Australian Government
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ATSB TRANSPORT SAFETY REPORT
Aviation Occurrence Investigation – AO-2007-003
Final

Breakdown of separation
19 km west-south-west of Sydney Airport, NSW
8 May 2007
VH-OLL
SAAB Aircraft Company 340B
VH-OGI
Boeing Company 767-338

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Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office location: 62 Northbourne Avenue, Canberra City, Australian Capital Territory
Telephone: 1800 020 616; from overseas + 61 2 6257 4150
Accident and serious incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117; from overseas + 61 2 6247 3117
E-mail: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

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Prepared by

Australian Transport Safety Bureau
PO Box 967, Civic Square ACT 2608 Australia
www.atsb.gov.au

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Abstract

On 8 May 2007 at about 1858 Eastern Standard Time, a Boeing Aircraft Company 767-338 (767), registered VH-OGI, was inbound to Sydney, NSW from Melbourne, Vic. on descent to 6,000 ft and a SAAB Aircraft Company 340B (SAAB), registered VH-OLL, was departing Sydney for Moruya, NSW on climb to FL140. The distance between the aircraft reduced to 1.5 NM horizontal and 400 ft vertical separation. Separation standards as specified in the Manual of Air Traffic Services (MATS) required the provision of either 3 NM horizontal or 1,000 ft vertical separation between the aircraft. There was a breakdown of separation.

The apparent distraction of the controller by his involvement in a non-operational control room discussion would probably have adversely affected his mental 'air picture' and traffic planning. That included unintentionally clearing the flight crew of the SAAB to climb through the assigned level of the inbound 767, rather than the routinely-assigned intermediate altitude of 5,000 ft. The traffic manager's preoccupation with administrative duties meant that the monitoring and control of the distraction risk and operational activities in the control room was ineffective.

Action by the controllers to issue traffic information to the flight crew of the 767 and a radar vector and altitude limit to the flight crew of the SAAB quickly re-established the required separation standards.

Although no safety issue was identified as a result of this investigation, in its submission in response to the draft report, Airservices Australia (Airservices) advised of its development of an Air Traffic Control (ATC) Reform initiative. The aim of that initiative was to improve the structure and processes used by Airservices to verify ATC operational performance. At the time of writing this report, the initiative was in the design phase, with implementation planned for early 2009.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal bureau within the Australian Government Department of Infrastructure, Transport, Regional Development and Local Government. ATSB investigations are independent of regulatory, operator or other external organisations.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

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

Purpose of safety investigations

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

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

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to proactively initiate safety action rather than release formal recommendations. However, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation, a recommendation may be issued either during or at the end of an investigation.

The ATSB has decided that when safety recommendations are issued, they will focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on the method of corrective action. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations. It is a matter for the body to which an ATSB recommendation is directed (for example the relevant regulator in consultation with industry) to assess the costs and benefits of any particular means of addressing a safety issue.

About ATSB investigation reports: How investigation reports are organised and definitions of terms used in ATSB reports, such as safety factor, contributing safety factor and safety issue, are provided on the ATSB web site www.atsb.gov.au.

FACTUAL INFORMATION

History of the Flight

On 8 May 2007 at about 1858 Eastern Standard Time[1], a Boeing Aircraft Company 767-338 (767), registered VH-OGI, was inbound to Sydney, NSW from Melbourne, Vic. on descent to 6,000 ft and a SAAB Aircraft Company 340B (SAAB), registered VH-OLL, was departing Sydney for Moruya, NSW on climb to flight level (FL) 140. The distance between the aircraft reduced to 1.5 NM lateral and 400 ft vertical separation. Separation standards as specified in the Manual of Air Traffic Services (MATS) required the provision of either 3 NM lateral or 1,000 ft vertical separation between the aircraft. There was a breakdown of separation (BOS).

The 767 was inbound to Sydney on an AUDLEY TWO ARRIVAL for a left circuit to runway 34 Left (34L) on descent to 6,000 ft. The SAAB was outbound to Moruya on a runway 34L GLENFIELD 6 DEPARTURE on climb to 3,000 ft. In accordance with local procedures, the flight crew of the SAAB contacted the Departures South (SDS) controller passing 1,900 ft on climb to 3,000 ft.

The standard altitude normally assigned for the next phase of the SAAB's flight was 5,000 ft, as that provided separation assurance with other traffic operating in the Approach South (APPS) airspace. However, as the SAAB approached Glenfield, the SDS controller instructed the flight crew of the SAAB to climb to their flight planned altitude of FL140. That meant that the SAAB would climb through the APPS airspace, and required the SDS controller to coordinate the traffic with the Approach Director (APP/DIR). The pilot acknowledged that instruction to climb and read back FL140.

At about 1858:13, the SDS controller detected that the SAAB was climbing through 5,300 ft, realised the potential BOS with the 767 and noted FL140 displayed in the air situation display's (ASD) radar data label. Prior to the SDS controller being able to clarify the discrepancy between the displayed radar data label cleared flight level (CFL) of FL140, and the normally-assigned altitude of 5,000 ft, a short-term conflict alert (STCA) activated on the SDS and APPS controllers' ASDs. That alert indicated that a loss of separation had or was about to occur.

At 1858:14, the APPS controller issued the flight crew of the 767 with a traffic alert, which advised that the SAAB was to their left at 10 o'clock[2] at about a mile and half and passing 5,000 ft. The SAAB had climbed through 5,000 ft at about 1858:13.

The SDS controller asked the flight crew of the SAAB to confirm that they were maintaining 5,000 ft but, prior to any response from the flight crew, the SDS controller instructed them to turn right onto a

1 The 24-hour clock is used in this report to describe the local time of day, Eastern Standard Time (EST), as particular events occurred. Eastern Standard Time was Coordinated Universal Time (UTC) + 10 hours.

2 Where practicable, Air Traffic Control (ATC) will provide information on radar-observed targets that are, or could be, traffic. Such traffic information is provided with reference to their 'clock positions'. For example, straight ahead is 12 o'clock, 3 o'clock is to the right, and so forth. ATC will state the position of the traffic in terms of its clock position, its distance (in nautical miles, spoken as 'miles'), its altitude if known, and may provide more details as they become available.

heading of 170 and to maintain 6,000 ft. The SDS controller did not issue the flight crew of the SAAB with a safety alert, or a reason for the radar vectoring as required by the MATS.[3]

At 18:58:21, the flight crew of the 767 informed the APPS controller that they had the SAAB in sight.

The SDS controller later reported being distracted by his participation in a non-operational discussion with other controllers in the control room relating to an ongoing organisational restructure (see discussion on page 3), staff shortages and their effect on planned leave, and the reliability of planned leave. He did not realise that he had issued the flight crew of the SAAB with a clearance to climb to FL140 instead of the routinely-assigned altitude of 5,000 ft. The SDS controller subsequently did not coordinate the SAAB's climb with the APPS controller.

The Traffic Manager (room supervisor) was present during, but not involved in, the non-operational discussion and was preoccupied with organising replacements for rostered, but unavailable staff. As such, he was unaware of the SDS controller's participation in the discussion and of the developing situation.

Organisational and management information

The Airservices Australia (Airservices) National Operating Standard (NOS) AA-NOS-SAF-0104 'Safety Change Management Requirements' defined the minimum change management requirements for application in that organisation. That included the safety assessment of proposed organisational change management initiatives, which included up to three primary steps:

- A Safety Case Assessment and Reporting Determination[4] (SCARD) was to be completed at the commencement of the change process, and was designed to evaluate that process and its assessment and reporting requirements.
- If required as a result of the SCARD process, or as a result of management discretion:
  - a Safety Plan was to be commenced early in the change life cycle, and be updated as required during the implementation of the change, and
  - a Safety Assessment Report outlined the necessary safety management arrangements to ensure the safety of the proposed change.

A Post Implementation Review (PIR) of the identified safety aspects of a proposed change was required in accordance with the safety assessment's review schedule. Alternately, if not specifically stated, the review was to be carried out no later than 12 months from the change becoming operational.

Ongoing organisational restructure

On 8 November 2005, the Chief Executive Officer (CEO) of Airservices announced a new organisational structure in response to a review of the organisation. That included the division of the

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3 The MATS Part 3 Considerations when vectoring 3.2.5.3 specified in part that, 'when vectoring an aircraft, a controller shall advise the pilot of the reason for the vector unless obvious.' MATS Issuing a Safety Alert 5.1.11.1 specified in part that 'A Safety Alert shall be issued to an aircraft when a controller is aware the aircraft is in a situation which is considered to place it in unsafe proximity to terrain, obstructions, or other aircraft.'

4 SCARD – a 'quick look' process that was developed by Airservices and was designed to assist users to evaluate a proposed change. The aim of a SCARD was to determine the type of safety assessment and reporting that was required in support of the proposed change. The process identifies the magnitude of the change and its associated potential hazards/risks.

then Air Traffic Control (ATC) Group into three Service Delivery Elements (SDEs). Those changes took effect from 1 December 2005, and were to be implemented in stages up to 21 April 2006. SCARDs were completed in support of those changes on 17 and 25 November 2005.

Although the supporting Safety Assessment Report identified a number of hazards that were associated with the restructure, the report found that the restructure would have 'minimal impact on operational functions'. Notwithstanding, a number of safety performance monitoring initiatives were commenced to monitor the impact of the restructure.

Subsequently, in January 2007, work commenced within the ATC Group to further divide the SDEs into a number of Service Delivery Lines (SDLs), and towards the proposed Line Manager concept. A comprehensive staff communication plan was developed in support of the implementation of that phase of the restructure.

However, and as might be expected in a geographically-dispersed, and largely shift work-based organisation, there were a number of reports from Sydney controllers that suggested they may not have been exposed to the relevant elements of the communications plan. In addition, a number of staff advised feeling that they were not given relevant, useful and specific information on the status of the ongoing restructure, and its effect on their particular work area. Finally, concern was expressed by a number of more senior staff in regard to any delay in Line Manager recruitment, and/or the pending changes to supervisory and/or other managerial arrangements.

An interim ATC Restructure PIR was carried out in April 2007, which found that there were no significant safety trends as a result of the ongoing restructure of the ATC group.

Management information

Room supervisor's role and responsibilities

As room supervisor, the Traffic Manager had overall responsibility for the provision of air traffic services in the Sydney Terminal Control Unit (TCU). That required the supervision of the Sydney operational staff to ensure a safe and efficient air traffic service, and to exercise Operational Command Authority (OCA) within that TCU.

In addition, the supervisor acted as the human resources, operational and administrative manager for the unit.

Team meetings

Generally, Sydney air traffic group team meetings were conducted once every 6-week roster cycle. In those meetings, air traffic controllers were provided with an opportunity to; discuss technical issues, receive technical or refresher training, obtain updates from senior managers on the progress of the organisational restructure, and to express any concerns of a technical or organisational nature.

The minutes of the meetings that were carried out during the period 22 February to 18 July 2007 indicated staff concern in regard to; the new organisational structure, including the proposed supervisor structure, staff rosters, the use at Sydney of Traffic Information Broadcast by Aircraft (TIBA) procedures, and TCU controller staffing levels at Sydney. Local management acknowledged that the Sydney air traffic control centre was six controllers below its core requirement, and that staff transfers, returns, and recruitment efforts were in-place to address that shortfall.

Additional information

Breakdown of Separation Review

In 2003, Airservices conducted a systemic review of 160 breakdowns of separation that were recorded over the period January 2000 to April 2003. The purpose of the review was:

> as well as looking at more obvious causal factors, was to look deep into our [Airservices] Safety Management Performance, to look for areas of weakness, and areas of strength, and to develop an action plan to treat areas of weakness, and reinforce areas of strength. Specifically, the outcome sought from the review was to develop an Action Plan that identifies opportunities to improve…safety performance.

The review's findings were reported in June 2003. A number of those findings are discussed in the following paragraphs.

Controller distraction

In regard to the causal factors that were immediately related to the resulting BOS,[5] controller distraction was identified by the review as a factor in 43% of the occurrences examined. In addition, in 51% of the cases where distraction was identified as a causal factor, the distraction was related to uncontrolled events, being events where there was a lower level of controller awareness of the impending conflict. Examples of distractive activities with the potential to draw a controller's attention away from their primary task included conversation groups in the vicinity of the workstation. Distractions were shown to originate equally from external sources, and from activities initiated by the affected controller(s).

The review found that the two main risks as a result of controller distraction were:

- tasks requiring action were not recognised/actioned
- tasks were only partially completed.

The review team considered that appropriate work area supervision would have addressed a large number of the distraction-related hazards that were identified by the review.

Situational awareness/coordination between controllers

In regard to the provision of air traffic services, the MATS defined situational awareness (SA) as:

> The perception and integration of external data inputs, the comprehension of their impact on the air situation, and the consideration of their effect on the provision of an effective air traffic management service.

The Airservices Performance Assessment Model suggested that there were three stages in the development of a controller's SA:

- the controller perceived the relevant information, termed the 'scanning' stage;
- that information was then integrated into a 3-D 'traffic picture', the 'integration/comprehension' phase; and

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5 The review distinguished between factors that were immediately related (or proximal) to the BOS being examined, and those that may have contributed to that event, but were remote from it (for example, perhaps as a result of the time between an organisational decision and its effect).

- that traffic picture was ‘projected’ in time by the controller to create a dynamic understanding of future events. That ability allowed the controller to plan for and manage those future events.

The review identified that, if the initial phases in the development of a controller’s SA resulted in an accurate traffic picture, then it was more likely that appropriate controller decisions would result. However, it was noted that a controller’s SA can be adversely affected by a lack of coordination between controllers, such as not obtaining a ‘heads-up’ from an adjoining sector controller.

There can be a number of other potential adverse influences on a controller’s SA, including the distraction of the controller by non-separation tasks, and any tendency for the controller’s attention to become ‘tunnelled’ to a single task.

Supervision

The review identified supervisory shortcomings in 44% of the occurrences examined. Moreover, the report stated that:

> A theme running through many of the proximate factors was the lack of supervision. In particular, the monitoring and control of distraction is seen as a requirement.

The review also commented that a number of supervisors were often too involved in administrative duties, rather than being proactive or giving priority to their supervision task. Recommendation 10 to the review appeared to address that concern, recommending that:

> Supervision must be close to consoles and supported by facilities and training. Supervision must be focused on operational activities

ANALYSIS

The receipt by the Sydney Departures South (SDS) and Approach South (APPS) radar controllers of a short-term conflict alert (STCA) confirmed their own detection of the potential conflict between the 767 and the SAAB as the latter aircraft climbed through 5,000 ft. While neither a safety alert, nor a reason for being radar vectored was provided to the flight crew of the SAAB, the action by the APPS controller to issue traffic information to the flight crew of the 767, and by the SDS controller to issue a radar vector and altitude limit to the flight crew of the SAAB, quickly re-established the required separation standards. This analysis examines those factors that may have contributed to the development of the breakdown of separation (BOS).

The apparent distraction of the SDS controller through his involvement in the non-operational control room discussion would probably have adversely affected his mental ‘air picture’ and traffic planning. Furthermore, it is apparent that the controller had not intended to clear the SAAB to FL140, and that the issue of that clearance was a slip or lapse by the controller as a result of self-generated distraction. This is likely the reason that the controller did not perform the coordination normally required for issue of such a clearance. The result was that both controllers expected that the SAAB would climb to, and maintain, the routinely-assigned altitude of 5,000 ft for departing aircraft in that sector.

The Traffic Manager’s inability to oversight the activity in the control room, and the impact of those activities on the application of the correct procedures, was a function of his preoccupation with administrative duties. The result was that the monitoring and control of the distraction risk and operational activities in the control room were ineffective. Had the supervisor not been carrying out administrative duties, the BOS may not have occurred.

FINDINGS

From the evidence available, the following findings are made with respect to the breakdown of separation (BOS) event involving Boeing Aircraft Company 767-338 (767), registered VH-OGI, and SAAB Aircraft Company 340B (SAAB), registered VH-OLL, which occurred 19 km west-south-west of Sydney Airport, NSW on 8 May 2007. The distance between the aircraft reduced to 1.5 NM horizontally and 400 ft vertically, compared with the required separation of 3 NM horizontally or 1,000 ft vertically. They should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- The apparent distraction of the Sydney Departures South (SDS) controller by the non-operational control room discussion would probably have adversely affected his mental 'air picture' and traffic planning. That included clearing the flight crew of the SAAB to climb through the assigned level of the inbound 767.

Other safety factors

- The SDS controller did not issue the SAAB flight crew with a safety alert or a reason for the radar vectoring.
- The non-operational control room discussion probably distracted the other involved controllers from their primary air traffic control tasks.
- The supervisory effectiveness of the Traffic Manager was adversely affected by his preoccupation with administrative duties.

Other key findings

- The action by the APPS controller to issue traffic information to the flight crew of the 767, and by the SDS controller to issue a radar vector and altitude limit to the flight crew of the SAAB, quickly re-established the required separation standards.

SAFETY ACTIONS

Any safety issues identified during an investigation are listed in the Findings and Safety Actions sections of Australian Transport Safety Bureau (ATSB) Transport Safety Reports. The ATSB expects that all safety issues identified by an investigation should be addressed by the relevant organisation(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

All of the responsible organisations that were involved in this investigation were given a draft report and invited to provide submissions on its content (see Appendix A).

Airservices Australia

Air Traffic Control supervision

Although no safety issue was identified as a result of this investigation, in its submission in response to the draft report, Airservices Australia (Airservices) advised of its development of an Air Traffic Control (ATC) Reform initiative. The aim of that initiative was to improve the structure and processes used by Airservices to verify ATC operational performance.

An integral part of the reform initiative was the review of ATC supervision. Airservices' intent was to provide for the correct level of ATC supervision at all times in order to ensure service integrity. At the time of writing this report, the initiative was in the design phase, with implementation planned for early 2009.

APPENDIX A: SOURCES AND SUBMISSIONS

Sources of information

The main sources of information during the investigation included:

- the Sydney Departures South (SDS) controller
- the Sydney Approach South (APPS) controller
- the Traffic Manager
- the other affected controllers
- relevant Airservices Australia documentation.

References

References that were accessed during the investigation included:

- Airservices Australia. (June 2003). *Systematic Review of Breakdown of Separation Occurrences (January 200 to April 2003)*
- Airservices Australia. *Manual of Air Traffic Services (Version 3)*.

Submissions

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

A draft of this report was provided to the Civil Aviation safety Authority (CASA), Airservices Australia (Airservices) and the affected controllers.

Submissions were received from CASA, Airservices and the SDS controller. The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.