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**Australian Transport Safety Bureau**

# Loss of separation due to runway incursion involving Airbus A320, VH-VGI, and Fokker F50, VH-FKV

Adelaide Airport, South Australia, 17 August 2016

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#### **Addendum**

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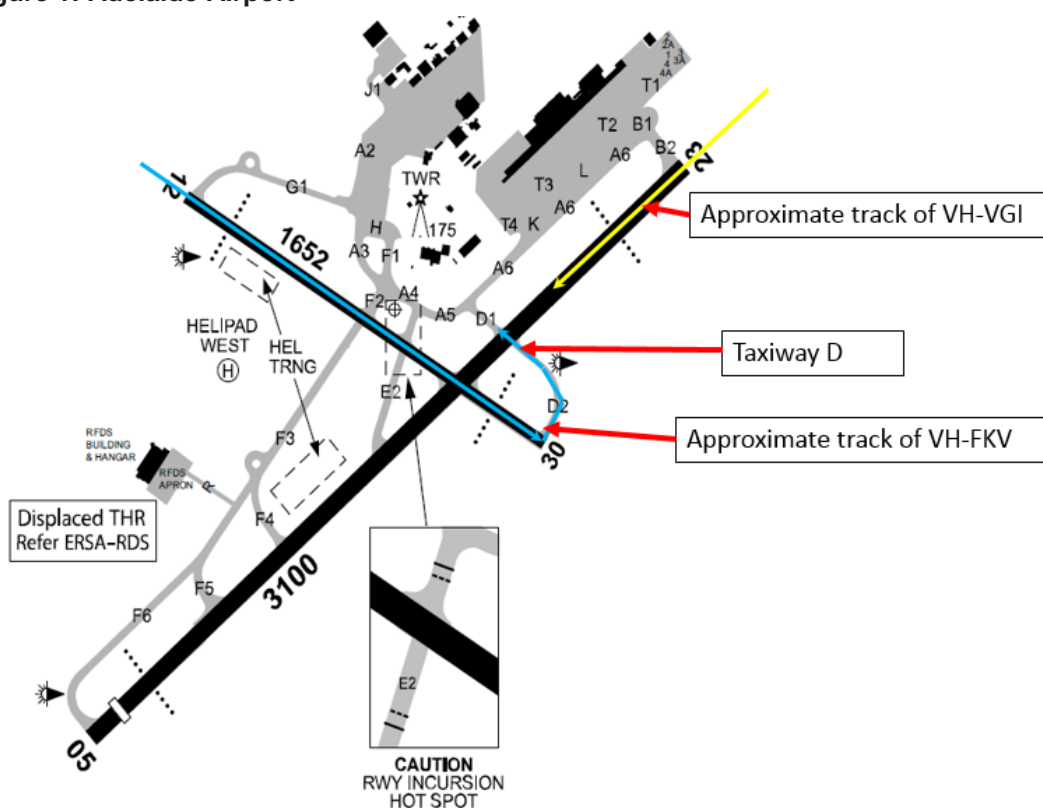
# Loss of separation due to runway incursion involving Airbus A320, VH-VGI, and Fokker F50, VH-FKV

## What happened

On 17 August 2016, at about 0926 Central Standard Time (CST), an Alliance Airlines Fokker F27 MK 50 aircraft (Fokker 50), registered VH-FKV (FKV), and operating with callsign 'Unity 3201', landed on runway 12 at Adelaide Airport, South Australia (SA) after a flight from Olympic Dam, SA. The flight crew consisted of a captain seated in the left seat and a check captain seated in the right seat acting as the first officer. Also on board were two cabin crewmembers and 49 passengers.

Air traffic control (ATC) audio recordings showed that at 0926:53, after FKV had rolled through the intersection with runway 23, the aerodrome controller (ADC) cleared an aircraft for take-off on runway 23 (Figure 1).

Figure 1: Adelaide Airport



Source: Airservices Australia – annotated by ATSB

At the end of runway 12, FKV then exited runway 12 onto taxiway D2. After vacating the runway, the check captain switched the aircraft radio from the ATC Tower frequency to Ground frequency and reconfigured the aircraft in accordance with standard operating procedures after landing. The check captain was unable to immediately contact the surface movement controller (SMC) due to

congestion on the Ground frequency. The SMC position had combined SMC and airways clearance<sup>1</sup> delivery responsibility.

At 0927:46, the ADC cleared a Jetstar Airbus A320 aircraft, registered VH-VGI (VGI), to land on runway 23. At that stage, the ADC sighted the A320 about 3 NM away on final approach. The flight crew of FKV did not hear that clearance.

Shortly after entering taxiway D2, the check captain, seated on the right of FKV looked outside and sighted an aircraft in the take-off roll on runway 23 and also sighted the A320 on final approach. They estimated that the A320 was 5 to 6 NM away. Based on that estimate, the check captain assessed that they would probably be cleared to cross runway 23 behind the departing aircraft and in front of the landing A320, and then turned their attention inside the cockpit to complete their after-landing checks.

As FKV approached holding point D2, the flight crew had not received an ATC clearance to cross runway 23, and the flight crew therefore assumed they were going to stop at the holding point. The check captain was still waiting for a break in transmissions to make their initial contact with the SMC to advise 'Adelaide Ground, Unity 3201 for bay 50 golf'.

The SMC was issuing a clearance to another aircraft when they sighted FKV taxiing on taxiway D2 towards the direction the controller was facing. At 0927:49, the SMC told the flight crew of an aircraft awaiting an airways clearance to standby, then immediately said 'Unity 3201 hold short of runway 23, I've got you going to 50 golf'.

The check captain of FKV reported that the start of the transmission from the SMC was over-transmitted and what they heard was 'runway 23 and I've got you for bay 50 golf'. As the instruction included the parking bay, the check captain thought the SMC had instructed them to 'cross runway 23...' and read back 'cross runway 23 to 50 golf, Unity 3201'. The SMC thought the pilot read back 'short runway 23...' and assumed that the word 'hold' had been 'clipped'. Both flight crewmembers of FKV thought they had received a clearance to cross runway 23.

The ADC sighted FKV on taxiway D2 and heard the SMC say 'hold short', but did not hear the response from the flight crew. The ADC scanned runway 23 to check it was still clear for the landing A320, which was then over buildings and less than 30 seconds from touchdown, and then commenced a handover of the ADC position to another controller.

At 0928:10, the SMC coordinated<sup>2</sup> with the ADC and cleared a vehicle to cross runway 12.

The captain (in the left seat) of FKV then looked to their left and stated 'clear left' and taxied the aircraft onto runway 23 to cross. The check captain then looked to their right and sighted the A320 and reported that it was a lot closer than they had expected.

The SMC had looked down at their screen to check the flight strip for the aircraft awaiting a clearance. As the controller looked up, they saw FKV crossing the holding point.

At 0928:21, the SMC called 'hold short' and immediately realising that was not the correct instruction, said 'Unity expedite expedite Unity'. The SMC could then see the A320 in the go-around. The ADC heard the SMC call 'expedite' and looked up to see the A320 about 100 ft above the runway – already in the go-around. At 0928:25, the ADC directed the A320 crew to go around.

The captain of FKV continued to taxi the aircraft across the runway and onto taxiway D1 and did not sight the A320 at any time. The A320 (VGI) returned to land without further incident.

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<sup>1</sup> A clearance issued by ATC to operate in controller airspace along a designated track or route at a specified level to a specified point or flight-planned destination.

<sup>2</sup> Coordination is the process of obtaining agreement on clearances, transfer of control, advice or information to be issued to aircraft, by means of information exchanged.

## ***Flight crew (FKV) comments***

### ***Check captain acting as first officer***

The check captain commented that a crossing instruction fitted with their judgment of the situation when they first sighted the A320 while taxiing on D2. They were close to the holding point when they received the initial (hold short) instruction from ATC, and assessed that there was a level of urgency in the SMC's voice which indicated to them that it was a crossing instruction.

The sun was behind the A320 on final approach to runway 23, which may have affected the check captain's initial estimate, when they first entered taxiway D2, of how far away the A320 was. However, it was not a factor when FKV taxied onto the runway. At that time, the check captain estimated that the A320 was about 1.5 NM away at about 200 ft above the runway. The check captain decided not to advise the left-seat captain then of the A320 as they had already entered the runway.

There was no confusion in the flight deck over whether they had been instructed to cross the runway or not, they both thought that was the clearance.

The clearance was clipped or over-transmitted and led them to believe it was 'cross' not 'hold short'. In hindsight, the pilot commented that maybe they should have reconfirmed the clearance to cross because the words were clipped, but they expected the readback would give the SMC confirmation that what they understood was correct and the opportunity to detect any misunderstanding. They did not hear anything that sounded like 'hold short'. It was possible that the check captain had pushed their transmit (push-to-talk (PTT)) button which had momentarily over-transmitted the SMC's call.

If the check captain had sighted the A320 later in the taxi and closer to the holding point, they would probably have expected to hold short rather than cross in front of it.

The controller's addition of the bay information to the instruction was not consistent with a hold short instruction. The standard clearance is either hold short (with no further instructions), or cross and taxi to your bay or with additional taxiing instructions.

It was possibly a professional courtesy so the pilot did not have to respond with their bay number, but it added to their expectation that it was a crossing instruction. The flight crew had contacted their company personnel about 100 NM prior to their arrival and were issued with parking bay 50G. It was standard procedure to advise the SMC of their bay number on first contact with the SMC. The SMC presumably gets the bay allocation from the airport ground personnel, and provided that information to the flight crew to save a radio transmission. However, its addition to the end of the hold short instruction misled the pilots.

In the absence of any communication with the SMC prior to reaching the holding point, they would have stopped at the holding point rather than enter the runway.

When discussing the incident afterwards, the captain told the check captain that they had not been aware of or sighted the A320 at any time. The check captain commented that maybe they should have told the captain 'there is one rolling and one on final' when they first saw the two aircraft to increase the captain's situational awareness.

### ***Captain***

The captain was normally based in New Zealand and commented that to cross an active runway there, pilots are required to contact the ADC on the Tower frequency for a clearance.

The captain was intending to stop at the holding point, but proceeded to cross when they thought they got the clearance to do so. They had to increase power to accelerate, having slowed ready to stop.

The bay number was a non-normal addition to a taxi instruction, possibly provided as the check captain had not yet been able to give the normal transmission with their bay allocation after exiting the runway.

## **Controller comments**

The air traffic controllers provided the following comments.

### **Aerodrome controller**

It was a quiet and routine traffic sequence and the weather at the time was benign.

The voice equipment was fitted in 2013 to Adelaide Tower. The Tower was a 'quiet tower', which means that the controllers can only hear the transmissions on the frequency they are controlling, in their own headsets. Although the ADC could hear the SMC give the instruction to hold short, they could not hear any response from flight crew on the Ground frequency.

Prior to the implementation of the quiet tower, controllers could hear transmissions on the other frequencies on speakers in the Tower. The ADC commented that this improved their situational awareness, particularly from a coordination perspective.

The ADC commented that since the incident, in a similar situation, they would wait for the aircraft to land before commencing a handover.

The ADC commented that following the incident there would be a greater focus among the controllers, not just on the instructions controllers give, but that it is not complete until you get adequate readback that responds to all the components of the clearance. In addition, there should be no taxi instruction beyond a hold short instruction.

### **Controller taking over from aerodrome controller**

The controller in the process of a handover/takeover with the ADC was looking at the weather display and listening to the ADC handing over, when they heard the SMC say 'hold short' and then 'expedite'. The controller looked across and sighted FKV half way across the runway and the A320 in the go-around.

The controller commented that before the 'quiet tower' they could all hear each other's radio, which improved their situational awareness.

The controller also commented that when they receive a call from a pilot, they sometimes miss the first part of the transmission. The controller reported that this is a known fault that the controllers have reported via the Airways systems issues reporting scheme (see below). They also advised that they have become desensitised to hearing only part of the readback, which negates the effectiveness of the readback.

The controller advised that there were a number of things that could have prevented the incident:

- if the SMC had heard the readback correctly
- better scanning by air traffic controllers and pilots of aircraft approaching and crossing runways
- stop bars<sup>3</sup> could have been an effective risk control even without hearing the readback or effective scanning.

The controller commended the actions of the A320 flight crew.

### **Surface movement controller**

The SMC was confident they had given the hold short instruction clearly.

The SMC thought that the Unity flight crew would be expecting to hold short because there was no way they were going to be cleared to cross in front of the landing A320. The SMC commented that if they had not contacted Unity 3201 as they were approaching the holding point, they would have

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<sup>3</sup> Stop bars are a series of unidirectional lights at right angles to the taxiway centreline. The lights are spaced three metres apart and located 0.3 m before the holding point. Stop bars show red in the direction of approach to the stop bar from the taxiway and are controlled by ATC.

stopped. Because the aircraft was taxiing towards the runway and it is difficult to tell if the aircraft is slowing down, the SMC issued the hold short instruction to be sure they would stop.

They commented that they added the bay number to the hold short instruction to save a transmission, as another aircraft was waiting for their clearance. They were not sure why they did not pick up the incorrect readback, but they did not hear the first word.

The SMC asserted that in most of the transmissions in Adelaide, the initial second of a readback is clipped, for example they only hear 'short' instead of 'hold short'. The controller thought the readback was 'short runway 23' not 'cross runway 23'. As they thought the pilot would be expecting to hold short, the controller was expecting the readback to be 'hold short' and that expectation affected what the controller heard.

In Adelaide Tower, it is difficult to tell when a controller's PTT button is released and whether the frequency is open or closed. Normally for a 'hold short' readback, you would be expecting two words but they get used to looking for one word. If you are not certain of a readback, you are meant to ask again, but if they don't get the first word every time, it can lead to a lot of additional transmissions. Maybe if radio operators push the PTT button and then wait two heartbeats before they start talking, that technique may prevent transmissions being clipped.

The pilots may not hear the controllers' instructions clearly either as they are also not listening in a perfect environment.

The airport ground staff provide the ADC with bay allocations, which the ADC then put on the flight strip. When the pilots first make contact with the SMC, they state the bay allocated by their company and the SMC checks that matches the bay number on the strip.

The SMC did not hear the ADC clear the A320 to land (or the other aircraft to take off) because they were issuing a clearance at the time.

If the A320 had landed and FKV had crossed the runway, they may have just got across in front of it but it would have been close.

If the airport had stop bar lights, the incident would more than likely not have occurred.

### ***Manual of air traffic services***

In the Manual of air traffic services (MATS), under section 12.3.1.11 *Taxiing across runways*, section 12.3.1.11.1 *Intermediate holding points*, stated: 'Do not include positions beyond required intermediate holding points in taxi instructions.'

### ***Airways systems issues database report***

Airservices Australia provided the ATSB with a copy of the relevant *Airways systems issues database (ASID)* report. In June 2013, the ASID report from Adelaide ATC stated that inbound calls from pilots were clipped at the beginning of calls. This could be heard on recorded audio from the tower transmissions and was compared with transmissions recorded prior to the implementation of the new radio system. Following ATC transmissions, when the controller releases the PTT, the voice communications control system switch remains in the transmit state for 200 milliseconds, known as the guard period. During this period, receive audio is blocked, therefore the audio from pilots is dropped.

In August 2014, the report was updated to state that the clipping issue had been incorporated into the voice system training manual. On 17 December 2015, the comment added was 'Vendor has advised that this defect will be addressed in the next software release which is currently scheduled for delivery in June 2016'. There was no indication what, if anything, was delivered in that release to address the issue.

On 25 August 2016, a comment was added to the report indicating that rather than a system defect, the cut-off responses could be 'mostly attributed to poor radio technique by pilots or ATC'. Furthermore, 'it is also important that controllers release PTT as soon as possible to ensure that the receiver is unmuted'.

The ASID entry dated 17 December 2015 was based on information received from the vendor. Airservices sought input from the vendor on whether they believed the reported issue was a defect and whether the guard period could be adjusted.

Airservices received a response from the vendor with a list of issues which the vendor aimed to address in the next release and the guard period issue was included in this list. Airservices has investigated this issue and has determined it is not a system issue, given that the guard period of 200 milliseconds is less than other voice communication systems used by Airservices and the same as used in other Integrated Tower Automation Suite (INTAS) towers where there has been no observed replication of this issue. It was instead concluded that this issue was due to controller actions related to extended engagement of the foot PTT beyond the end of their transmissions. Airservices considers that the issue was not prevalent in the occurrence as was communicated by the interviewees.

### ***Airservices Australia comment***

Airservices Australia provided the following comments in response to the ATSB draft report.

#### ***Quiet tower***

Although some controllers prefer speakers to increase their situational awareness, it may also result in considerable noise when all three positions are open during periods of increased traffic. Such noise is particularly distracting for controllers that have transitioned from an enroute environment where headsets are used and speakers are not permitted.

Additionally, ATC procedures are designed to ensure controllers can perform their duties safely without reliance on speakers. The use of speakers does not always increase situational awareness and should not be relied upon as an effective threat barrier.

#### ***Clipped transmissions***

The recorded audio leading up to, during and after the occurrence did not contain any clipped transmissions related to the 'fault' reported.

Adelaide Tower Line Manager's and Shift Manager's regular monitoring of the controller's air-ground communications have observed that pilot transmissions may occasionally be missing the first part of the call (clipped transmissions are less than one second in duration). This typically occurs when the pilot commences their response prior to the controller releasing the press to talk (PTT) button. However, clipping of this nature does not occur frequently and not to a point where controllers would become desensitised to only hearing part of the readback.

Existing ATC procedures require the controller to obtain a correct readback of instructions (in accordance with per AIP GEN 3.4 -12). In the absence of the correct and complete readback, the controller must challenge the readback until they are satisfied it is correct.

#### ***Audio sample***

Airservices randomly sampled 90 minutes of audio from 1 August 2016 at Adelaide and did not identify any calls which had a clipped the transmission.

On 12 September, Airservices reviewed the radio technique of a controller in the tower using a foot PTT and noted that there was a significant (0.5-1 second) delay from the end of the delivery of the instruction by the controller to the time when the controller disengaged the foot PTT. This anomaly in the controller's technique resulted in a number of clipped pilot transmissions due to them starting the readback whilst the foot PTT was still engaged. The controller's error was rectified by using the in-line PTT which decreased the delay of the controller releasing the foot PTT.

Additionally, the Voice Communications and Control System (VCCS) enables controllers to view the status of the transmitter and receiver.



## ATSB comment

The A320 crew are to be commended for their actions in preventing a potentially more serious incident occurring.

The flight crew of FKV thought they were cleared to cross the runway probably because of the bay allocation at the end of the hold short instruction. An effective sighting of the aircraft on final approach may have led them to query their understood instruction to cross the runway.

The SMC heard one word in response and mis-heard it as 'short' rather than 'cross' and that assumed 'hold' had been clipped from the transmission. The SMC did not question the pilots about the missing word as they had some previous experiences of the beginning of transmissions being clipped. As there was a 'quiet tower' communications system, there was no opportunity for the ADC to hear this pilot read-back to the SMC and notice the misunderstandings before the runway incursion.

The ADC was in the process of handover/takeover and was not watching the landing A320 or the runway as they assumed FKV would hold short and that the runway was clear.

## Safety message

The risk of runway incursions and other separation events can be minimised through good communication. This incident highlights the importance of:

- controllers and flight crews using correct phraseology
- controllers and pilots challenging instructions which they have not heard or understood fully
- pilots looking carefully for aircraft or other hazards before entering an active runway.

## General details

### Occurrence details

Date and time:	17 August 2016 – 0928 CST	
Occurrence category:	Serious incident	
Primary occurrence type:	Operational – Runway events – Runway incursion	
Location:	Adelaide Airport, South Australia	
	Latitude: 34° 56.70' S	Longitude: 138° 31.83' E

### Aircraft details: VH-FKV

Manufacturer and model:	Fokker Aircraft F27 Mk 50	
Registration:	VH-FKV	
Operator:	Alliance Airlines	
Serial number:	20303	
Type of operation:	Air transport high capacity – Passenger	
Persons on board:	Crew – 4	Passengers – 49
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

### Aircraft details: VH-VGI

Manufacturer and model:	Airbus A320	
Registration:	VH-VGI	
Operator:	Jetstar Airways	
Serial number:	4466	
Type of operation:	Air transport high capacity – Passenger	
Persons on board:	Crew – Unknown	Passengers – Unknown
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

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## About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.