

An airside driver's guide to

RUNWAY SAFETY

Safe surface operations at controlled aerodromes





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Introduction

Traffic levels rise. Airports expand. And you, an airside driver, are expected to understand how to safely operate your vehicle on or near runways.

Add all the various combinations of weather, time of day, aircraft movements and language skill to the mix, and the risk of an error increases. Of particular concern to all operators on an aerodrome is the risk of a runway incursion which may have catastrophic consequences.

An Airside Driver's Guide to Runway Safety was created for you and is complementary to a similar guide developed for aircrew. It is not intended to cover everything there is to know about safely operating on an aerodrome. Rather the guide focuses on four areas that are important in surface operations:

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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, and ground vehicles. Many have resulted in fatalities. It doesn't take much, be it either single or multiple, intentional or unintentional factors, and you could be involved in a runway incursion.

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. The RSG:

- provides high level oversight of runway incursion issues
- monitors the emerging trends in international runway safety performance and embraces current and emerging technologies to support runway safety
- liaises with the Australian Defence Force and other relevant industry stakeholders as required to ensure cooperation with safety initiatives
- ensures adequate dissemination of key runway safety documentation
- initiates and supports awareness campaigns and other communication as appropriate
- reviews proposed extensions of activities to cover any runway safety concern that might have been revealed.

More details about the activities of the RSG may be obtained from:

Safety Services

Email: safety.promotions@airservicesaustralia.com

Planning your aerodrome operation

Thorough knowledge of your aerodrome is essential for safe driving. Take a moment to think about where you need to go and how you are going to get there.

- Have a current aerodrome chart or diagram readily available to use.
- Check the expected route against the aerodrome chart or diagram and pay special attention to any complex intersections (for example, where two or more taxiways cross) or where you will be close to a runway.
- Always be aware of where you are and what is around your vehicle — especially when operating close to a runway.
- If in doubt of your current position on a taxiway, ask air traffic control (ATC) for assistance.
- If in doubt of your position on an apron, ask for assistance from other ground personnel (for example the aerodrome safety officer).



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

Aerodrome procedures

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

Air Traffic Control (ATC) Instructions

Drivers of vehicles must obtain an ATC clearance and instructions before entering the manoeuvring area (any taxiway or runway).

Once you receive an ATC clearance or instruction, you should:

- Write down the clearance or instruction, especially where they are complex. This can help reduce the chance of forgetting part of the clearance or instruction.
- Monitor ATC clearances/instructions issued to other vehicles and aircraft to help you build up a picture of what is happening around you.
- Be especially careful if another vehicle or aircraft has a similar sounding call-sign.
- Listen carefully to avoid responding to a clearance/instruction intended for someone else.
- Ask immediately if you are uncertain about any ATC clearance/instruction.
- Read back all required clearances/instructions including your vehicle call-sign.
- Remember an ATC instruction to operate on taxiways or other areas of the aerodrome is **NOT** a clearance to cross a runway holding position, illuminated stopbar or to enter or operate on a runway unless specifically cleared to do so.
Only the words CROSS or ENTER authorise a vehicle on to a runway. At some aerodromes, holding positions may not be marked, in which case, vehicles should hold short of the runway strip edge usually marked by gable markers. This also applies to works vehicles operating on areas adjacent to runways where there are no taxiways, such as mowers. *(Note: 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?

Manoeuvring area: That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

ATC will nominate the points of crossing for a vehicle when issuing a runway crossing of an active runway. A typical instruction is: *'Car 1 on Taxiway November cross Runway One Seven'*.

Did you know?

Several Australian airports are equipped with the Advanced Surface Movement Guidance Control System (A-SMGCS). This is an air traffic surveillance system enabling aircraft and vehicles on the airport surface to be accurately tracked by ATC in all visibility conditions.

Drivers of vehicles that need to operate on runways and/or taxiways at A-SMGCS equipped airports will progressively find that their vehicles are fitted with vehicle locators, often referred to as 'VeeLo'. These transmitters send vehicle information to the A-SMGCS system enabling the vehicle to be automatically tracked and identified on ATC tower displays. They are normally installed so that they switch on and off through the vehicle ignition switch, and will only transmit to ATC when the vehicle is on an area of ATC interest. This is normally, but not necessarily, only taxiways and runways. There is no requirement for drivers to interact with the VeeLo unless it has a manual ON/OFF switch. However, if it is not operating correctly drivers may be requested by ATC to have it repaired.



Situational awareness

When operating on the aerodrome, you need to be aware of your location, and how that location relates to your intended route, and to other vehicles and aircraft 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 a current aerodrome chart or diagram
- 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
- maintaining a 'sterile' environment in your vehicle — you must be able to focus on your duties without being distracted by non-operational matters like engaging in conversation with a passenger
- avoiding distractions
- using vehicle lights to convey location — ensure rotating beacon is on when driving on aprons, taxiways and runways
- minimising 'heads down' activities while the vehicle 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.** Then advise ATC and, if necessary, request progressive clearances or instructions.

While driving on an aerodrome

- Use extra caution when directed to enter or cross a runway, especially at night and during reduced visibility conditions.
- Use all resources available to keep your vehicle on its assigned route, including:
 - aerodrome charts and diagrams
 - aerodrome markings, signs and lights.
- Make sure you comply with hold short or crossing instructions when approaching an intersecting runway.
- Make sure you are familiar with radio fail procedures, including tower light signals. Carry a mobile phone with the tower contact details as a contingency.

Clear left, ahead, above and right

Scan the full length of the runway and the approaches for possible landing aircraft before entering or crossing any runway, **even if you have received a clearance.**

- Use utmost caution when operating on a runway where the exit taxiways intersect another runway, in particular when operating at aerodromes with parallel runway systems.

Did you know?

There have been significant runway incursions that have resulted from a driver responding to a clearance or instruction intended for another vehicle or aircraft. This is commonly the result of the driver expecting to hear his call-sign in the next communication from ATC but in fact the communication is directed to another party with a similar sounding call-sign. Remain alert to the call-signs of other vehicles and aircraft operating on or near to a runway and listen carefully for your call-sign in any communication from ATC. Contact ATC any time you have a concern about a potential confliction.

Communications

Effective driver/controller communications are vital 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 ensure clear and concise communication. Your **initial** transmission should contain these elements:
 - who you are calling
 - your call-sign
 - where you are located
 - a concise description of what you want to do.
- 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 using the microphone, know what you want to say and check to make sure you are on the appropriate 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 position specified in a clearance or instruction and any clearance or instruction to:
 - hold short of a runway
 - enter a runway
 - cross a runway
 - conditionally enter or cross a runway.
- Include the runway designator in all readbacks.
- If unfamiliar with the layout of an airport, ask for detailed instructions.
- Clarify any misunderstanding or confusion concerning ATC instructions or clearances.

Did I hear that right?

Question: You are driving on Runway 22 subject to an appropriate clearance and you hear **what you think** is a landing clearance for an aircraft approaching the same runway. What should you do?

Answer: Confirm with ATC that you are still cleared to operate on Runway 22.

Always ensure that you maintain a listening watch on the appropriate frequency when operating on a runway.



Glossary of 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.

HOLD SHORT – Hold at the appropriate holding position for the runway or the runway strip edge at the intersection of a crossing runway.

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 men with hand tools”).

WILCO – I understand your message, and will comply with it. Under no circumstances to be used in reply to a question or instruction requiring a readback.

Examples of ATC/driver communications

Requesting tow

EXAMPLE **Driver:** Sydney Ground, Tug Delta Whiskey, request tow Qantas 747 from Qantas maintenance to International Bay 71.

Controller: Tug Delta Whiskey, Sydney Ground, tow approved via Bravo One, hold short of Runway One Six Right.

Driver: Tow via Bravo One, holding short of Runway One Six Right, Tug Delta Whiskey.

Request to drive from one location to another on the aerodrome

EXAMPLE **Driver:** Adelaide Ground, Tug Lima Delta, main apron, request proceed to maintenance hangars.

Controller: Tug Lima Delta, Adelaide Ground, proceed via Kilo, Alpha and Foxtrot One to the maintenance hangars.

Driver: Via Kilo, Alpha and Foxtrot One, Tug Lima Delta.

Request to cross a runway

EXAMPLE **Driver:** Tender 5, on Echo, request cross Runway One Six.

Controller: Tender 5, on Echo, cross Runway One Six.

Driver: On Echo, crossing Runway One Six, Tender 5.

Request to enter runway for runway inspection

EXAMPLE **Driver:** Car 2, on Kilo request enter Runway One Six for inspection.

Controller: Car 2, on Kilo enter Runway One Six, report vacated.

Driver: On Kilo, entering Runway One Six, Car 2.

ATC instruction to vacate runway

EXAMPLE **Controller:** Car 3, vacate runway.

Driver: Vacate Runway, Car 3.

Driver: Car 3, runway vacated (when runway vacated).

ATC instruction to give way to other traffic

EXAMPLE **Controller:** Tug Papa Victor, give way to Virgin 737 crossing right to left.

Driver: Giving way to Virgin 737, Tug Papa Victor.

ATC instruction to hold short

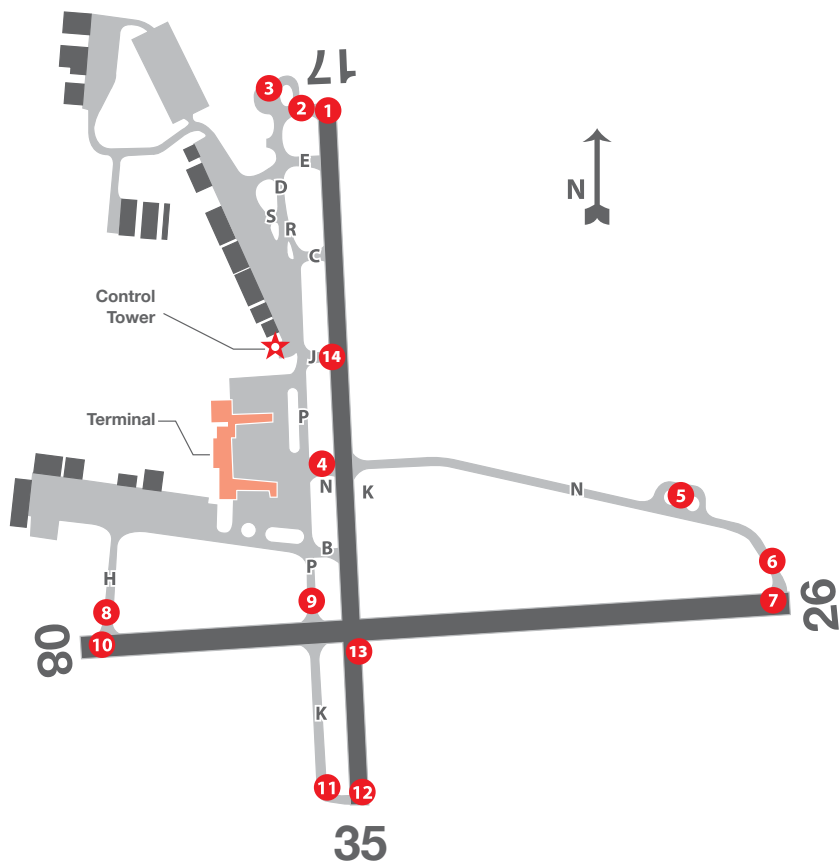
EXAMPLE **Controller:** Tug Delta Whiskey, hold short of Taxiway Juliet.

Driver: Holding short of Taxiway Juliet, Tug Delta Whiskey.



Check your understanding of ATC instructions

You are operating on the aerodrome detailed below, and inform the tower that you want to proceed to the positions specified in each of four scenarios. The controller's 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

“Smith Ground, Tug Tango Golf, at Main Terminal, request tow Citation to Runway Two Six run-up bays for engine runs.”

“Tug Tango Golf, Smith Ground, tow approved via November, hold short of Runway Three Five.”

Answer _____

Scenario B

“Smith Ground, Tug Juliet India, at Main Terminal, request enter Runway Zero Eight to retrieve disabled aircraft.”

“Tug Juliet India, Smith Ground, proceed via Hotel, hold short of Runway Zero Eight.”

Answer _____

Scenario C

“Car 2, on Kilo request enter Runway Three Five for runway inspection.”

“Car 2, on Kilo enter Runway Three Five, hold short of Runway Two Six.”

Answer _____

Scenario D

“Car 3, on Juliet request cross Runway Three Five.”

“Car 3, hold short Runway Three Five.”

Answer _____

Answers – A-4, B-8, C-13, D-14

Read back instructions to enter or hold short of a runway

If instructed to hold short of a runway, you must not cross the marked runway holding point or holding position. You must read back any clearance or instruction to hold short of, enter, cross or operate on a runway or within a runway strip. Do not merely acknowledge these clearances or instructions by saying ‘Roger’ or ‘Wilco’ or your call-sign.

Aerodrome markings, signs and lights

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

Aerodrome markings – understanding the differences

Review the colour and meaning of these items. In understanding aerodrome markings, remember the following principles.

Colour

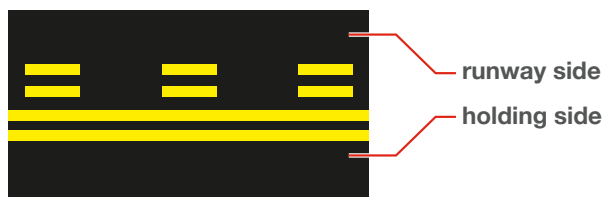
- Runway markings are white (although yellow taxiway centrelines may lead on, lead off, or cross the runway).
- Taxiway markings are yellow.
- Markings on aprons and in ramp areas may include other colours (for example, it is common to mark vehicle roadways in white).

A vehicle roadway on an apron area. The edges of a roadway are often identified by solid white stripes. An aircraft may taxi across roadways, but 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:
 - 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 prior to first solid line of the runway holding position marking.



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 four types of signs when driving on an aerodrome.
 1. **Location sign:** Identifies the taxiway you are currently located on. It has a yellow inscription on a black background.



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 and vehicles. It has a white inscription on a red background.



Remember: Red and white, runway in sight.

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 with that taxiway. They are located prior to the intersection, normally on the left side and normally with a location sign. It has a black inscription on a yellow background.



Remember: Yellow array points the way.

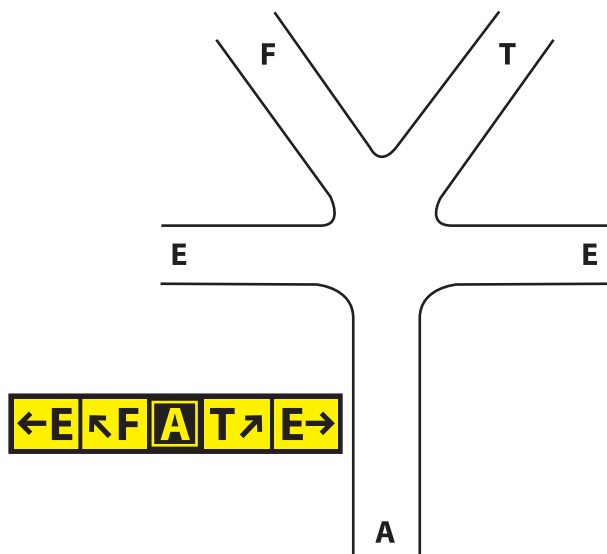
4. **Destination sign:** Identifies with arrows the directions to specific destinations on the aerodrome (for example, runways, terminals or airport services). It also has a black inscription on a yellow background.



Remember: Yellow array points the way

Examples of airfield sign usage:

- **Sign arrays:** Grouping of direction signs. Orientation of signs is from left to right in a clockwise manner. Left turn signs are on the left of the location sign and right turn signs are on the right of the location sign.



- **Holding position sign:** This sign is located next to the yellow runway holding position markings painted on taxiways that intersect a runway. The example below indicates that you are on Taxiway A at the Holding Point with Runway 15 on your left; the threshold for Runway 33 is to your right.



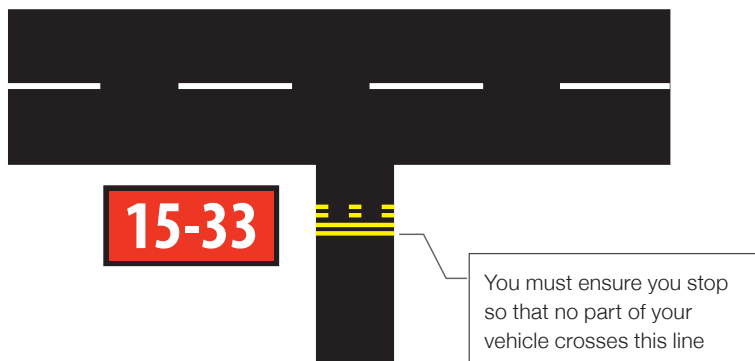
Did you know?

A number of runway incursions result from drivers acknowledging ATC hold short instructions and then proceeding across the runway holding position line anyway.

Runway holding position markings on taxiways identify the locations where an aircraft or vehicle is required to stop when it does not have a clearance to proceed onto a runway (you may also see a red and white runway holding position sign and possibly runway guard lights). When instructed by ATC to “Hold Short of Runway XX”, you must read back the instruction and stop so no part of the vehicle extends over the first solid line of the runway holding position marking. Keep your head up — distances of runway holding position markings from the centreline of a runway can vary even at the same aerodrome but they are never aligned with the edge of the sealed surface of the runway. When approaching the runway holding position marking, you must not cross the marking without ATC clearance. A vehicle exiting a runway has not vacated the runway unless all parts of the vehicle have crossed the applicable runway holding position 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.





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

Some runway incursion incidents result from drivers acknowledging ATC hold short instructions and then continuing to proceed across the runway holding position line. Stop bars have been introduced at several Australian airports and are considered to be a valuable defence against a vehicle inadvertently entering a runway without a clearance. No special equipment is necessary in a vehicle to enable stop bar usage. A stop bar provides a visual alert to the driver 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. When driving around an aerodrome you should remember the following:

- Runway edge lights are white (although on runways fitted with high intensity lighting, the runway edge lights within 600m 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.



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



TIP: Never drive across a row of illuminated red lights on a taxiway. This is a stop bar – do not proceed until the lights are turned off and ATC issues you with an instruction to cross. Stop bars are being progressively fitted at some major aerodromes.

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.

For more information on runway safety, visit
www.airservicesaustralia.com or email safety.promotions@airservicesaustralia.com

Designed and published by Airservices.
Correct at the time of printing. Check AIP and refer to ERSA for local procedures.



VH-CCL

VH-BXV

MAXIMUM WINGSPAN 12m

