The NSW inter-agency aviation standard operating procedures noted that air tankers could provide large volumes of suppressant, and careful planning and supervision was needed to ensure this was used effectively.

The NSW RFS air tanker guidelines stated that for a LAT and/or birddog to be dispatched, an aircraft request form from the incident controller (IC) was required, outlining a strategy in conjunction with the SAD who could provide 'guidance on availability and suitability'. The request was then subject to approval by the state operations controller (SOC).

When considering tasking air tankers, the operating procedures stated the IC and SOC were to consider the following:

- incident objectives
- threats (life/property, assets, forests)
- terrain and fuel types (forest/grassland/urban interface)
- prevailing and/or forecast weather and flying conditions, including turbulence & visibility
- effectiveness of alternate capacity aircraft and/or ground units
- elapsed time for aircraft to arrive 'on site'
- time of day (last light); and
- suppressant / retardant quantity required.

Following SOC approval, the SAD would advise the LAT airbase manager of the approval and mission objectives.

According to the NSW RFS operational management procedure 'dispatch of aviation resources':

> Any dispatch of aviation resources must always be supported by an appropriately approved aircraft/aviation equipment request form.

The operational management procedures further noted that:

> It is acknowledged that the tasking of aviation resources can have a range of specific requirements not covered directly in this tasking procedure. In the event the SAOM [state air desk operations manager] or the SDAO [state duty aviation officer] believes there is valid reason to initiate dispatch outside of these guidelines (including dispatching a different resource to what was requested, or a compelling reason to dispatch another aircraft in addition to the area contract aircraft), they must first contact the State Duty Operations Officer (SDOO), State Operations Controller (SOC) or Manager aviation and advise the reasons for operating outside of the guidelines and gain approval for this variation BEFORE the dispatch is allocated.
>
> The reasons and approval for dispatch outside of these guidelines should be documented within the 'decision notes' area of the air desk dispatch module in ARENA.[13]

[13] ARENA: a web-based national aviation management system developed and maintained through the National Aerial Firefighting Centre. ARENA effectively acted as a single access point for tracking and event data relating to aerial firefighting.

NSW RFS later advised that:

> No decision notes were kept in ARENA, if the aircraft were directed to attend by the SDOO or SOC this was captured in the Air Tanker Dispatch form and SAD/SOC log books.

In response to the draft report, NSW RFS advised the ATSB that:

> RFS doctrine explicitly provided the SOC and State Duty Operations Officer discretion to deploy aircraft outside the standard request workflow in rapidly escalating situations or where there was an immediate threat to life or property.

In addition, it advised:

> that SOC-initiated tasking on the day was consistent with approved doctrine and that the absence of formalised integration triggers reflected procedural maturity at the time, not non-compliance.
>
> Since the occurrence, NSW RFS has strengthened integration processes through revised Standard Operating Procedures (SOPs) and targeted training. These changes explicitly address the interface between SOC-initiated tasking and IMT coordination, ensuring that Large Air Tanker (LAT) tasking is both procedurally supported and operationally integrated.

Large aircraft tanker tasking on 31 October 2023

On the incident morning, the IMT requested one LAT with a birddog to assist with fire suppression. The request form was completed by the AOM, with the form detailing:

- the specific target intended for the LAT
- the entry and exit paths mapped out
- appropriate Fire-CTAF.

This request was approved by the SOC. The LAT arrived at the fireground a short time later and after discussions with the AAS around drop sites, successfully completed a drop.

Later that afternoon, a decision to task 3 additional LATs was made by the SOC and relayed to the Glen Innes IC during the 1352 conference call discussing the fire situation in the Tenterfield area with senior personnel from the State Operations Centre. However, the ARENA dispatch form for all 3 LATS listed the AOM as the requesting officer.

The incident controller, air operations manager, air attack supervisor, state air desk operations manager and large air tanker coordinator logbooks were provided to the ATSB, none of which detailed the decision to send the 3 LATs on 31 October 2023.

The SOC did not maintain an operational logbook for 30 and 31 October 2023. They recorded some notes in their personal notebook, however, they were not of sufficient detail for the SOC to later recall key events or decisions made on 31 October 2023, including the rationale for dispatching 3 unrequested LATs to the Tenterfield area.

In response to the draft report the NSW RFS advised the ATSB that:

> The NSW RFS Operational Management Procedure – State Operations Controller (OMP) in force at that time, did not impose a universal requirement for all senior personnel to maintain a formal operational logbook. Rather, it required that the SOC was ‘responsible for ensuring a record is maintained of significant decisions taken, the rationale for those decisions, and to whom, when and how they were communicated.’

> In addition, the recorded emergency conference calls constitute an important complementary record. These recordings capture significant decisions, the rationale underpinning them, and the details of communication including who was informed, when, and how. Taken together, the SOC's notebook and the conference-call recordings demonstrate compliance with the OMP requirement to maintain a record of significant decisions, even if that record was not in the form of a formal logbook.

While recorded conference calls did provide operational context and captured significant decisions, the rationale for the dispatch of 3 LATs remained unclear. The LAT dispatch forms also did not capture any decision-making notes.

Additionally, the dispatch form, received by the birddog AAS after departure, did not contain detail of specific target/s or information on the 3 Fire-CTAFs in use. It also had incomplete detail of the known aircraft already operating in the area (the intelligence gathering aircraft were not identified). At the time, there was no documented requirement for flight crew to wait for a dispatch form prior to departure.

Despite the IC not requesting the LATs, no personnel from the SAD, the IMT or the fireground queried the LATs dispatch. Multiple personnel interviewed stated that LATs were often dispatched by the SAD without a request from the fireground. Those personnel further stated that dispatch in that manner was often a hindrance as the LATs did not have specific targets, and the incident plan was regularly disrupted to accommodate them, which reduced overall firefighting effectiveness.

In this instance:

- B164 'dropped wherever they could as they were running out of fuel'
- B210 departed for Coffs Harbour after completing a partially effective drop retardant
- B132 'completed an effective drop' before returning to Richmond.

Task rejection procedures

The NSW RFS task rejection procedure provided guidance for the rejection of an aviation dispatch/tasking as follows:

> Flight crew or operators may reject an aviation tasking when:
>
> - there is a violation of regulated safe aviation practices;
> - weather and environmental conditions make the activity unsafe;
> - there is insufficient information to safely plan or undertake the activity; or
> - they lack the necessary qualification or experience.
>
> There is an obligation on individuals to ensure any concerns or a decision to reject a tasking are notified as soon as possible.
>
> Equally, there is an obligation on an IMT and/or SAD to ensure all aircraft and operators assigned to a particular incident are advised of any tasking rejection as soon as possible.

The NSW RFS held a task rejection register, which had 19 task rejections recorded for 2023.

When interviewed 12 months after the Tenterfield fires, neither the LATCO nor SOC could recall specific details of the call with the AAS in Birddog 123, in which they reported voicing safety concerns about coordination and communication. However, at the time neither recognised the concerns raised as a task rejection. They further reported that

they needed to hear the words ‘task rejection’ from crew before actioning the task rejection procedures.

The SAD operations manager stated that in hindsight it was probably not recognised because no one said, ‘I task reject this’ and that ‘we should have paused and taken it as a task rejection’. Additionally, the SOC advised that it was the first or second season after the task rejection arrangements had been implemented, and that improvements were probably required to ensure that task rejections were more explicit.

Other NSW RFS personnel advised that crew relaying safety concerns would prompt them to ask the crew if they were rejecting a task. Another LATCO, who was not on shift that day, reported that if a crew advised they were not returning to a fireground due to safety concerns, that would prompt them to action the task rejection process.

In addition to the Birddog’s concerns, the B210 crew reported that on return to their base at Coffs Harbour, they advised the SAD that their intentions were not to return to the fire until the communications problems were resolved. The LATCO reported being unaware of that, and there were no records in any logbooks or ICON[14] of that conversation.

At about 1800 on 31 October 2023, B210 was re-tasked back to the fireground with a different birddog. Recorded calls to the SAD confirmed that B210 sought clarification from the SAD that communication issues have been resolved. When the SAD operator advised that they did not know, B210 advised the operator that ‘we had to shut it down because too many aircraft were not communicating’. They reported advising the SAD that they would load but remain on the ground until they received confirmation from their birddog, when they arrived at the fireground, that the operation was safe to continue.

Following the occurrence, the NSW RFS sent a memo to all operators reminding them to raise any risks or concerns and to reject an aviation tasking if they felt it necessary.

Airspace procedures

Fire common traffic advisory frequencies

On the evening prior to the incident, anticipating significant aerial assets, the AOM based at the Glen Innes IMT requested, and was issued, 2 additional fire common traffic advisory frequencies (Fire-CTAFs) to the earlier assigned 123.65 by the SAD (Figure 1). While there was likely a verbal handover between SAD shift personnel following the frequency allocation, it was not possible to determine what information was shared.

There was also no requirement for a map of the Fire-CTAF divisions to be recorded or displayed at the SAD, although it was reported that this had occurred on previous occasions. Personnel manning the SAD on 31 October 2023 had no visual representation of the Fire-CTAF divisions and assumed the only Fire-CTAF in use in the Tenterfield area was the southern Fire-CTAF 123.65.

In addition, aircraft request and aircraft dispatch forms only prompted one Fire-CTAF to be recorded.

[14] ICON: incident control online – NSW RFS operational management system.

Temporary restricted area

To prevent aircraft entering airspace associated with an active fireground, a temporary restricted area (TRA) could be requested through the Civil Aviation Safety Authority's (CASA) Office of Airspace Regulation. NSW RFS had a 24/7 contact number for CASA to facilitate such a request.

The NSW RFS interagency aviation standard operating procedures stated that:

> ICs may require additional airspace restrictions or provide additional NOTAM advice to pilots during incident operations. This requirement may be due to complex incident operations, working environment, level of activity or interference from other traffic. The IC/OIC is required to contact the SAD [state air desk] or the hiring agency to seek advice.

The emergency services inter-agency standard operating procedures stated that:

> Airservices Australia (ASA) provide a Temporary Flight Restriction (TFR) for bush fires on Area Forecasts specifying non fire traffic to remain clear at a five (5) nautical mile radius and not below 3,000 feet above ground level (AGL) of observed fires.

However, CASA advised that the emergency services inter-agency standard operating procedure was outdated, and, although published in the Airservices Australia (Airservices) Aeronautical Information Publication (AIP), was advisory only, and there was no requirement for aircraft to remain clear of bushfires unless a TRA had been implemented.

NSW RFS had no further guidelines or procedures in place regarding when a TRA should be implemented, or who was responsible for implementing one. The NSW RFS did not request a TRA for the Tenterfield area on 31 October 2023.

Wake turbulence separation

Wake turbulence[15] is produced by heavy aircraft with the most turbulent air being produced by aircraft flying slowly at high angles of attack, which is typical of a LAT during a fire-retardant drop. Wake turbulence can result in a dangerous situation for smaller aircraft flying directly into a larger aircraft's wake.

NSW RFS had no minimum wake turbulence separation (time or distance) requirement in its procedures, and the responsibility for separating LATs with other aircraft operating at the fireground was assigned to the Birddog crew (LAT AAS).

According to the NSW RFS LAT guidelines:

> The Birddog is to establish flight paths to avoid creating hazards to other aircraft at the fire and drop zone along with persons or property on the ground with consideration to potential wake turbulence created by the air tanker.

The United States Forestry Service (USFS), which oversees extensive aerial firefighting operations across the US, has a minimum wake turbulence separation of 2 minutes when very large air tankers (VLATs) are operating, but there was no minimum separation standard when LATs are operating.

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[15] Wake turbulence: turbulence from wing tip vortices that result from the creation of lift. Those from large, heavy aircraft are very powerful and persistent and are capable of causing control difficulties for smaller aircraft either following or below.

While not specifically a wake turbulence procedure, the WA aerial fire suppression procedures always required a 5 NM (9 km) separation between LATs and other aircraft:

> All firebombing aircraft shall be cleared from the sector prior to the LAT entering the stack from its 5 NM holding position at a pre-determined nominal entry level of not above 1,500 ft [above ground level] AGL.
>
> There must be a minimum horizontal separation of 5 NM from:
>
> • the sector the LAT is operating in
>
> • all other aircraft operating below 2,500 ft AGL.

The ATSB notes that procedures from other jurisdictions are shaped by their own operating context and may not be directly transferable or suitable for the NSW operational environment.

Cross-border procedures

Queensland Fire and Emergency Service (QFES) had a similar command structure to NSW RFS. On the incident day, the state operations centre, including a SAD was established in Brisbane. Similar to the incident management teams established by NSW RFS, QFES established a regional operations centre (ROC) to oversee the Wallangarra fire,[16] at Charlton, Qld. An incident AAS was in a helicopter over the fireground at Wallangarra supervising QFES aerial assets at the fire on the Queensland side of the border.

There were no documented procedures for either QFES or NSW RFS for cross-border fires regarding aviation assets. However, NSW RFS had established cross-border arrangements in place with both Victoria and the Australian Capital Territory.

On the day, at around 1525 (NSW time), the NSW SAD advised the Qld SAD of 3 LATs inbound to Jennings. The Qld SAD advised NSW of the Qld 122.65 Fire-CTAF in use. It could not be ascertained why this information was not provided to the 3 NSW LATs and Birddog.

At 1555 (NSW time), the NSW SAD advised the Qld SAD of the NSW 123.65 Fire-CTAF which was passed to the Qld incident controller. About 15 minutes later, the Qld SAD received updated advice from the NSW SAD that the correct frequency for the area was 118.65.

Recorded data

The ATSB sourced flight track data between 0800–1800 on 31 October 2023, based on geographic location, as in the area outlined in red in Figure 4. The reviewed data included information sourced[17] from:

- Airservices Australia (ASA)
- Radar data (primary and secondary surveillance)

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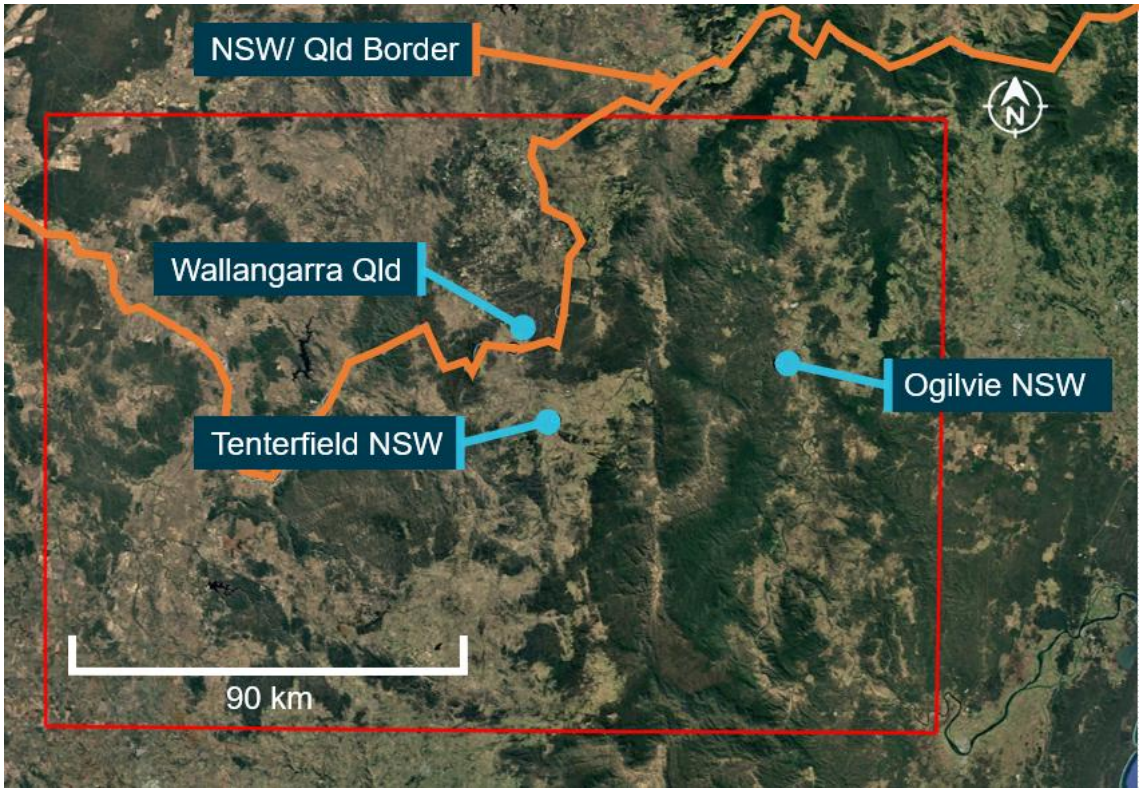
[16] Qld QFES identified the fire at Christies as the ‘Wallangarra’ fire.

[17] Consideration was given to sourcing ADS-B data from commercial sources, however, sufficient data was available in the Airservices data set for the work that was completed.

- ADS-B[18] data and
- National Aerial Firefighting Centre (NAFC) ARENA[19] recordings.

Figure 4: ATSB data search area



The red border outlines the area assessed. The Qld/NSW border is marked in orange.
Source: ATSB

The ASA-processed radar data provided positional information at 5-second intervals. Where available, the ADS-B data was generally captured at 1-second or better intervals. The NAFC data, which could be transmitted at any selected interval, with an interval no greater than 120 seconds, varied between 15 seconds and 120 seconds. Data from all sources was combined for the analysis.

Identification of proximity events

Where data was not captured at 1- second intervals, positional data was interpolated, based on great circle arcs between recorded points. This allowed for determination of approach points between aircraft, noting that where gaps are large (up to 2 minutes for the 19 NAFC only dataset) and aircraft are manoeuvring, these paths may not accurately reflect aircraft movement. Distances between aircraft at each point were then calculated using the same method.

The data review identified 205 instances of unique pairs of aircraft operating within 1,000 m of each other over the reviewed period. This was indicative of the nature of

[18] ADS-B: Automatic Dependant Surveillance Broadcast is a system in which electronic equipment on board an aircraft automatically broadcasts the precise location of the aircraft via a digital data link.

[19] ARENA: a web-based national aviation management system developed and maintained through the National Aerial Firefighting Centre. ARENA effectively acted as a single access point for tracking and event data relating to aerial firefighting.

aerial firefighting operations, where aircraft are typically managed through established altitude, lateral, and time-separation procedures. As such, proximity alone does not indicate an elevated collision risk.

Limitations of the data for aircraft operating at low levels meant there may have been more instances where aircraft were in close proximity to each other which were not captured.

Of the 4 reported incidents reviewed, 2 were positively identified in the data analysis. The third event could not be identified, however, potentially involved a private aircraft without an active transponder. Analysis of the available data for the fourth event identified a few potential conflicts, but due to data limitations could not positively identify the aircraft involved.

Transponder analysis

Reporters raised concerns that firefighting helicopters had transponders turned off. An analysis was conducted of the 52 aircraft with active transponders (either in the ADS-B or NAFC data set), to determine the time elapsed between received data points, and identify periods of missing data greater than 5 minutes. The ATSB reviewed the data and could find no evidence of any firefighting helicopters turning transponders off during flight. (For further information on the data review see *Appendix*.)

Safety analysis

Introduction

In the days leading up to 31 October 2023, extreme fire weather,[20] critically dry fuels and multiple simultaneous fire escalations combined across the Tenterfield, Inverell, and Glen Innes Severn Local Government Areas (LGAs). The NSW Rural Fire Service (NSW RFS) advised this created one of the most challenging operational environments encountered during the 2023 fire season.

On 31 October 2023, the Tenterfield LGA recorded 10 active fires, many of which escalated during the afternoon under the influence of strong winds. Up to 17 New South Wales (NSW) Rural Fire Service (RFS) aircraft were deployed in the Tenterfield area in support of firefighting activities. The aircraft had been separated geographically and by different operating altitudes, and there were also 3 separate fire common traffic advisory frequencies (Fire-CTAFs) in use. While the airspace was busy, the involved air attack supervisor (AAS) reported that the activity was manageable, and there were no reported aircraft separation or communication/coordination issues.

In the early afternoon, a birddog aircraft and 3 large air tankers (LATs) were dispatched to the Tenterfield area, with incomplete operational information provided to both the involved crews and the receiving personnel. That led to the LATs and birddog arriving unexpectedly and transiting through the busy airspace on incorrect frequencies, resulting in multiple communication issues with other aircraft.

This analysis will examine the safety risks associated with the deployment of the LATs, together with airspace issues and state cross-border coordination.

Large air tanker dispatch

Operational coordination

The state operations controller (SOC) ordered the dispatch of the birddog aircraft and 3 large air tankers (LATs) to the Tenterfield area without consultation with the incident management team (including the air operations manager (AOM)) on how the LATs would be effectively integrated into the existing incident plan. While there were provisions for the SOC to instigate the dispatch of the LATs, this bypassed the normal provision of operational tasking information and resulted in the LATs being dispatched without specific targets or correct airspace information. Additionally, their specific arrival time was unknown by the receiving personnel.

Contributing factor

Three large air tankers (LATs) were tasked to the Tenterfield fireground by the state operations controller without consultation with the incident management team. That

[20] The Australian Fire Danger Rating System uses a combination of weather forecasting and information about vegetation that could fuel a fire, to provide an indication of the consequences of a fire, if one was to start. The ratings are medium, high, extreme and catastrophic. Extreme indicates dangerous fire conditions

resulted in the LATs being dispatched without targets or correct airspace information and receiving personnel being unaware of their arrival time.

Incident plan integration

While NSW RFS had documented procedures outlining the process when the incident management teams (IMTs) requested a LAT, there was no documented procedure specifying what communication and coordination needed to occur when the state air desk (SAD) proactively dispatched a LAT/s.

On the day, this resulted in the LATs being dispatched with no consideration for how they would be incorporated into the already established incident plan at the fireground/s and no clear consideration of their intended target/s. There was also no apparent consideration of whether the incident AAS had capacity to incorporate the LATs when they arrived. In this instance the AAS was required to depart the fireground to refuel as the LATs arrived.

While acknowledging that the SAD has a greater understanding of available aircraft resources across the state during an emergency than local IMTs do, procedures requiring coordination with the IMT prior to dispatch ensures that:

- the incident AAS is on scene and has capacity to coordinate the LATs when they arrive
- there is a suitable plan to utilise the LATs when they arrive at a fireground
- LAT crews have all the required operational information.

Contributing factor

The New South Wales Rural Fire Service did not have a procedure for ensuring that when large air tankers were dispatched by the state air desk their tasking was coordinated with the incident management team and integrated into the existing incident plan. (Safety issue)

Fire common traffic advisory frequency usage

Despite the fire common traffic advisory frequencies (Fire-CTAFs) being allocated by the state air desk the evening prior, personnel on the state air desk were not aware that there were 3 Fire-CTAFs in use on 31 October 2023.

While it was normal practice to display a pictorial map of Fire-CTAF boundaries at the state air desk, there was no documented requirement to do so. This resulted in the 3 LATs and their birddog being dispatched with incomplete airspace information provided to their crews.

Contributing factor

The New South Wales Rural Fire Service had no procedure to ensure that fire common traffic advisory frequencies (Fire-CTAFs) were reliably known by state air desk personnel. This resulted in aircraft being dispatched with incomplete Fire-CTAF information. (Safety issue)

Fireground communication

While the AOM was aware that LATs had been dispatched around 60 minutes prior to their arrival, they had not been made aware of the LATs' anticipated arrival time or intended target/s. It is possible that due to their workload on a day of high fire complexity, they did not pass what they knew of the LAT tasking to the incident AAS.

Shortly after the Birddog and LATs arrived at the fireground, the AAS was required to depart the fireground to refuel and then tasked by the AOM to a search and rescue task around 19 km south of the Scrub Road fireground. This meant that while there was an AAS in the birddog aircraft, there was no supervision of the remaining aircraft at the fireground following the arrival of the LATs.

Contributing factor

Possibly due to their workload, the air operations manager likely did not pass what they knew of the large air tanker tasking to the incident air attack supervisor (AAS) and subsequently tasked the AAS away from the fireground on an emergency task.

The incident AAS was not aware that the LATs had been dispatched and was about to depart the fireground to refuel when they arrived. As such, they had no opportunity to plan and coordinate the LATs' arrival.

Prior to departing, the AAS did not provide the birddog crew with an overview of the known traffic situation. In addition, while it was reasonable that they assumed that LAT and birddog crews had been informed of the multiple Fire-CTAFs in operation, this was a missed opportunity for that information to be passed on.

Contributing factor

Due in part to the air attack supervisor (AAS) not expecting the large air tankers, and being unaware they had incomplete dispatch information, the AAS did not provide traffic or Fire-CTAF information to the birddog AAS prior to departing the fireground.

Aerial supervision

NSW RFS required an incident AAS to be in place when 3 or more aircraft were operating at a fireground. However, an AAS would have to leave the fireground for scheduled rest breaks or, as on the day, to refuel, and there was no documented procedure for consideration of ongoing supervision when this occurred. On the day, this resulted in no AAS being made available to replace the incident AAS when they were required to depart the fireground.

Contributing factor

Despite a New South Wales Rural Fire Service requirement for an air attack supervisor (AAS) to be in place when 3 or more aircraft were operating, when the AAS was required to depart the fireground there was no planned replacement AAS to supervise the multiple aircraft in the area.

There was a provision in the NSW RFS large air tanker (LAT) guidelines for the LAT AAS in the birddog aircraft to assume the incident AAS role in the absence of an incident AAS, but there was no guidance or procedure to assess their capacity to do so. On the day, there was no evidence that the LAT AAS was expected to take over the incident AAS role and it was unlikely they would have had capacity to do so, while already coordinating 3 LATs.

Additionally, there was no consideration or trigger points for increasing the number of supervisors when the number of aircraft increased at a fireground or when the complexity of fire activity increased. Although the NSW RFS ground firefighting span of control principle was that no more than 8 assets should be under one individual's control, similar limits were not applied to aerial operations. As such, the NSW RFS had no documented means of ensuring there was adequate supervision when aerial assets were operating.

Contributing factor

The New South Wales Rural Fire Service procedures required an air attack supervisor when 3 or more aircraft were deployed to a fireground. However, there was:

- **no assurance aerial supervision would remain adequate as aircraft numbers and/or fire complexity increased**
- **inadequate guidance for consideration of suitable supervision when the AAS was required to depart the fireground.** (Safety issue)

Task rejection

The birddog crew reported having numerous conversations with the state air desk relaying concerns around communication issues and congested airspace including advising that the conditions were 'dangerous'. LAT Bomber 210 also reported advising the state air desk they would not be returning to the fireground until communication issues were resolved. Neither of these conversations were recognised by the state air desk as task rejections and, as such, the task rejection procedures were not implemented. However, on the day, this did not have an adverse effect on the replacement birddog and LAT, as by the time they were re-tasked, the traffic levels had reduced and the state air desk had information on the Fire-CTAFs.

Both the LAT tasking coordinator (LATCO) and SOC stated in interview that unless the term 'task rejection' was specifically stated, they did not necessarily action the procedure, which was inconsistent with the understanding of other senior state air desk personnel interviewed. This indicated an under appreciation of the importance of the procedure by senior management at the NSW RFS.

The NSW RFS task rejection register verified that the task rejection procedure had previously been followed multiple times, indicating that state air desk personnel were aware of, understood, and actioned this procedure.

As previously identified in ATSB investigation AO-2020-007 (*Collision with terrain involving Lockheed Martin EC-130Q, N134CG 50 km north-east of Cooma-Snowy Mountains Airport (near Peak View), New South Wales, on 23 January 2020*),

communication of identified unsafe conditions to other operating crews and to personnel on the state air desk is critically important to ensure everyone has the same situation awareness, and that this information can be factored into flight crews and state air desk personnel's decision-making process and risk assessments.

Other factor that increased risk

There was an inconsistent understanding within New South Wales Rural Fire Service state air desk of the threshold required to action task rejection procedures. Consequently, reports of unsafe conditions on the fireground were not promptly actioned. (Safety issue)

Temporary restricted area

The NSW RFS did not have a procedure for implementing a temporary restricted area (TRA), including a trigger for when one should be implemented. As a result, despite anticipating multiple firefighting aircraft in the area, neither the state air desk nor personnel in the IMT considered implementing one on the day. The ATSB review of flight data identified that 27 non-essential aircraft transited through the Fire-CTAFs, with no way of verbally communicating with firefighting aircraft. Of these aircraft, 8 were also not transmitting a secondary surveillance radar output, so were not visible on firefighting aircraft's traffic avoidance systems.

Other factor that increased risk

The New South Wales Rural Fire Service did not have a procedure to implement a temporary restricted area to reduce the risk of an air proximity event with aircraft not associated with firefighting operations. (Safety issue)

Wake turbulence

While NSW RFS procedures considered wake turbulence separation between lighter aircraft from LATs, it relied on the incident or birddog AAS to provide separation between the LATs to other aircraft. However, the procedures did not require an incident AAS to always be present.

When large air tankers are completing drops, their configuration creates significant wake turbulence and aircraft within the wake turbulence zone may be subject to a loss of control in flight. Given these operations almost always occur at low level, there is an increased risk that there may not be sufficient altitude for affected aircraft to recover.

Other factor that increased risk

The New South Wales Rural Fire Service did not have an effective means to manage wake turbulence separation for aircraft operating in the vicinity of the large air tankers, increasing the risk of an unrecoverable loss of aircraft control. (Safety issue)

Cross-border coordination

Queensland Fire and Emergency Service (QFES) and the NSW Rural Fire Service (RFS) did not have documented procedures for how aircraft from both states would conduct joint cross-border firefighting. As a result, while there were some discussions at the state air desk level once the concerns were identified, NSW RFS and QFES aerial assets initially operated in proximity without any coordination, and on different radio frequencies.

On the day, the NSW RFS state air desk and the Glenn Innes IMT were aware of fires on the Qld border and, at some point, both QFES and NSW RFS were also aware of each other's aerial assets. However, initially neither agency considered that aerial assets on either side of the border may conflict.

Contributing factor

Neither the New South Wales Rural Fire Service or Queensland Fire and Emergency Service had established cross-border coordination procedures for aerial firefighting activities to ensure reliable aircraft communication and separation. (Safety issue)

Findings

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include 'contributing factors' and 'other factors that increased risk' (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

Safety issues are highlighted in bold to emphasise their importance. A safety issue is a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operating environment at a specific point in time.

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

From the evidence available, the following findings are made with respect to the coordination and communication breakdown during aerial firefighting operations near Tenterfield, New South Wales, on 31 October 2023:

Contributing factors

- Three large air tankers (LATs) were tasked to the Tenterfield fireground by the state operations controller without consultation with the incident management team. That resulted in the LATs being dispatched without targets or correct airspace information and receiving personnel being unaware of their arrival time.
- **The New South Wales Rural Fire Service did not have a procedure for ensuring that when large air tankers were dispatched by the state air desk their tasking was coordinated with the incident management team and integrated into the existing incident plan.** (Safety issue)
- **The New South Wales Rural Fire Service had no procedure to ensure that fire common traffic advisory frequencies (Fire-CTAFs) were reliably known by state air desk personnel. This resulted in aircraft being dispatched with incomplete Fire-CTAF information.** (Safety issue)
- Possibly due to their workload, the air operations manager likely did not pass what they knew of the large air tanker tasking to the incident air attack supervisor (AAS) and subsequently tasked the AAS away from the fireground on an emergency task.
- Due in part to the air attack supervisor (AAS) not expecting the large air tankers, and being unaware they had incomplete dispatch information, the AAS did not provide traffic or Fire-CTAF information to the birddog AAS prior to departing the fireground.
- Despite a New South Wales Rural Fire Service requirement for an air attack supervisor (AAS) to be in place when 3 or more aircraft were operating, when the AAS was required to depart the fireground there was no planned replacement AAS to supervise the multiple aircraft in the area.

- **The New South Wales Rural Fire Services procedures required an air attack supervisor (AAS) when 3 or more aircraft were deployed to a fireground. However, there was:**
    - **no assurance aerial supervision would remain adequate as aircraft numbers and/or fire complexity increased**
    - **inadequate guidance for consideration of suitable supervision when the AAS was required to depart the fireground.** (Safety issue)
- **Neither the New South Wales Rural Fire Service or Queensland Fire and Emergency Service had established cross-border coordination procedures for aerial firefighting activities to ensure reliable aircraft communication and separation.** (Safety issue)

Other factors that increased risk

- **There was an inconsistent understanding within New South Wales Rural Fire Service State Air Desk of the threshold required to action task rejection procedures. Consequently, reports of unsafe conditions on the fireground were not promptly actioned.** (Safety issue)
- **The New South Wales Rural Fire Service did not have a procedure to implement a temporary restricted area to reduce the risk of an air proximity event with aircraft not associated with firefighting operations.** (Safety issue)
- **The New South Wales Rural Fire Service did not have an effective means to manage wake turbulence separation for aircraft operating in the vicinity of the large air tankers, increasing the risk of an unrecoverable loss of aircraft control.** (Safety issue)

Safety issues and actions

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues. The ATSB expects relevant organisations will address all safety issues an investigation identifies.

Depending on the level of risk of a safety issue, the extent of corrective action taken by the relevant organisation(s), or the desirability of directing a broad safety message to the Aviation industry, the ATSB may issue a formal safety recommendation or safety advisory notice as part of the final report.

All of the directly involved parties are invited to provide submissions to this draft report. As part of that process, each organisation is asked to communicate what safety actions, if any, they have carried out or are planning to carry out in relation to each safety issue relevant to their organisation.

The initial public version of these safety issues and actions will be provided separately on the ATSB website on release of the final investigation report, to facilitate monitoring by interested parties. Where relevant, the safety issues and actions will be updated on the ATSB website after the release of the final report as further information about safety action comes to hand.

Incident plan large air tanker integration

Safety issue description

The New South Wales Rural Fire Service did not have a procedure for ensuring that when large air tankers were dispatched by the state air desk their tasking was coordinated with the incident management team and integrated into the existing incident plan.

Issue number:	AO-2023-054-SI-01
Issue owner:	New South Wales Rural Fire Service
Transport function:	Aviation: General aviation
Current issue status:	Closed – Adequately addressed
Issue status justification:	The NSW Rural Fire Service has implemented a policy to ensure that pilots in command of Large Air Tankers receive a briefing from the incident management team (IMT) regarding incident strategy prior to departure. In addition, the NSW RFS has developed new procedures for state air desk and IMT liaison and structured lines of communication between the IMT and air attack supervisors. The ATSB is satisfied that these procedures adequately address the safety issue. It is also noted that they have already been utilised, and their effectiveness verified through operational feedback, post-season review and an independent capability review.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-01
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

The New South Wales Rural Fire Service advised that in November 2023, an operational directive mandated that no large air tanker (LAT) departed until the pilot in command had received a briefing from the Incident Management Team (IMT), ensuring all deployments were directly aligned with the incident strategy. This reform clarified accountability between the state air desk (SAD), State Operations Centre, and field-level IMTs.

Throughout 2024, the Aviation Airspace Management Project (AAMP) redesigned LAT tasking and communication pathways to align with IMT planning cycles. This included new procedures for verifying incident objectives, formalising SAD to IMT liaison, and embedding structured lines of communication between Air Attack Supervisors (AAS) and IMTs.

By March 2025, these arrangements had been incorporated into the AAMP, significantly improving coordination, timeliness and resource utilisation. Their effectiveness has been validated through operational feedback, post-season reviews, and an independent aviation capability review (April 2025), confirming stronger task alignment and situational awareness.

Fire common traffic area frequency usage

Safety issue description

The New South Wales Rural Fire Service had no procedure to ensure that fire common traffic advisory frequencies (Fire-CTAFs) were reliably known by state air desk personnel. This resulted in aircraft being dispatched with incomplete Fire-CTAF information.

Issue number:	AO-2023-054-SI-02
Issue owner:	New South Wales Rural Fire Service
Transport function:	Aviation: General aviation
Current issue status:	Closed – Adequately addressed
Issue status justification:	NSW RFS updated Fire-CTAF tracking within its ARENA dispatch system, providing real-time visibility of active frequencies. In addition, it has implemented the Electronic Aircraft Request module in ARENA (2025) to automate the flow of task details, frequency allocations and acknowledgements between the state air desk, incident management teams and operators. The ATSB is satisfied that performance audits and operator feedback from the 2024–25 season, confirming improved communication accuracy from these new procedures and tools, adequately addresses the safety issue.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-02
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

Between mid-2024 and August 2025, the NSW RFS implemented a suite of communications reliability measures. Fire-CTAF tracking was embedded within the ARENA dispatch system, providing real-time visibility of active frequencies and reducing the likelihood of dispatch errors.

In parallel, the NSW RFS implemented the Electronic Aircraft Request module in ARENA (2025), providing a unified digital platform for aircraft tasking and communications. By automating the flow of task details, frequency allocations and acknowledgements between the SAD, IMTs and operators, the system has reduced manual errors and improved the accuracy and timeliness of information reaching air crews.

Complementing this, a cockpit reference guide was introduced in 2025, offering standardised reference material for pilots and SAD personnel, incorporating frequencies, radio protocols, and tasking procedures.

The Safety Hub (introduced July 2025) enables real-time reporting of frequency conflicts or communication lapses. Reports are automatically categorised and trended to inform system enhancements and SAD refresher training. The SAD curriculum was updated in 2024 to include frequency validation, communications discipline, and safety implications modules.

Performance audits and operator feedback from the 2024–25 season confirmed improved communication accuracy and consistent radio discipline across contracted operators.

Aerial supervision

Safety issue description

The New South Wales Rural Fire Services procedures required an air attack supervisor (AAS) when 3 or more aircraft were deployed to a fireground. However, there was:

- no assurance aerial supervision would remain adequate as aircraft numbers and/or fire complexity increased
- inadequate guidance for consideration of suitable supervision when the AAS was required to depart the fireground.

Issue number:	AO-2023-054-SI-03
Issue owner:	New South Wales Rural Fire Service
Transport function:	Aviation: General aviation
Current issue status:	Closed – adequately addressed
Issue status justification:	The NSW RFS has established processes to ensure that aerial supervision arrangements are assessed regularly, giving consideration to the complexity of the fire and the number of aircraft tasked to the area. The ATSB also welcomes the introduction of the Aviation Centre of Excellence and the further training

	opportunities this provides, along with the increased surveillance activities through the aviation safety management system. In addition, the ATSB welcomes the implementation of the Operational Procedure Guideline that provides guidance for what should occur when the AAS is required to depart the fireground.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-03
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

To strengthen aerial supervision, the NSW RFS established 5 permanent air attack supervisor (AAS) positions in 2024. These roles provide continuity, professional development, and surge capacity during periods of high operational tempo.

An instruction issued in November 2023 (and remaining current) specifies the following AAS requirements:

- 1 aircraft – AAS required for Type 1 or Air Tanker operations only
- 2 aircraft – consider AAS requirement
- 3 or more aircraft – AAS required.

The instruction further directs that the state air desk (SAD) liaise regularly with the air operations manager (AOM) and the AAS responsible for operations involving 3 or more aircraft to confirm that aerial supervision arrangements remain appropriate.

These discussions are to occur at least each morning, with outcomes formally recorded, and must consider:

- the number of aircraft tasked
- the number and proximity of fires
- the size and complexity of the area of operations
- environmental factors, such as weather and visibility.

This instruction reinforces that aerial supervision in NSW RFS operations already scales dynamically in accordance with operational complexity, proximity, and environmental conditions – rather than relying on fixed numeric limits.

An Aerial Supervision Operational Procedure Guideline (OPG) was developed to define supervisory scaling based on aircraft numbers (span of control no more than 9 aircraft) and operational complexity, including clear handover procedures for when an AAS must depart the fireground. This OPG was finalised and approved on 25 November 2025.

The Aviation Centre of Excellence has also introduced simulator-based training to rehearse supervision under stress, tactical handovers, and cross-agency coordination. These training scenarios replicate mixed fleet operations and degraded communications environments to build proficiency in maintaining situational awareness and control.

Post-implementation reviews conducted during the 2024–25 fire season confirmed clearer role delineation, more predictable scaling, and enhanced supervision quality across aerial operations.

AAS performance and fatigue data are now routinely reviewed under the aviation safety management system (ASMS), with outcomes reported through quarterly aviation safety committee meetings. A focus group representative attends these meetings to provide updates on AAS activity, performance metrics, and fatigue management data, ensuring continuous oversight and integration of operational learnings into future planning and assurance processes.

Task rejection

Safety issue description

There was an inconsistent understanding within New South Wales Rural Fire Service state air desk of the threshold required to action task rejection procedures. Consequently, reports of unsafe conditions on the fireground were not promptly actioned.

Issue number:	AO-2023-054-SI-04
Issue owner:	New South Wales Rural Fire Service
Transport function:	Aviation: General aviation
Current issue status:	Closed – adequately addressed
Issue status justification:	The NSW RFS confirmed that post-incident, senior state air desk (SAD) and state operations controllers (SOC) have received explicit training, direction and reinforcement on the identification, recording and management of task rejections. The NSW RFS advised that the training emphasised that a task rejection is not dependent on a pilot or operator using that specific terminology. Any communication from an aircraft indicating an inability to safely complete, continue or return to a task, whether phrased as ‘unsafe conditions’, ‘unable to continue’, ‘not returning’, or any similar expression must be treated and managed as a task rejection. The ATSB is satisfied that the above training, combined with an updated SAD training package scheduled for release in early 2026, adequately addresses the safety issue.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-04
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

The NSW RFS advised that, in late 2023, it introduced a formal Task Rejection Procedure to ensure that pilots, AAS, and IMT members could decline or suspend taskings where they identified unacceptable risk or inadequate information.

This initiative reinforced a just culture and supported operational decision-making based on safety and situational awareness, mitigating operational pressure.

All refusals were logged and reviewed through the Aviation Safety Manager to ensure transparency, identify systemic issues, and inform procedural or training improvements.

Since its implementation, more than 45 formal rejections had recorded at the time of writing, demonstrating growing confidence among personnel and operators to exercise their professional judgement.

The process has been integrated into aviation governance training and is subject to quarterly review by the Aviation Safety Governance Committee, ensuring it remains an active safeguard against unsafe tasking.

Additionally, senior state air desk (SAD) and state operations controllers (SOC) have received explicit training, direction and reinforcement on the identification, recording and management of task rejections. This training has consistently emphasised that a task rejection is not dependent on a pilot or operator using that specific terminology. Any communication from an aircraft indicating an inability to safely complete, continue or return to a task whether phrased as ‘unsafe conditions’, ‘unable to continue’, ‘not returning’, or any similar expression must be treated and managed as a task rejection.

This expectation has been formally communicated during each aviation pre-season briefing since November 2023, which included updated aviation dispatch & task rejection procedures and was subsequently re-issued to personnel on 10 November 2023. These procedures were also referenced within the interim arrangements memorandum issued on 20 November 2023. Combined, these materials provided clear guidance that pilots may communicate safety-related decisions in a variety of ways and that SAD personnel and SOC personnel are required to recognise, verify, document, escalate, and act upon any such communication.

Following the Tenterfield incident on 31 October 2023, senior SAD personnel and SOCs also participated in targeted discussions to reinforce these expectations. These discussions focused on:

- improving situational awareness
- clarifying the threshold for a task rejection,
- ensuring that all safety-related communications (explicit or implied) trigger the appropriate operational response, including the reassessment of risk to other aircraft.

Task rejection management was further reinforced as part of the RFS state pre-season exercise for the 2025–26 season conducted on 11 September 2025. This exercise included scenario-based activities involving both the SOCs and SAD personnel, requiring personnel to identify implicit task rejections, request clarification from pilots, apply the correct recording and escalation protocols, and adjust operational activity in accordance with the assessed level of risk. This ensured consistency, competency and shared understanding across operational teams.

In addition, the revised state air desk training package, developed during 2025 and scheduled for release in early 2026, formally incorporates instruction on recognising both explicit and non-explicit task rejections. This includes standardised criteria, reference tools, and case-based examples to strengthen operational decision-making and ensure alignment across all SAD staff. Once implemented, this package will serve as the primary competency framework for SAD personnel and will embed the treatment of any safety-related pilot feedback as a potential task rejection.

Taken collectively, these briefings, exercises and training programs demonstrate that the RFS has provided clear, consistent and structured direction to SAD personnel and SOCs regarding task rejection procedures. The organisational expectation is unambiguous; any indication from a pilot or operator that conditions are unsafe, unsuitable, or beyond safe operational limits is to be treated as a task rejection, recorded appropriately, escalated to

the relevant supervisory personnel, and used to reassess the safety of ongoing aerial operations.

Temporary restricted area

Safety issue description

The New South Wales Rural Fire Service did not have a procedure to implement a temporary restricted area to reduce the risk of an air proximity event with aircraft not associated with firefighting operations.

Issue number:	AO-2023-054-SI-05
Issue owner:	New South Wales Rural Fire Service
Transport function:	Aviation: General aviation
Current issue status:	Closed – Adequately addressed
Issue status justification:	The ATSB is satisfied that the implementation of a structured framework for risk-based TRA activation, including procedural triggers, adequately addressed the safety issue.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-05
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

In partnership with the Civil Aviation Safety Authority, the NSW RFS implemented interim Temporary Restricted Area (TRA) activation protocols in November 2023, enabling rapid establishment of restricted zones during complex or high-density operations. The Aviation Airspace Management Plan (finalised in 2024) expanded these arrangements into a structured framework for risk-based TRA activation, including procedural triggers, approval pathways, and notification templates. The procedural triggers are included in the Fire Response Airspace Matrix Operational Guideline, which was finalised and approved on 25 November 2025.

Wake turbulence mitigation

Safety issue description

The New South Wales Rural Fire Service did not have an effective means to manage wake turbulence separation for aircraft operating in the vicinity of the large air tankers, increasing the risk of an unrecoverable loss of aircraft control.

Issue number:	AO-2023-054-SI-06
Issue owner:	New South Wales Rural Fire Service
Transport function:	Aviation: General aviation
Current issue status:	Closed – Adequately addressed
Issue status justification:	The ATSB is satisfied that the introduction of defined wake turbulence standards, and associated training to contracted operators adequately addresses the safety concern.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-06
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

The NSW RFS released a cockpit reference guide in 2025, introducing defined wake turbulence separation standards: 800m horizontal, 1,000ft vertical, or 3-minute time-based clearance, based on recommendations from an internal review and international best practice. Training modules were delivered to all contracted operators to standardise application. Annual audits and post-season reviews continue to validate TRA compliance and turbulence management effectiveness.

Cross-border procedures

Safety issue description

Neither the New South Wales Rural Fire Service or Queensland Fire and Emergency Service had established cross-border coordination procedures for aerial firefighting activities to ensure reliable aircraft communication and separation.

Issue number:	AO-2023-054-SI-07
Issue owner:	New South Wales Rural Fire Service and Queensland Fire Department
Transport function:	Aviation: General aviation
Current issue status:	Closed – Adequately addressed
Issue status justification:	The ATSB is satisfied that the introduction of a national guideline establishing frequency alignment, air desk-to-air desk liaison, state jurisdictional border mapping and cross-border tasking triggers, combined with NSW RFS training modules focused on mixed-jurisdiction operations, adequately addresses the safety issue.

Proactive safety action taken by New South Wales Rural Fire Service

Action number:	AO-2023-054-PSA-07
Action organisation:	New South Wales Rural Fire Service
Action status:	Closed

The NSW RFS advised that, on behalf of the National Aerial Firefighting Centre (NAFC), NSW RFS led the development of the national Cross-Border Airspace Management Guideline, which was released in January 2024 and involved all jurisdictions.

This guideline established common procedures for frequency alignment, air desk to air desk liaison, cross-border tasking triggers, and shared temporary restricted area/temporary flight restrictions activation.

The document was endorsed by the NAFC Strategic Committee as a model for national interoperability.

Cross-border training modules were introduced into the Aviation Centre of Excellence simulation program, focusing on mixed-jurisdiction operations. Joint exercises conducted

during the 2024–25 season demonstrated improved communication clarity and reduced duplication of airspace control.

These arrangements are monitored annually through NAFC reporting and joint operational audits.

Proactive safety action taken by Queensland Fire Department

Action number:	AO-2023-054-PSA-08
Action organisation:	Queensland Fire Department
Action status:	Closed

Queensland Fire Department (QFD) advised that following the occurrence, discussion was held at a national level and a process of establishing clearer processes when operating in proximity to state/territory borders has been established.

QFD provided a copy of those procedures and advised that since implementation they have been effectively utilised several times – demonstrating increased and effective verbal and written communication with the NSW state air desk regarding crewed and uncrewed aerial firefighting operations.

QFD has also worked with its mapping personnel and generated a boundary of 15NM (28 km) either side of the border, which triggers contact with the NSW SAD when operations are conducted within this area.

Safety action not associated with an identified safety issue

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Additional safety action by New South Wales Rural Fire Service

Governance and oversight

The NSW RFS established the Aviation Services Directorate in March 2025 to centralise governance, safety oversight and operational policy for all aviation activities. This created a single accountable structure linking doctrine development, training, and operational delivery. The Directorate provides leadership on strategic planning, resource coordination and risk management, supported by specialist functional areas, such as Fixed Wing Operations, Rotary Wing Operations, Aviation Business and Aviation Safety.

The Aviation Safety Governance Committee was also formalised to provide cross-directorate oversight of aviation safety performance indicators, monitor Aviation Safety Management System (ASMS – see below) outcomes, and ensure compliance with both Civil Aviation Safety Authority and National Aerial Firefighting Centre frameworks.

Quarterly safety assurance reviews now integrate training, audit results, and operational performance data. These mechanisms ensure lessons are captured and directly inform continuous improvement cycles, reinforcing transparency and leadership accountability.

Aviation Safety Management System

The NSW RFS developed a formal Aviation Safety Management System (ASMS), following extensive consultation, to provide a structured, agency-wide framework for managing aviation risk, aligning with Civil Aviation Safety Regulations Part 138, ICAO Annex 19 and the Civil Aviation Act 1988.

The ASMS was approved by the Commissioner in October 2025 and defines governance, accountabilities and assurance processes across all aviation activities. It also integrates hazard reporting, contractor oversight, safety performance indicators, investigation management, and continuous improvement mechanisms.

The ASMS is administered by the Aviation Safety Manager and overseen by the Aviation Safety Committee, providing structured oversight of safety performance, trend analysis, and corrective action tracking. Safety data is captured in the NSW RFS Safety Hub (DoneSafe platform) and monitored through quarterly governance reviews.

Through the ASMS, the NSW RFS has strengthened coordination with the Civil Aviation Safety Authority, National Aerial Firefighting Centre and contracted operators, embedding consistent reporting standards and assurance pathways.

Training, simulation and assurance

Ongoing investment in the Aviation Centre of Excellence has enabled integration of advanced simulation, scenario-based learning, and operator workshops. Between 2024 and 2025, new modules were developed focusing on supervision under stress, airspace deconfliction and communications reliability.

Pre-season briefings for 2024–25 and 2025–26 incorporated updated doctrine and safety lessons from recent reviews. Annual operator briefings (beginning July 2025) provided a structured forum for information exchange between NSW RFS, contractors, and partner agencies.

These briefings have also included joint industry engagement with the Aerial Application Association of Australia (AAAA), the Australian Helicopter Industry Association (AHIA), and the National Aerial Firefighting Centre (NAFC), promoting shared understanding of emerging risks, standardisation of safety practices, and alignment of operational expectations across jurisdictions and sectors.

Audit and assurance results are reviewed by the Aviation Safety Governance Committee and directly inform training updates.

General details

Occurrence details

Date and time:	31 October 2023 – around 1530 Eastern Daylight-saving Time
Occurrence class:	Incident
Occurrence categories:	Communication issues/Separation issues/TCAS
Location:	Tenterfield area, New South Wales

Glossary

AAS	Air attack supervisor
ADS-B	Automatic dependent surveillance broadcast
AGL	Above ground level
AIP	Aeronautical information publication
AOM	Air operations manager
ARENA	National system for supporting the use of aircraft for fire and emergency response
CASA	Civil Aviation Safety Authority
Fire-CTAF	Fire common traffic advisory frequency
IC	Incident controller
ICON	Incident control online
IMT	Incident management team
LAT	Large air tanker
LAT AAS	Large air tanker air attack supervisor
LATCO	Large air tanker tasking coordinator
LGA	Local Government Areas
NAFC	National Aerial Firefighting Centre
QFES/QFD	Queensland Fire and Emergency Services/Queensland Fire Department
RFS	Rural Fire Service
SAD	State air desk
SADOM	State air desk operations manager
SAR	Search and rescue
SEAT	Single engine air tankers
SOC	State operations controller
TCAS	Traffic collision avoidance system
TFR	Temporary Flight Restriction
TRA	Temporary Restricted Area

Sources and submissions

Sources of information

The sources of information during the investigation included:

- New South Wales Rural Fire Service
- Queensland Fire and Emergency Service/Queensland Fire Department
- the involved flight crews
- Airservices Australia
- National Aerial Firefighting Centre
- AgAir
- Careflight
- Coulson Aviation
- Field Air
- United States Department of Agriculture (Forestry Service).

References

Australian Transport Safety Bureau (2021), Collision with terrain involving Lockheed Martin EC-130Q, N134CG.

National Aerial Firefighting Centre, National Aerial firefighting strategy 2021-2026, 2021.

National Wildfire Coordinating Group (2022) NWCG Standards for Aerial Supervision.

New South Wales Rural Fire Service (2023) 'Air attack supervisor manual'.

New South Wales Rural Fire Service 'Incident Ground Organisation', March 2024.

New South Wales Rural Fire Service (2022) *'Interagency Aviation Standard Operating Procedures'.*

New South Wales Rural Fire Service (2023) '*Operating guidelines for air tankers operations 2023'.*

United States Department of Agriculture (2019) Standards for airtanker operations.

Western Australia Department of Fire and Emergency Services and Department of Biodiversity, Conservation and Attractions (2023) '*Western Australia fire suppression procedures 2023-2024'*.

Submissions

Under section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. That section 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 following directly involved parties:

- New South Wales Rural Fire Service
- Queensland Fire Department
- NSW National Parks and Wildlife Service
- Coulson Aviation
- Ag Air
- Field Air /Conair
- Civil Aviation Safety Authority
- National Transportation Safety Board
- United States Forest Service
- incident air attack supervisor
- air operations manager
- incident controller
- state air desk operations manager
- large air tanker coordinator
- state operations controller
- large air tanker air attack supervisor (birddog).

Submissions were received from:

- Coulson Aviation
- New South Wales Rural Fire Service
- Queensland Fire Department
- Civil Aviation Safety Authority

The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.

About the ATSB

The **Australian Transport Safety Bureau** is the national transport safety investigator. Established by the *Transport Safety Investigation Act 2003* (TSI Act), the ATSB is an independent statutory agency of the Australian Government and is governed by a Commission. The ATSB is entirely separate from transport regulators, policy makers and service providers.

The ATSB's function is to improve transport safety in aviation, rail and shipping through:

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

The ATSB prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

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

Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining 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.

The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

About ATSB reports

ATSB investigation final reports are organised with regard to international standards or instruments, as applicable, and with ATSB procedures and guidelines.

Reports 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

An explanation of ATSB terminology used in this report is available on the ATSB website.

Appendix

Identification of relevant aircraft

The ASA data included any aircraft that had transited the selected geographic area at any altitude. Commercial flights were identified and excluded, as were any other flights above 10,000 ft; these tracks showed the aircraft flying directly overhead, well above the operational firefighting area.

In addition, the NSW RFS provided a list of aircraft potentially active in the area throughout the day, which was data matched against the tracked aircraft, correlating registration with firefighting callsigns.

The data analysis identified 67 aircraft operating in the area of interest, which consisted of a mix of large and small aeroplanes and helicopters. Of these, 40 aircraft were identified as aerial firefighting assets from NSW RFS and Queensland (Qld) Fire and Emergency Services (QFES).[21] The remaining 27 aircraft were not associated with firefighting operations. Of these 27 aircraft, 8 did not have a transponder return or a matched flight plan and were only identified through primary radar returns in the data provided by ASA. As such, identifying details for these aircraft could not be obtained.

Of the 67 identified aircraft:

- 19 were contained in the NAFC data set only
- 19 were contained in both ADS-B and NAFC data sets
- 1 had both NAFC and radar returns
- 13 were contained in the Airservices ADS-B data set only[22]
- 15 had radar data only.

A total of 117 instances were identified where there were gaps of 5 minutes or longer between recorded data points. Of these, 53 were related to time between flights, where the aircraft was on the ground at an airport or aerodrome and 59 were related to the aircraft transiting in and out of the selected area of interest.

The remaining 5 instances related to 3 aircraft:

- One instance of a privately operated Cessna 210, where the transponder was activated about 9 km from Tenterfield Airport (last recorded about 1 hour 42 minutes before arriving at Tenterfield).
- One instance of a privately operated Cessna 182, where the transponder was activated about 20 km from Tenterfield Airport (last recorded about 1 hour 16 minutes before arriving at Tenterfield).
- Three instances of a NSW RFS fixed-wing aircraft with missed returns of 9 minutes, 16 minutes and 5 minutes respectively. These all correlated with the aircraft operating in the same area, at low level (below 2,100 ft AMSL).

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[21] QFES was subsequently renamed the Queensland Fire Department.

[22] One of these aircraft was matched to a NSW RFS firefighting asset that had not been captured in the NAFC dataset.

In the case of the missed returns from the NSW RFS aircraft in the reviewed data set, this was likely due to terrain and/or aircraft shielding between the aircraft and the receiver. ADS-B receivers require line-of-sight. For periods when an aircraft is operating at low level, this increases the likelihood there was no line of sight to a receiver due to terrain shielding. This may not reflect receipt of the transmission in a secondary, nearby aircraft. Aircraft that are operating in line of sight of the aircraft transmitter, if fitted with an appropriate receiver, may still receive transmissions, although again with potential shielding depending on their respective orientation and relative positions. It was also noted that multiple other aircraft operating below 3,000 ft had short (less than 2 minutes) periods of no recorded transmissions in the reviewed data set, again indicative of terrain shielding.

There was no evidence of any firefighting helicopters turning transponders off during flight.

Alternatively, in addition to potential shielding between aircraft, given the density of aircraft operating, and potential for electronic flight bag limitations, these limitations may lead to missed transmissions. It was outside the scope of the analysis to review the electronic flight bags, transponders and collision avoidance devices in use by these aircraft.