airservices

A pilot's guide to

RUNWAY SAFETY

6th edition - June 2015

INTRODUCTION

Traffic levels rise. Airports expand. And you, the pilot, are expected to understand how to safely taxi to and from runways.

Add all the various combinations of weather, time of day, aircraft type, and language skills to the mix, and the risk of an error increases. Of particular concern to both air traffic control (ATC) and pilots is the risk of a runway incursion.

This Pilot's Guide to Runway Safety was created for you. It is not intended to cover everything there is to know about safely operating on an aerodrome or to cover all types of operations. Rather, the guide focuses on seven areas that are important in surface operations:

Each section identifies safety measures you can take to help reduce errors that lead to runway incursions. Runway incursions are a serious safety concern. Globally, runway collisions have involved combinations of regular public transport aircraft, commuter aircraft, general aviation (fixed wing and helicopters) and ground vehicles, some of which have resulted in fatalities. It doesn't take much—be it either single or multiple, intentional or unintentional factors—you could be involved in a runway incursion.

Although the guide is focused on surface movement for single pilot operations, the information is also valid for operations with two or more crew members. However, operational coordination procedures between crew members are not addressed.

Runway Safety Group

The purpose of the Runway Safety Group (RSG) is to identify improvements to the safety of operations on or near the runway. With a focus on runway incursions, runway excursions and runway confusion, the RSG:

- provides high level oversight of runway safety issues
- monitors emerging trends in international runway safety performance and embraces current and emerging technologies to support runway safety
- liaises with aviation industry stakeholders to improve implementation of safety initiatives
- disseminates key runway safety documentation
- initiates and supports awareness campaigns and other communication as appropriate.

One of the main initiatives of the RSG is the implementation of Local Runway Safety Teams (LRST) at towered locations. The LRST consist of local representatives addressing local runway safety issues. At some airports, the LRST function is embedded in another aerodrome meeting, such as the Aerodrome Users Group or Airside Safety Committee.

More details about the activities of the RSG are available from:
Safety Improvement Branch
Email: safety.promotions@airservicesaustralia.com

1. PLANNING YOUR AERODROME OPERATION

Thorough planning is essential for safe taxi operations. You should give as much attention to planning the aerodrome surface movement of your flight as you give to other phases.

- Anticipate your taxi route. Base your plans on information from the Automatic Terminal Information Service (ATIS), Notices to Airmen (NOTAMs), En Route Supplement Australia (ERSA), recent experience at the aerodrome and a review of the aerodrome chart.

- Take time to study the layout of your departure and arrival aerodromes.

- Have an aerodrome chart or diagram readily available to use not only during the planning phase, but also during taxi.

- Check the expected taxi route against the aerodrome chart or ERSA. Pay special attention to any complex intersections (e.g. multiple taxiways intersecting along the taxi route or where runways intersect the taxi route).

- Identify when you should be in 'heads up' mode on the taxi route (e.g. transitioning through complex intersections and crossing runways).

- Confirm your assigned route if you are in doubt of the taxi instructions received from a controller.

Movement Area Guidance Sign (MAGS): You are at the Holding Point for Runway 16-34 on Taxiway E with 2345m take-off run available on Runway 16.

Responsibility for collision avoidance on the ground

A common misconception when operating on aerodrome movement areas is that ATC will provide positive separation between other aircraft or vehicles on the ground. This is not the case. While ATC will issue pushback approvals and provide taxi clearances, the main purpose of these is to regulate aircraft/vehicle movement at the aerodrome. The avoidance of a collision on the apron area is a joint responsibility of the pilot in command, airside driver and any assisting ground personnel. While ATC will provide you information about other aircraft/vehicles that they are aware of, it is imperative that drivers, pilots and ground crew maintain a good lookout.

Runway confusion

Runway confusion occurs when pilots enter, take-off or land on the wrong runway. This is a particular problem at aerodromes with parallel runway systems where it is relatively easy to mistake runways by day or night. Runway confusion can also occur when a taxiway, usually parallel, is mistaken for a runway. This is most often a problem at night.

In addition to thoroughly planning your aerodrome operation and maintaining situational awareness, to avoid runway confusion:

- pay careful attention to runways in clearances
- always read back an assigned runway in full (e.g. three one left)
- if a non-precision approach, circling approach or an entirely visual approach is being flown, take sufficient time during the approach briefing to agree how positive runway identification will be accomplished
- whenever conditions permit, make sure you visually identify the correct runway before you enter or land on it. Signage, orientation and runway markings are all important identifying features
- runway lighting is coloured completely differently to taxiway lighting and should provide a flight crew with an opportunity to distinguish one from the other.
- at aerodromes where parallel runway operations are conducted, ensure your 'ready' call is on the correct aerodrome control frequency.

> **Did you know?**
> At Class D aerodromes at which parallel runway operations are in progress, pilots must identify the departure runway when reporting 'ready'.
>
> EXAMPLE 'Alpha Bravo Charlie ready, Runway Right'.

AD ELEV 34
S33 55 28 E150 59 18 **SYDNEY/BANKSTOWN, NSW (YSBK)**

21 AUG 2014

ATIS 120.9 416	APP/DEP (SY) 128.3/118.4, 129.7	TWR 123.6 132.8	SMC 119.9	FIA (AH) SY CEN 125.8	CTAF+AFRU (AH) 132.8	Bearings are Magnetic Elevations in FEET AMSL

E150 59 00
E151 00 00

13° E

S33 55 00

S33 55 00

N2

J H

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E

C A1

A1

N1 N1

A2 L N1

ELEV 23 11C C ELEV 22 K N

B1 A A3 K P

F C A3 A L

B2 C A L M1

E ELEV 18 11R A3 A

B C A4 A

TWR E G B C A4 A5 72

G1 B C B3 A6 A

E B B3 **1100 x 30** A6

1416 x 30 B4 A7 A

1038 x 23 B4 A7 A8 ELEV 34

B4 B A8 29R A

B5 29L A8 ELEV 26

B5 29C ELEV 22 B6 B

NDB B

WARNING

PRIOR PLANNING OF
GROUND MOVEMENTS
AND UNDERSTANDING
OF AIRFIELD MARKINGS
AND ATC PROCEDURES
IS ESSENTIAL.
ALL RUNWAYS ARE
ACTIVE AT ALL TIMES
AND REQUIRE A
CLEARANCE TO ENTER,
CROSS OR TAXI ON.

Scale 1:15,000
METRES
0   100   200   300   400

S33 56 00

S33 56 00

E150 59 00
E151 00 00

Changes: RWY 11 IWI.

SBKAD01-140

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A pilot's guide to runway safety   **5**

Aerodrome charts provide the layout and names of runways and taxiways and show the location of major facilities. They are available through various sources including:

- En Route Supplement Australia (ERSA)
- Departure and Approach Procedures (DAP)
- Visual Terminal Charts (VTC)
- ERSA and DAP charts are available on the Airservices website at www.airservicesaustralia.com/publications/aip.asp

Did you know?
The taxi clearance limit for all aircraft is the holding point for the runway unless an intermediate point, such as the holding (run-up) bay, is specified by ATC.

Unless the holding bay is specified as an intermediate clearance limit, an aircraft cleared to the runway holding point may enter an en route holding bay and subsequently leave the holding bay for the runway holding point provided the aircraft gives way to other aircraft on the taxiway. A specific ATC clearance is required to cross any runway that intersects the taxi route.

One of the most common readback errors by pilots is the failure to read back the term 'holding point' if it is specified in a taxi clearance.

2. TAXI PROCEDURES

Following good operating procedures while taxiing increases the safety of operations on an aerodrome. This section focuses on some of the common tasks that you should incorporate into your taxi procedures.

ATC instructions

Wherever possible, obtain your airways clearance before requesting your taxi clearance. Once taxi instructions are received you should:

- write down taxi instructions, especially instructions that are complex. This can help reduce your vulnerability to forgetting part of the instruction
- monitor ATC instructions/clearances issued to other aircraft to enhance your situational awareness
- be especially vigilant if another aircraft has a similar sounding call sign
- listen carefully to avoid responding to an instruction/clearance intended for someone else
- ask immediately if you are uncertain about any ATC instruction or clearance
- read back all required instructions/clearances with your aircraft call sign. Readbacks should be in accordance with the requirements in (AIP) Aeronautical Information Publication
- remember an ATC taxi instruction is **not** a clearance to cross a runway holding point, illuminated stopbar or to enter or to taxi on **ANY** runway unless specifically cleared to do so
  (Note: you must not cross an illuminated stopbar, even if ATC clear you to do so. A runway holding point marking will always be set back from the sealed surface of a runway and never aligned with the edge of the sealed surface)
- advise ATC if you anticipate a delay or are unable to comply with their instructions
- look for light signals from the tower if you suspect radio problems.

> **Did you know?**
> ATC will nominate the points of crossing for an aircraft when issuing a runway crossing. A typical instruction is: *'Alpha Bravo Charlie on Taxiway November cross Runway One Seven'*
> Your readback should be: *'On November, crossing runway One Seven, Alpha Bravo Charlie'*

TOWER SIGNALS TO VEHICLES	
SIGNAL	MEANING
🟩🟩🟩🟩 Green flashes	Permission to cross landing area or to move onto taxiway
🟥 Red light	Stop
🟥🟥🟥🟥 Red flashes	Move off the landing area or taxiway and watch out for aircraft
⬜⬜⬜⬜ White flashes	Vacate the manoeuvring area in accordance with local instructions

Check your understanding of ATC instructions

You, call sign Alpha Bravo Charlie, are parked at the main terminal apron. You inform the tower that you want to takeoff on the runway specified in each of three scenarios. (Assume that you need the full length of the runway for take-off.) The controller's taxiing instructions to you are provided. Select a circled number on the aerodrome diagram provided below to indicate where you are required to stop.
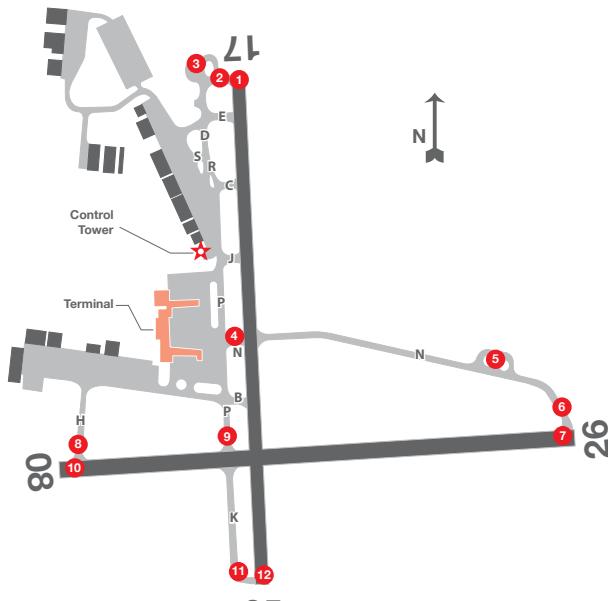
Scenario A—Runway 08
'Alpha Bravo Charlie, taxi to Holding Point Hotel Runway 08'.   Answer ____

Scenario B—Runway 35
'Alpha Bravo Charlie, taxi via Papa hold short of Runway 26'.   Answer ____

Scenario C—Runway 26
'Alpha Bravo Charlie, taxi to Holding Point November,
Runway 26, cross Runway 35'.   Answer ____

Answers: A–8, B–9, C–6

> ### Is the Tower active?
> There have been some safety occurrences where pilots or airside drivers are unsure if a Tower is active or if CTAF procedures apply. If you are unsure, listen to the ATIS. If the tower is not active, the ATIS will be information ZULU and will include the time of activation and the CTAF frequency.

Situational awareness

> Maintain a 'sterile' cockpit. You must be able to focus on your duties without being distracted by non-flight related matters like engaging in conversation with a passenger or talking on a mobile phone.

When taxiing, you need to be aware of your location, how that location relates to your intended taxi route, and to other aircraft and vehicles that may be operating on the aerodrome. This is commonly referred to as 'situational awareness.' Maintain situational awareness by:

- ensuring you understand and follow ATC instructions and clearances
- using current aerodrome charts/diagrams
- knowing the meaning of the visual aids available on the aerodrome, such as markings, signs and lights
- monitoring the radio and using the aerodrome chart to assist you in locating other aircraft and vehicles that may be on the aerodrome
- avoiding distractions
- minimising 'heads down' activities while the aircraft is moving.

TIP: If you become uncertain about your location on the aerodrome manoeuvring area, make sure you are clear of any runway and stop the aircraft. Advise ATC and, if necessary, request progressive taxi instructions.

Non controlled aerodromes

When operating at a non-controlled aerodrome, the additional safety net provided by ATC is removed and the principles of 'alerted' see-and-avoid are critical to safety. In addition to the guidance in this booklet, make sure that you monitor the aerodrome frequency and broadcast your intentions to maintain both your situational awareness and that of other pilots and drivers. Although standard broadcasts are detailed in AIP, remember that you should also make any additional broadcasts you feel are necessary to minimise the risk of collision.

At non-controlled aerodromes, you may be able to use an aerodrome frequency response unit (AFRU) to confirm that you are on the correct frequency, and that your radio is working and set up correctly.

While taxiing

- Use extra caution when directed to taxi on a runway, especially at night and during reduced visibility conditions.
- Use all resources available to keep your aircraft on its assigned taxi route, including:
  - aerodrome charts and diagrams
  - aerodrome markings, signs and lights
  - heading indicators.
- Make sure you ask for, receive and comply with hold short or crossing instructions when approaching an intersecting runway.
- Turn on rotating beacon and taxi lights.

Clear left, ahead, above and right
Scan the full length of the runway and the approaches before entering or crossing any runway, even if you have received a clearance.

Did you know?
At some aerodromes, holding points are located at a runway undershoot or overshoot and you may not even see the sealed surface of the runway when you are at the holding point. You are still required to get a specific clearance from ATC to cross this holding point.

Remember: an airways clearance or a taxi clearance are not clearances to enter or use the runway—you need a specific clearance to do this.

Line up and wait

ATC uses the 'line up and wait' instruction when a take-off clearance cannot be immediately issued due to traffic or for other reasons.

Pay close attention when instructed to 'line up and wait,' especially at night or during periods of low visibility. Before entering the runway, remember to:

- scan the full length of the runway
- scan for aircraft on final approach or landing roll out
- turn on strobe lights, if fitted.

TIP: Consider lining up slightly to the left or right of the centreline (approximately one metre) when holding in position at night so landing aircraft can differentiate your aircraft from runway lights and markings.

When issuing you with a line-up clearance, ATC will issue a 'wait' instruction if the runway is/will be occupied by a preceding, arriving or departing aircraft or other obstruction.

- If ATC expect the preceding aircraft or obstruction to have vacated prior to you stopping in the lined up position, the 'wait' instruction may not be included.
- ATC will advise the nature of the obstruction if it is not apparent.

TIP: Take care to note the position of traffic and, while you are waiting for take-off clearance, keep track of the amount of time that passes after you have received the 'line up and wait' instruction.

- If you are on the runway and held for longer than you think is normal for your anticipated departure (90 seconds is a good guide), contact ATC and advise that you are holding on the runway.
- When full length and intersection departures are being used, be aware that similar sounding call signs have been a factor in the wrong aircraft lining up.

Did you know?
There have been some collisions in other countries and several incidents involving aircraft holding on a runway waiting for a take-off clearance. An analysis of these collisions and incidents indicated that two minutes or more elapsed between the time an instruction was issued for the departing aircraft to line up and the resulting collision, land over or go around by an aircraft cleared to land. Contact ATC anytime you have a concern about a potential conflict.

After landing

- Use caution after landing on a runway where the exit taxiways intersect another runway, in particular when operating at aerodromes with parallel runway systems. You will require a specific ATC clearance to cross or enter any runway.
- Do not hold on the runway in use unless ATC authorise you to do so.
- Do not exit onto another runway without ATC clearance.
- Do not accept last minute turn-off instructions from the tower unless you clearly understand the instructions and are certain that you can comply.
- Do not initiate non-essential communications or actions after landing until you have exited and cleared the runway.

Did you know?
A clearance to land includes a clearance to cross any other runway as part of your landing. However, you cannot exit the landing runway onto another runway without a specific clearance to do so.

3. AIRCRAFT LIGHTS

During day and night time operations, exterior aircraft lights may be used to make an aircraft operating on an aerodrome more conspicuous, and to convey location and intent to other pilots.

Use of exterior aircraft lights

- **Engines running** – turn on the rotating beacon.
- **Taxiing** – prior to commencing taxi, turn on rotating beacon, navigation, taxi, and logo lights if available.
- **Crossing a runway** – all exterior lights should be illuminated when crossing a runway. You should consider any adverse effects to safety that illuminating the forward facing lights will have on the vision of other pilots or ground personnel during runway crossings.
- **Entering the departure runway following an instruction to line up and wait** – turn on all exterior lights to make your aircraft more conspicuous to aircraft on final and to ATC. In some circumstances this may include using your landing lights if you believe it is warranted.
- **Take-off** – turn on landing lights when take-off clearance is received or when commencing take-off roll at an aerodrome without an operating control tower.

USING AIRCRAFT LIGHTS						
✓ = Turn on	Rotating beacon	Navigation lights	Strobe lights*	Taxi lights	Logo lights	Landing lights
Engine(s) running	✓					
Taxiing	✓	✓		✓	✓	
Crossing a runway	✓	✓	✓	✓	✓	✓
Entering departure runway for line up and wait	✓	✓	✓	✓	✓	
Take-off	✓	✓	✓	✓	✓	✓

*Strobe lights should not be illuminated if it will have an adverse effect on others.

4. COMMUNICATIONS

Effective pilot/controller communications are key to safe aerodrome operations. You can help enhance the controller's understanding by responding appropriately and using standard phraseology.

Guidelines for clear and accurate communications

- Use standard phraseology when contacting ATC to facilitate clear and concise communication. Your initial transmission should contain these elements:
  - who you are calling
  - your call sign
  - where you are located
  - what you want to do (a short description).

- State your position whenever making initial contact with any tower or ground controller, regardless of whether you have previously stated your position to a different controller.
- Focus on what ATC is instructing you to do. Do not perform any non-essential tasks while communicating with ATC.

Good radio technique

Prepare first: your transmission should be well thought out. Before keying your transmitter, know what you want to say and check to make sure you are on the proper frequency and will not be interrupting another transmission or its response.

Communication with ATC should be concise and to the point: for unusual situations or lengthy communications, initial contact should be established first.

Acknowledge all clearances: read back required elements of the clearance and end your transmission with your call sign.

- Read back any holding point including the words 'holding point' specified in a taxi instruction and any clearance or instruction to:

  – hold short of a runway

  – enter a runway

  – land on a runway

  – conditionally line up on a runway

  – wait on a runway

  – take-off on a runway

  – cross a runway

  – taxi or backtrack on a runway.

- When holding on a runway for take-off or on final approach, monitor the assigned tower frequency for potential conflicts involving your runway.
- Read back all take-off and landing clearances, including the runway designator where it is included in your clearance.
- If unfamiliar with the taxi routes at an airport, ask for progressive taxi instructions.
- Clarify any misunderstanding or confusion concerning ATC instructions or clearances.

What's that aircraft doing on the runway?

Question: You are approaching an aerodrome and have received a landing clearance. As you continue your approach, you notice an aircraft on the runway you are cleared to land on. What should you do?

Answer: In all probability, the controller is aware of the traffic and has already issued a take-off clearance to that aircraft or is waiting for the aircraft to clear the runway. However if any doubt exists or if you are uncomfortable with the spacing, query the clearance to land with the controller referring to the other traffic, and be prepared to execute a go around.

Examples of taxi instructions

Initial call-up

EXAMPLE **Pilot**: Essendon Ground, Alpha Bravo Charlie, GA Park, received Alpha, to Sydney, request taxi.

Controller: Alpha Bravo Charlie, Essendon Ground, taxi to Holding Point Echo, Runway One Seven.

Pilot: Holding Point Echo, Runway One Seven, Alpha Bravo Charlie.

EXAMPLE **Pilot:** Bankstown Ground, Helo Forty Four, request air taxi from Heli Tours to the main pad.

Controller: Helo Forty Four, Bankstown Ground, air taxi to the main pad, cross Runway Two Niner Left, Centre and Right.

Pilot: Cross Runway Two Niner Left, Centre and Right, Helo Forty Four.

Initial call-up with specific request
Make clear any special requests on initial contact

EXAMPLE   **Pilot:** Melbourne Ground, Qantas Five Forty Two, Boeing 737, received Alpha, squawk four three two one, Bay Twenty, IFR, to Sydney request taxi and intersection departure from Juliet.

                     Controller: Qantas Five Forty Two, Melbourne Ground, taxi to Holding Point Juliet, Runway Three Four.

                     Pilot: Holding Point Juliet, Runway Three Four, Qantas Five Forty Two.

'Line up and wait'
Read back all 'line up' and 'line up and wait' instructions, including the runway designator when transmitted by ATC or when there is a possibility of confusion.

EXAMPLE   **Controller:** Virgin Two Thirty Two, line up and wait Runway Two Seven.

                     Pilot: Line up and wait, Runway Two Seven, Virgin Two Thirty Two.

Conditional clearance
A pilot receiving a conditional clearance must identify the aircraft or vehicle causing the conditional clearance before proceeding in accordance with the clearance.

EXAMPLE   **Controller:** Alpha Bravo Charlie, behind Cessna on short final line up behind.

                     Pilot: Behind the Cessna, lining up, Alpha Bravo Charlie.

Take-off clearance/landing clearance
Read back all take-off and landing clearances with a call sign, including the runway designator when transmitted by ATC or when there is a possibility of confusion.

EXAMPLE   **Controller:** Alpha Bravo Charlie, Runway Three Four, cleared for take-off.

                     Pilot: Runway Three Four, cleared for take-off, Alpha Bravo Charlie.

EXAMPLE   **Controller:** Qantas Two Twenty-Two, Runway Three Four, cleared to land.

                     Pilot: Cleared to land, Runway Three Four, Qantas Two Twenty-Two.

'Land and hold short' (LAHSO)

Land and hold short instructions require pilot readback.

EXAMPLE   **Controller:** Virgin Five Thirty Four a Cessna 441 landing on crossing runway, hold short Runway Two Seven, cleared to land Runway Three Four.

Pilot: Hold short Runway Two Seven, cleared to land Runway Three Four, Virgin Five Thirty Four.

EXAMPLE   **Controller:** Qantas Thirty Three, Boeing 737 landing on crossing runway will hold short – Runway Two Seven cleared for take-off.

Pilot: Runway Two Seven, cleared for take-off, Qantas Thirty-Three.

Initial contact after exiting runway
You are expected to exit the runway at the first available taxiway or as instructed by ATC. You should contact ground control as soon as possible after exiting the runway.

EXAMPLE   **Pilot:** Cairns Ground, Alpha Bravo Charlie, Bay Two.

                        Controller: Alpha Bravo Charlie, Cairns Ground, taxi to Bay Two, cross Runway One Two.

                        Pilot: Cross Runway One Two, Alpha Bravo Charlie.

Did you know?
When instructed to taxi to a runway for departure, you must read back the holding point specified in the taxi clearance.

EXAMPLE   **Controller:** Alpha Bravo Charlie, taxi to Holding Point Tango Runway One Seven.

                        Pilot: Holding Point Tango, Runway One Seven, Alpha Bravo Charlie.

5. PHRASEOLOGY

This section contains a glossary of phraseology commonly used in aerodrome surface operations. For a complete listing of all ATC phraseology, consult the Aeronautical Information Publication (AIP).

ACKNOWLEDGE – let me know that you have received my message.

AFFIRM – yes.

APPROVED – permission for proposed action granted.

BREAK – I hereby indicate the separation between portions of the message.
(To be used when there is no clear distinction between the text and other portions of the message).

CANCEL – annul the previously transmitted clearance.

CLEARED – authorised to proceed under the conditions specified.

CONFIRM – have I correctly received the following…? Or did you correctly receive this message.

CONTACT – establish radio contact with...

CORRECTION – an error has been made in this transmission (or message indicated) the correct version is…

FINAL – commonly used to mean that an aircraft is on the final approach course or is aligned with a landing area.

HOLD POSITION – stay in place, where you are currently located.

HOW DO YOU READ? – what is the readability of my transmission?

> **Note:** The readability scale is:
>
> 1. unreadable
> 2. readable now and then
> 3. readable but with difficulty
> 4. readable
> 5. perfectly readable.

I SAY AGAIN – I repeat for clarity or emphasis.

NEGATIVE – 'no' or 'permission not granted' or 'that is not correct'.

LINE UP AND WAIT – used by ATC to inform a pilot to taxi onto the departure runway and to hold in take-off position. It is not an authorisation for take-off. It is used when take-off clearance cannot immediately be issued because of traffic or for other reasons.

READ BACK – repeat all, or the specified portion, of this message back to me exactly as received.

ROGER – I have received all of your last transmission. Under no circumstances to be used in reply to a question requiring 'readback' or a direct answer in the affirmative or negative.

SAY AGAIN – repeat all or the following part of your last transmission.

SPEAK SLOWER – reduce your rate of speech.

STAND BY – wait and I will call you. Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. The caller should re-establish contact if a delay is lengthy. 'Stand by' is not an approval or denial.

UNABLE TO COMPLY – indicates inability to comply with a specific instruction, request or clearance.

VERIFY – request a check and confirmation of the information identified (e.g. 'verify squawk code').

WILCO – I understand your message and will comply with it.

Did you know?
A clearance to line up does not authorise backtracking. If you require backtracking, you must request and obtain a specific clearance to do so.

6. AERODROME MARKINGS, SIGNS AND LIGHTS

Aerodrome markings, signs and lights are designed to assist you in navigating around an aerodrome and during landing and take-off.

Aerodrome markings – understanding the differences

In understanding aerodrome markings, remember the following principles.

Colour

- Runway markings are white (although yellow taxiway centrelines may lead on, lead off, or cross the runway).
- Taxiway markings are yellow.
- Markings on aprons and in ramp areas may include other colours (e.g. it is common to mark vehicle roadways in white).

A vehicle roadway on an apron area. The edges of this roadway are often identified by solid white stripes. You may taxi across these roadways but you should not taxi on them.

Taxiway marking patterns

- If a marking pattern consists of two or more lines—some of which are solid and some of which are dashed—these are runway holding position markings.
  - It is always permissible to cross from the dashed side to the solid side.
  - ATC permission is always required to cross from the solid side to the dashed side at an aerodrome with an operating control tower.
  - When instructed to 'hold short' always stop before the first solid line of the runway holding point marking as depicted below.

runway side
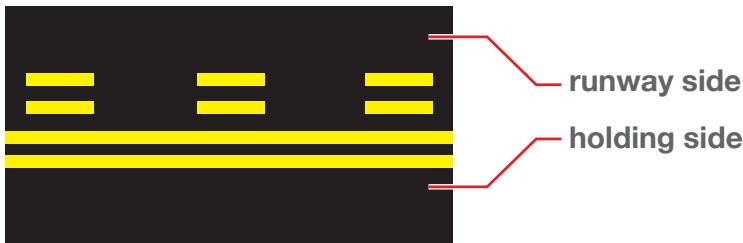
holding side

Intermediate Holding Positions

Intermediate holding position markings show a holding position between taxiways. You will need to hold at these if ATC direct you to hold short of a particular taxiway.

Aerodrome signs – how to get from here to there safely

Along with aerodrome markings and lights, aerodrome signs are designed to assist you in navigating around an aerodrome.

It is essential that you understand the colour coding and meaning of these five types of signs when taxiing on an aerodrome

1. **Location sign:** identifies the taxiway you are currently located on. It has a yellow inscription on a black background.

A

Remember: black square, you're there.

2. **Mandatory instruction sign:** identifies the entrance to a runway or critical area, and areas prohibited for use by aircraft. It has a white inscription on a red background. You must obtain a clearance from ATC prior to proceeding past this point.

15-33 ⊖

3. **Direction sign:** identifies the designations of taxiways leading out of an intersection along with an arrow indicating the approximate direction of turn needed to align the aircraft on that taxiway. They are located before the intersection, normally on the left side and normally with a location sign. It has a black inscription on a yellow background.

←J B↗

Remember: yellow array points the way.

4. **Destination sign:** identifies with arrows the directions to specific destinations on the airfield (e.g. runways, terminals or airport services). It also has a black inscription on a yellow background.

Remember: yellow array points the way

- **Sign arrays:** grouping of direction signs. Signs are orientated clockwise from left to right. Left turn signs are on the left of the location sign and right turn signs are on the right of the location sign.
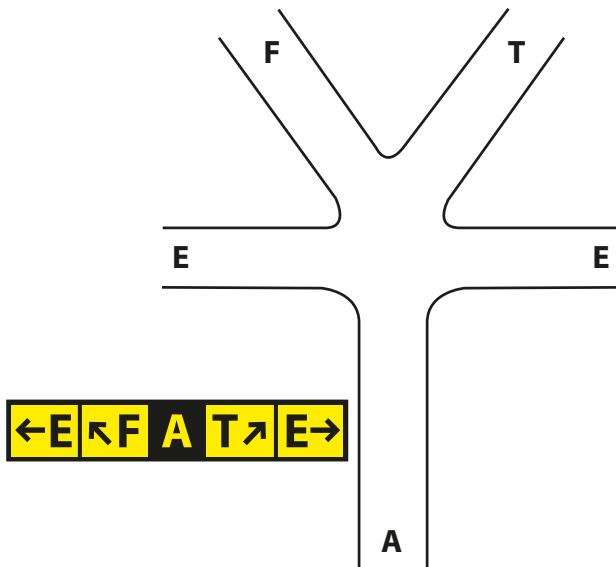
5. **Taxi-holding point sign:** this sign is located next to the yellow runway holding point markings painted on taxiways that intersect a runway. The sign below indicates that you are on taxiway Alpha at the Holding Point for Runway 15-33. The threshold for Runway 15 is to your left; the threshold for Runway 33 is to your right.


Did you know?
Many runway incursions result from pilots acknowledging ATC hold short instructions and then proceeding across the runway holding point line.

Runway holding point markings on taxiways identify the locations where an aircraft is required to stop when it does not have a clearance to proceed onto a runway (you should also see a red and white runway holding point sign and possibly runway guard lights). When instructed by ATC to 'hold short of runway XX', you should read back and stop so no part of the aircraft extends over the first solid line of the runway holding point marking. Keep your head up—distances of runway holding point markings from the centreline of a runway can vary even at the same aerodrome.

When approaching the runway holding point marking, you should not cross the marking without a specific ATC clearance. An aircraft exiting a runway is not clear of the runway until all parts of the aircraft have crossed the applicable runway holding point marking.

Holding Point for Runway 32–14 on Taxiway Bravo. An above ground runway guard light is installed between the holding point sign and pavement marking.

15-33

Stop so that no part of the aircraft crosses this line.
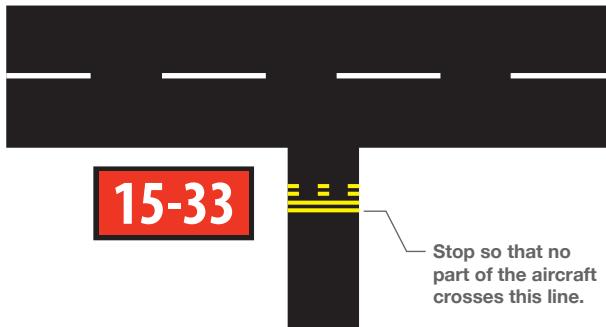
TIP: If you are facing solid lines, be sure you are cleared to enter or cross the runway. The dashed lines are always on the side toward the runway.

Runway stop bars

Many runway incursion incidents result from pilots acknowledging ATC hold short instructions and then continuing to proceed across the runway holding point line. Stop bars have been introduced at several Australian airports and are considered to be a valuable defence against an aircraft inadvertently entering a runway without a clearance. No special equipment is necessary in an aircraft to enable stop bar usage. A stop bar provides a visual alert to the pilot to stop and hold. Crossing the stop bar is only permissible after ATC switches off the stop bar light **AND** instructs you to cross.

Remember, never cross a lit stop bar (as shown below).

Aerodrome lighting

There are many different lighting combinations that may exist on some aerodromes, especially where aircraft operations are conducted in the lower visibility ranges. For taxiing operations around airfields, you should remember:

- runway edge lights are white (although on runways fitted with high intensity lighting, the runway edge lights within 600 m from the end of the runway will be yellow.)

Note: Picture also shows runway centreline and touchdown zone lights.

- taxiway edge lights or reflectors are blue

- taxiway centreline lights or reflectors are green

TIP: Never taxi across a row of illuminated red lights. This is a stop bar—do not proceed until the lights are turned off and you are in receipt of an ATC clearance to cross. Stop bars are being progressively fitted at some major aerodromes.

- runway guard lights are flashing yellow lights (either in the pavement or located on the side of the taxiway) and highlight a runway holding point.

High intensity approach lighting (HIAL) is red and white.

Runway holding point as viewed from a taxiway centreline. This holding point has both above ground and in-pavement runway guard lights.



Parking clearance lines.

7. RUNWAY INCURSION HOTSPOTS

Runway incursions (RIs) are defined by ICAO as; any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft. Airservices regards runway safety as one of the most significant risks to aircraft operators.

Airservices has an excellent reporting culture for runway safety incidents. It is important that the lessons learnt are communicated to the broader aviation group to enhance the safety of all operations in and around the runway. On average, there are approximately 15 pilot attributable runway incursions per month at Airservices 28 towered airports. Most of these occur at the Metropolitan Class D airports.

Fortunately, most runway incursions have had no immediate safety consequences. However there are regular incursions which do have significant potential for a collision. Incident reports show runway incursions do not occur randomly around the aerodrome, but are often clustered at particular runway holding points. These are known as 'hotspots'. Runway hotspot diagrams are an ICAO-endorsed and internationally-recognised means of providing information about locations of increased risk for incursions at each aerodrome.

RI hotspots are depicted on DAP plates, in ERSA and on special 'hotspot diagrams' available on the Airservices website. Careful consideration of these hotspots when planning your flight can significantly reduce your risk of a runway incursion.
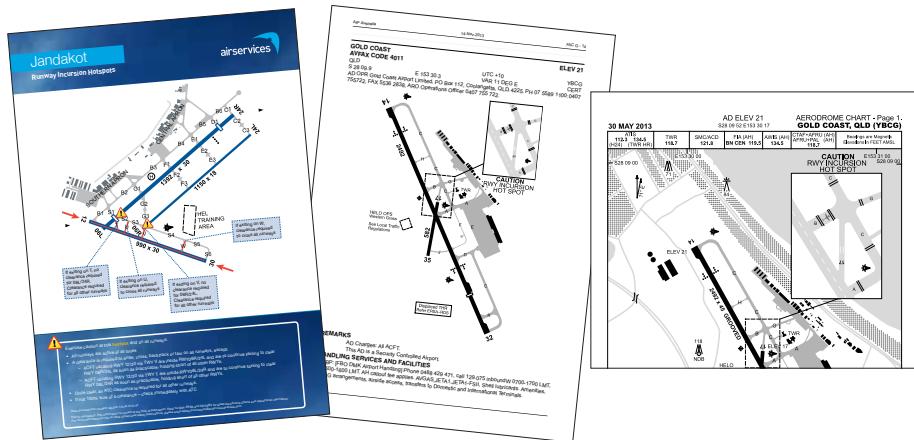
For more information on runway safety, visit
www.airservicesaustralia.com or email safety.promotions@airservicesaustralia.com

Airservices has developed a range of safety educational products to assist pilots understand a range of topics such as:

- Working with ATC
- Runway Safety
- Airspace Infringements

The information will not only make your flight safer, but give you an understanding of how we work, which will improve the efficiency of your flying operations and highlight that we are an important part of your 'crew' who can assist you during your flight.

Safety Bulletins

Safety Bulletins are designed to deliver information quickly to the relevant sections of the aviation community, to improve awareness and understanding of important safety information.

Safety Bulletins are available on the Airservices website at the following location:

www.airservicesaustralia.com/publications/safety-publications

Safety Nets

Safety Nets provide key factual information on aviation procedures, equipment and/or known safety issues to the aviation community. Safety Nets are currently available on the following topics:

- Runway stop bars
- Using GNSS as a VFR navigation tool
- Safe operations around controlled airspace
- SARTIME management
- Communicating with air traffic control
- Flight following
- Operating in Class D airspace
- Pilot responsibilities for obtaining information in-flight
- SIDs and STARs.

Runway Safety

Airservices has developed a range of runway safety products to reduce the likelihood of runway incursions, runway excursions and runway confusion. These products include runway incursion hotspot diagrams for:

- Moorabbin aerodrome
- Bankstown aerodrome
- Parafield aerodrome
- Jandakot aerodrome
- Archerfield aerodrome
- Gold Coast aerodrome
- Sunshine Coast aerodrome.

Airspace infringements

Airservices has produced a range of products to reduce the likelihood of airspace infringements, including the following airspace infringement hotspot diagrams:

- Melbourne Airspace Infringement Hot Spots
- Adelaide Airspace Infringement Hot Spots
- Perth Airspace Infringement Hot Spots
- Sydney Airspace Infringement Hot Spots
- Gold Coast Airspace Infringement Hot Spots
- Brisbane Airspace Infringement Hot Spots

Pilot information nights

Airservices holds pilot information nights at its Melbourne, Sydney and Brisbane centres to increase awareness of the air traffic system and show how pilot activities, decisions and operations can impact it. The sessions promote safe flying and encourage pilots and air traffic services employees to engage and communicate with each other.

For more information, or to view Airservices safety products, have a look at our Pilot and Airside Safety webpage.

www.airservicesaustralia.com/flight-briefing/pilot-and-airside-safety

TIPS TO AVOID
A RUNWAY INCURSION

- » At both departure and arrival aerodromes
- » Check for NOTAMS that will affect your ground movements
- » Research the likely runway in use (ATIS or Met)
- » Check ERSA for standard taxi routes
- » Ensure you have a current Aerodrome Chart for planning purposes and to reference during taxi

The Aerodrome Chart in AIP Departure and Approach Procedures (DAP) contains more detail than ERSA for ground operations. Aerodrome Charts are accessible through the Publications/ AIP section of the Airservices website.

- » Look out for, and comply with these when taxiing

✓ **Minimise 'heads-down' activities while the aircraft is moving**

✓ **Resist the pressure to take short cuts**

✓ **Listen and comply with ATC instructions and clearances**

- » Wherever possible get your airways clearance prior to engine start or taxi
- » Write down your taxi instructions
- » Ask for progressive taxi instructions if unfamiliar with the taxi routes at an airport
- » Listen carefully to avoid responding to an instruction/ clearance intended for someone else
- » Use standard phraseology and read back requirements from AIP

✓ **Obtain a clearance to enter, cross, backtrack and taxi on any runway, including runway undershoots (where marked)**

All runways are considered active at all times and require a clearance to enter, cross, backtrack or taxi

Unless directed otherwise by ATC, a clearance to land on any runway authorises you to cross any intersecting runway during that landing (it does not automatically allow you to vacate using an intersecting runway as a taxiway)

✓ **Before entering a runway, always look out for other aircraft or vehicles on, or approaching the runway.**

✓ **Stay alert until after engine shut-down**

More information on runway safety is available through:

- » **www.airservicesaustralia.com/flight-briefing/ pilot-and-airside-safety/runway-safety/**
- » **runway.safety@airservicesaustralia.com**

B 15-33

←B

←B A B→

"If you are unsure about your clearance, or your location, immediately check with air traffic control"

Developed by the Australian Runway Safety Group—an aviation industry collaborative committed to maintaining safe aerodrome operations.

Diagram not to scale. Indicative markings only

COMMON AERODROME SIGNS AND MARKINGS

15-33

Mandatory Runway Holding Position Sign

Generally co-located with the Pattern A runway holding position markings.

## 15 CAT I

ILS Critical Area Holding Position Sign

Generally co-located with a Pattern B holding position marking.
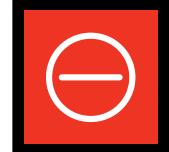
Aircraft No Entry

Mandatory signs

At some aerodromes non-standard signage may exist. All signs with white text on a red background are mandatory and identify a location beyond which aircraft or vehicles shall not proceed unless authorised by ATC.

RWY 15 — RWY 33

A 15-33
Gable marker, mandatory runway holding position sign and Pattern A runway holding position marking

15 CAT I
ILS critical area holding position sign and Pattern B holding position marking

F   T

E   E

Intermediate holding position marking

←E ↖F A T↗ E→

Destination and taxiway location signs

A

DIAGRAM NOT TO SCALE
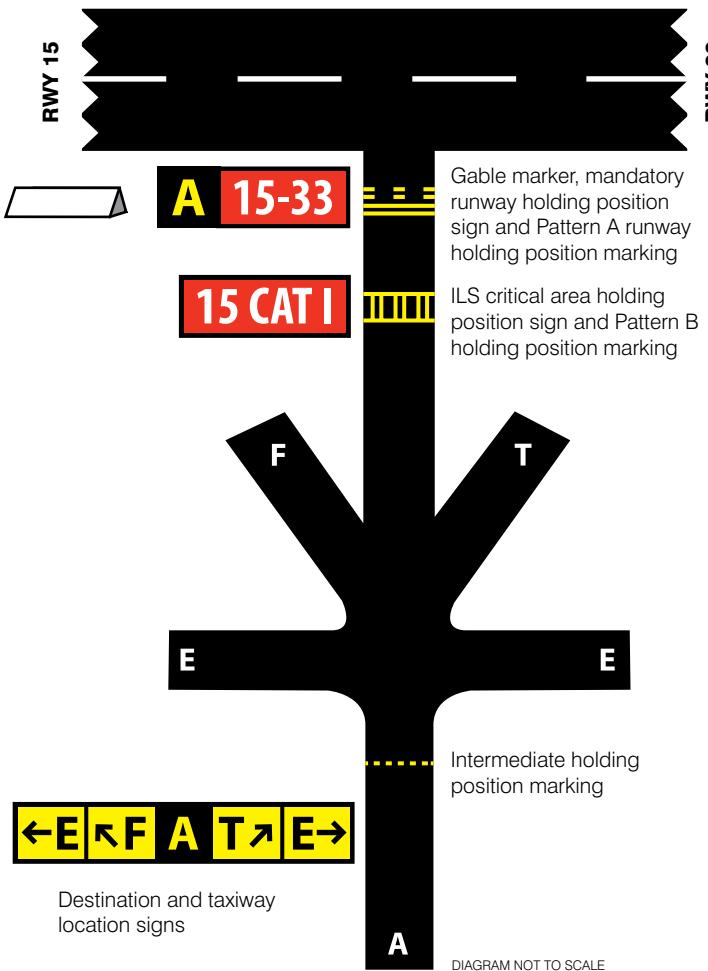
← APRON

Destination signs

These give directions of where to go and will be located before the taxiway turnoff

(e.g. Turn left at the next taxiway for the apron)

Remember: Yellow array points the way

← Runway side
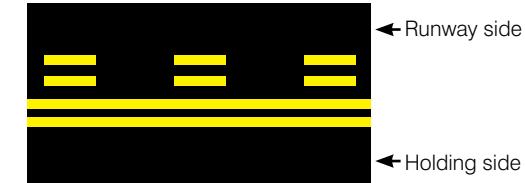
← Holding side

Pattern A Runway Holding Position

At controlled aerodromes you must have ATC clearance to cross from the Holding side to the Runway side.

These will always be set back from the sealed surface of the runway to be in line with the gable markers or a greater distance.
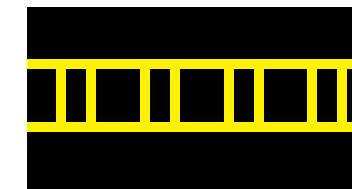
Pattern B Holding Position Marking

Similar to Pattern A runway holding positions, but are generally associated with precision approach runways. These will generally be set back further than runway holding positions and will only be applicable when advised by ATC or the ATIS.

Intermediate Holding Position Marking

Marks the holding position between taxiways. You will need to hold at these if ATC direct you to hold short of a particular taxiway.

A **Taxiway Location Signs**

These show where you are on the aerodrome

(e.g. You are on taxiway A)

Remember: Black Square—You are there

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www.airservicesaustralia.com