An airside driver's guide to runway safety

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airservices australia

A changing space

The global aerospace industry is currently going through a significant time of change. We are welcoming new and different aerospace users and environments in response to the introduction of new aircraft, increasing populations, structural development and global response to climate change.

The combination of weather, time of day, aircraft and aerodrome type, communication skills and your unfamiliarity with your operating environment can all contribute to an increase in risk of error. Of particular concern to both air traffic control (ATC) and pilots is the risk of a runway incursion.

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.

In this guide, we focus on a few areas that are important in surface operations. Each section identifies safety measures you can take to help reduce errors that lead to runway incursions.

Digital first

As part of Airservices Australia's commitment to sustainability and flexible service delivery, this document is designed to view on an electronic device. In doing so, we hope to reduce waste of unused and outdated material and enable greater access to our communications. Please consider saving to your device rather than printing and emailing to a friend or colleague to increase safety awareness. Thank you.

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For enquiries or feedback about this publication, please email **safetypromotions@airservicesaustralia.com.**

The information contained in this document is current as of the date of publication. It is offered as supplemental guidance material to be used in conjunction with the AIP. However, the AIP is the primary source of information for charts and operational data. Always refer to the current AIP for the latest information.

Contents

Local runway safety teams

One of the main global initiatives to improve runway safety is the implementation of Local Runway Safety Teams (LRST) at towered locations. The LRST consists 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.

For more information about Local Runway Safety Teams, please email **safety.liaison@airservicesaustralia.com.**

01. 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.
- Review current aerodrome information for any taxiway or runway closures, construction activity or other surface risks.
- 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).
- Use service roads whenever possible to minimise time spent on taxiways or runways.

02. 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. 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.

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 it
+ 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 to yours
+ 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 stop bar or to enter or operate on a runway unless it specifically states that you are cleared to do so. (Note: you must never cross an illuminated stop-bar, even if ATC verbally clear you to enter a runway. You should ask ATC to confirm that the stop bar should be off'.)
+ where holding positions are not marked, 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.

Light signal meanings for vehicles when taxiing		
Signal		Meaning
■■■■■	Green flashes	Permission to cross landing area or to move into taxiway
■■■■■	Steady 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

Who is responsible 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 push-back approvals and provide taxi clearances, the main purpose of these is to regulate aircraft/vehicle movement at the aerodrome.

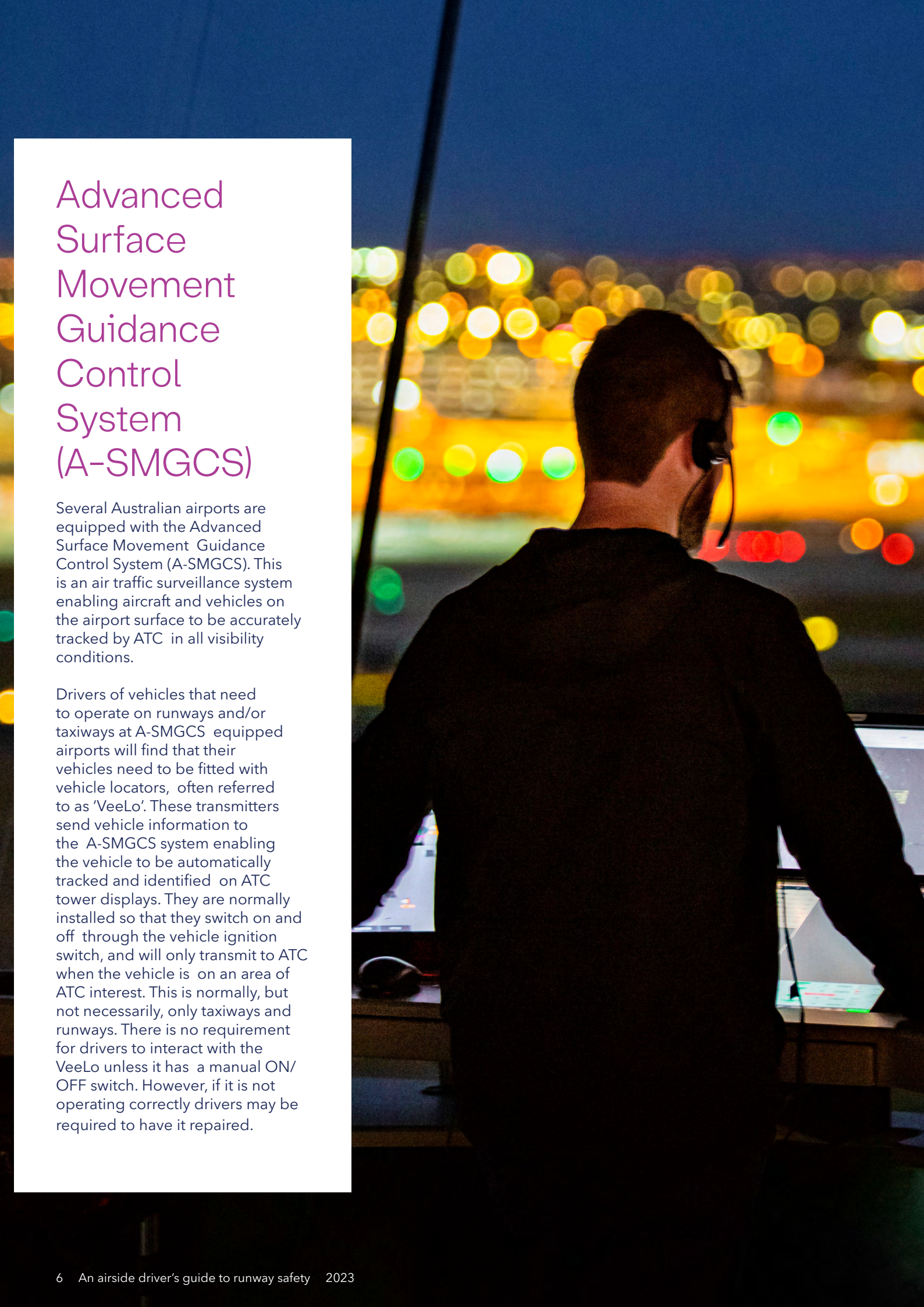
The avoidance of a collision on the apron area is a joint responsibility of the pilot in command, airside driver and any assisting ground personnel.

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.

Advanced Surface Movement Guidance Control System (A-SMGCS)

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 find that their vehicles need to be 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 required to have it repaired.



Situational awareness

When operating on the aerodrome, you need to be aware of your location, 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:

Maintain situation awareness by:

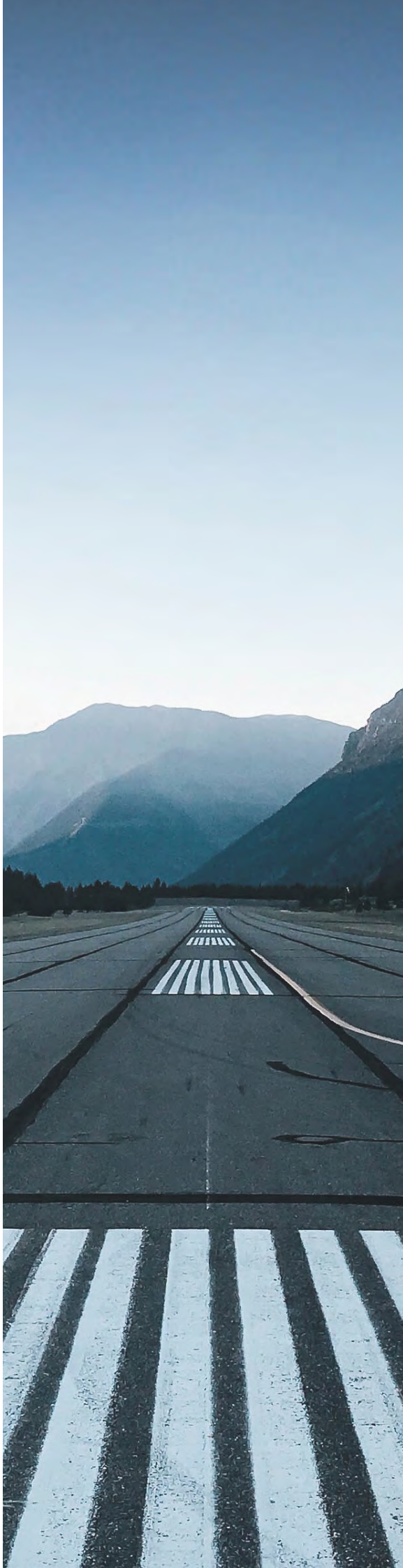
- ensuring you understand and follow ATC instructions and clearances
- using current aerodrome charts/diagrams
- knowing the meaning of the visual aids available on the aerodrome, such as markings, signs and lights
- monitoring the radio and using the aerodrome chart to assist you in locating other aircraft and vehicles that may be on the aerodrome
- 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 or on a mobile phone
- using vehicle lights to convey location—ensure rotating beacon is on when driving on aprons, taxiways and runways
- avoiding distractions
- minimising 'heads down' activities while the vehicle is moving.

If you become uncertain about your location on the aerodrome manoeuvring area, make sure you are clear of any runway and stop. Advise ATC and, if necessary, request progressive clearances or 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 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 back up.

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.

Runway incursions

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 their 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.

Remember, you must never cross an illuminated stop-bar, even if ATC verbally clear you to enter a runway. You should ask ATC to confirm that the stop bar should be off.

ATC will advise the nature of the obstruction if it is not apparent.

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, as outlined in AIP GEN, 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 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.

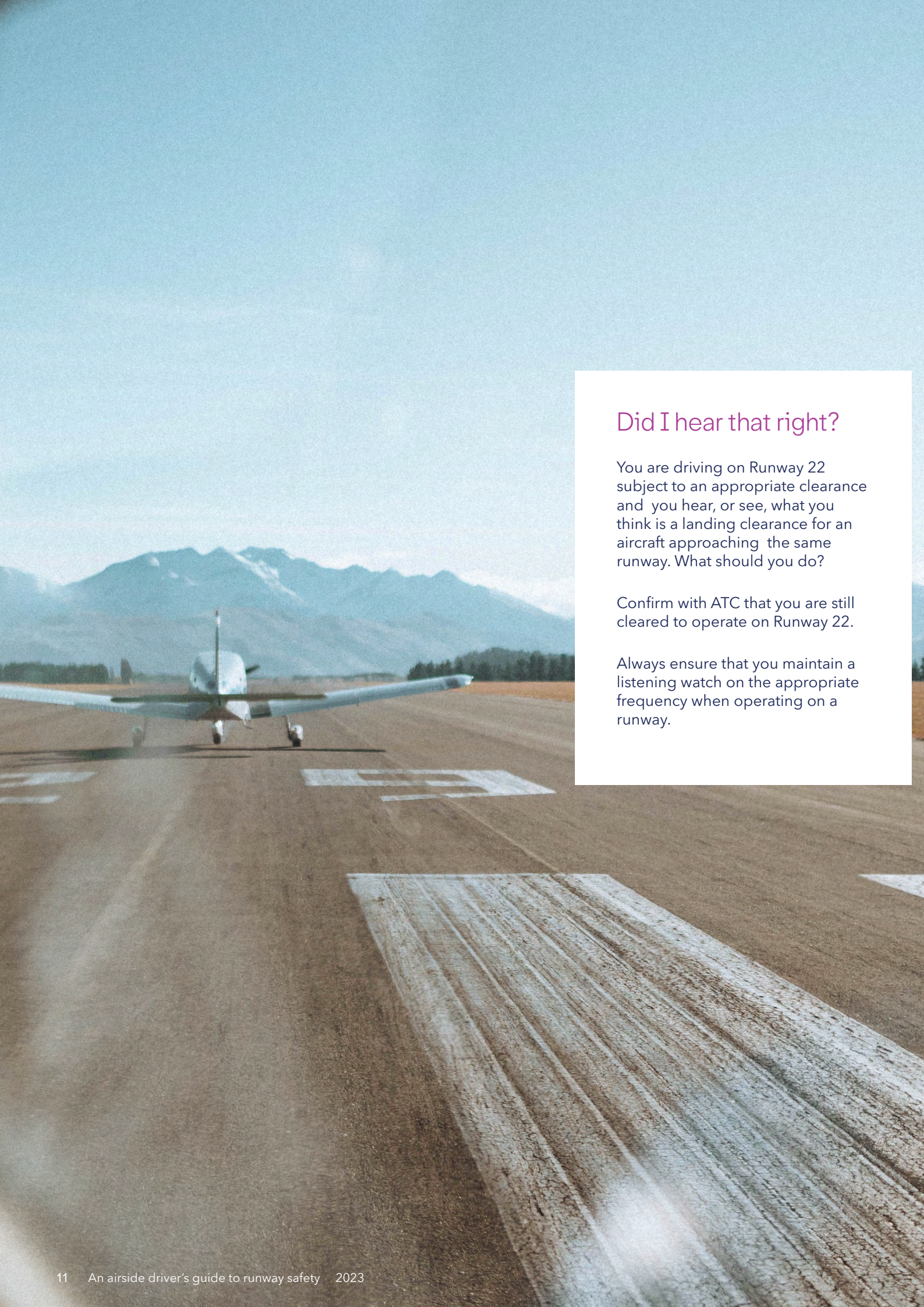
+ Acknowledge all clearances: read back required elements of the clearance and end your transmission with your call-sign.

+ Read back any holding 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
  - 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?

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

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.

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 and understood my message.

AFFIRM – yes.

APPROVED – permission for proposed action granted.

BREAK – This indicates separation between parts of the message when there is no clear distinction between the text and other parts of the message.

CANCEL – call off 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 communication 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 or how easy is it to understand?

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.

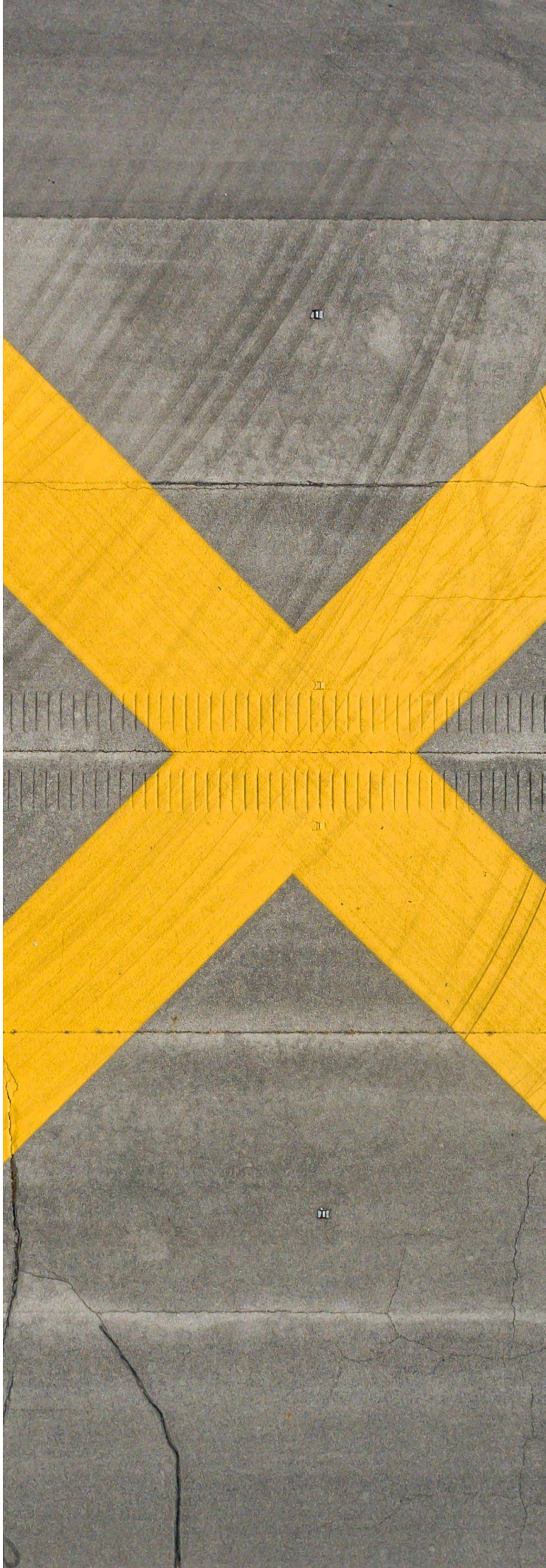
SPEAK SLOWER – reduce your rate of speech.

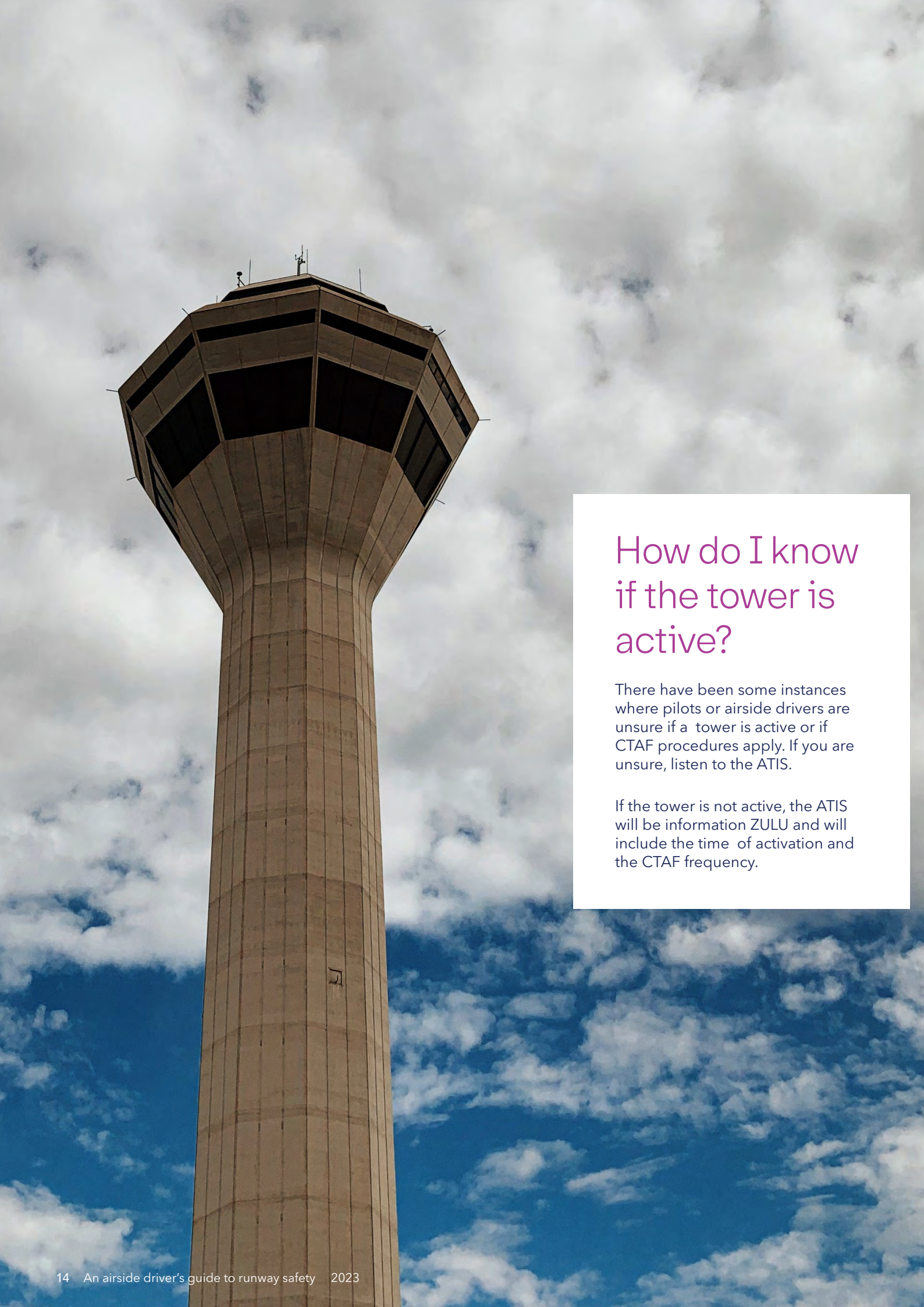
STAND BY – wait and I will call you. This means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. The caller should re-establish contact if a delay is lengthy. 'Stand by' is not an approval or denial.

UNABLE – I cannot comply with your request, instruction or clearance, usually followed by a reason.

VERIFY – request a check and confirmation of the information identified.

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.





How do I know if the tower is active?

There have been some instances 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.

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, proceed 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.

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).

Note: the required terminology is 'runway vacated' not 'clear of runway'.

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.

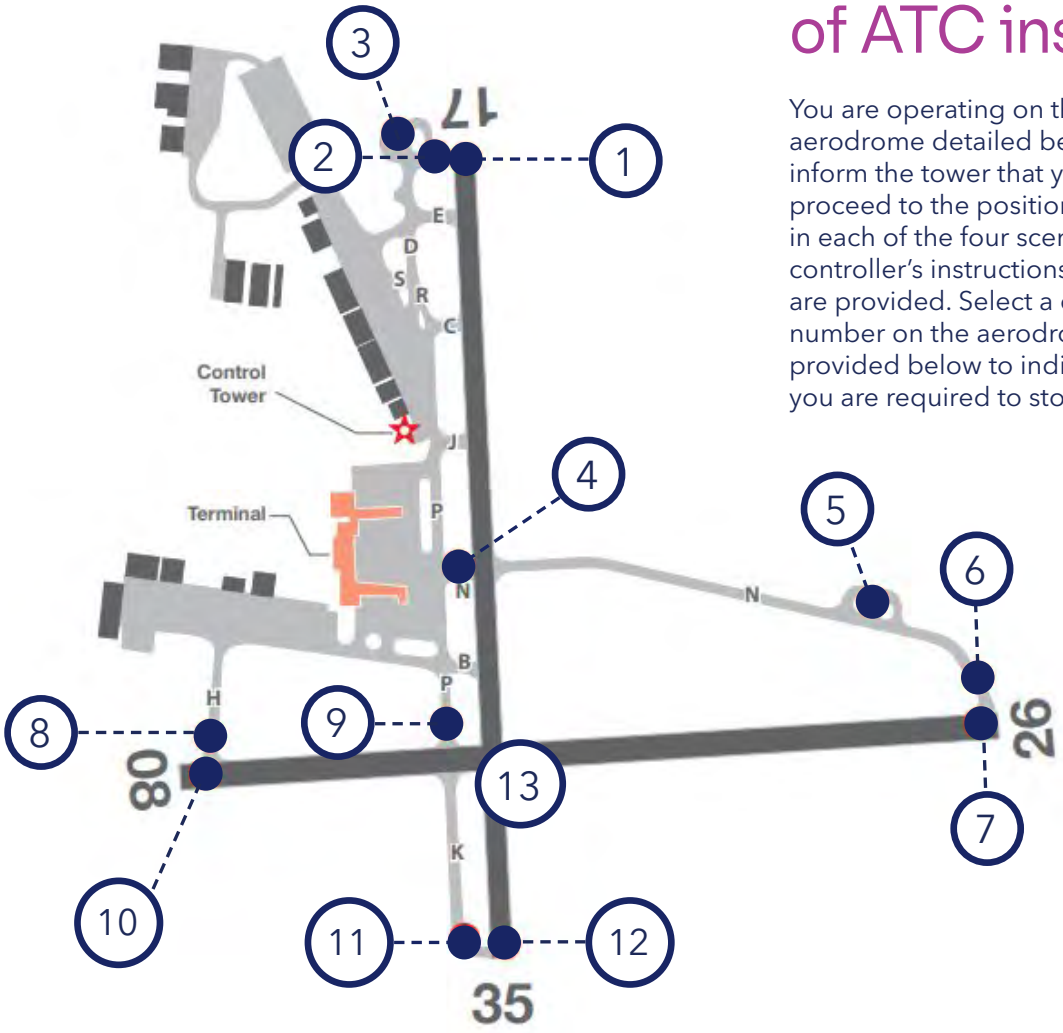
Driver: Holding short of Taxiway Juliet, Tug Delta Whiskey.

Readback 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.

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 the 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

'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

'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

4. 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

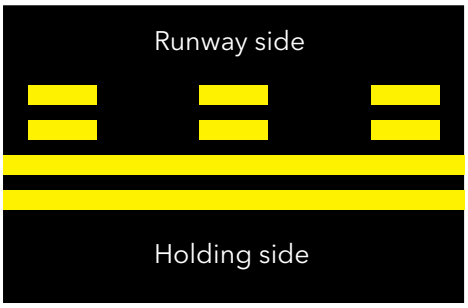
- Runway markings are white (although yellow taxiway centrelines may lead on, lead off, or cross the runway).
- Taxiway markings are yellow.
- Markings on aprons and in ramp areas may include other colours (e.g. it is common to mark vehicle roadways in white).

A vehicle roadway on an apron area. The edges of 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—these are runway holding position markings.

- It is always permissible to cross from the dashed side to the solid side, providing you have checked there is no conflicting traffic.
- 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.

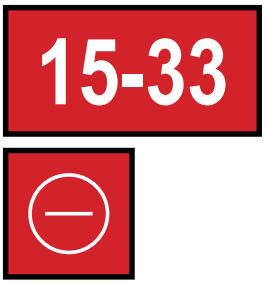


Aerodrome signs – how to get from here to there safely

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 types of signs when driving on an aerodrome.

1. Taxiway location sign: identifies the taxiway you are currently located on e.g. you are on taxiway A. It has a yellow inscription on a black background. Remember: *black square, you are there!*



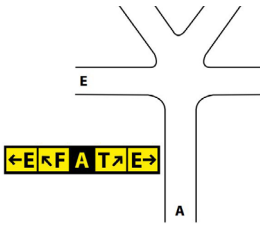
2. Mandatory instruction sign: identifies the entrance to a runway or critical area, and areas prohibited for use by aircraft. It has a white inscription on a red background. It is generally co-located with the runway holding position markings. Remember: *red and white, runway in sight.*

   You must obtain a clearance from ATC prior to proceeding past this point.

3. Direction sign: identifies the 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.

   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. Check AIP AD 1.1 - 20 for abbreviations used.



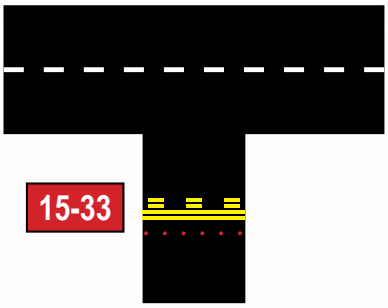
5. Sign arrays: grouping of direction signs. Signs are orientated clockwise from left to right.

6. Left turn signs are on the left of the location sign and right turn signs are on the right of the location sign.

7. Holding position sign: this sign is located next to the yellow taxi-holding point markings painted on taxiways that intersect a runway. The sign to the left 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. As this is a mandatory instruction sign you must get a specific clearance from ATC to cross this holding point.

8. 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.

9. Runway stop bars: have been introduced at several Australian airports and are considered to be a valuable defense against an aircraft or vehicle 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.

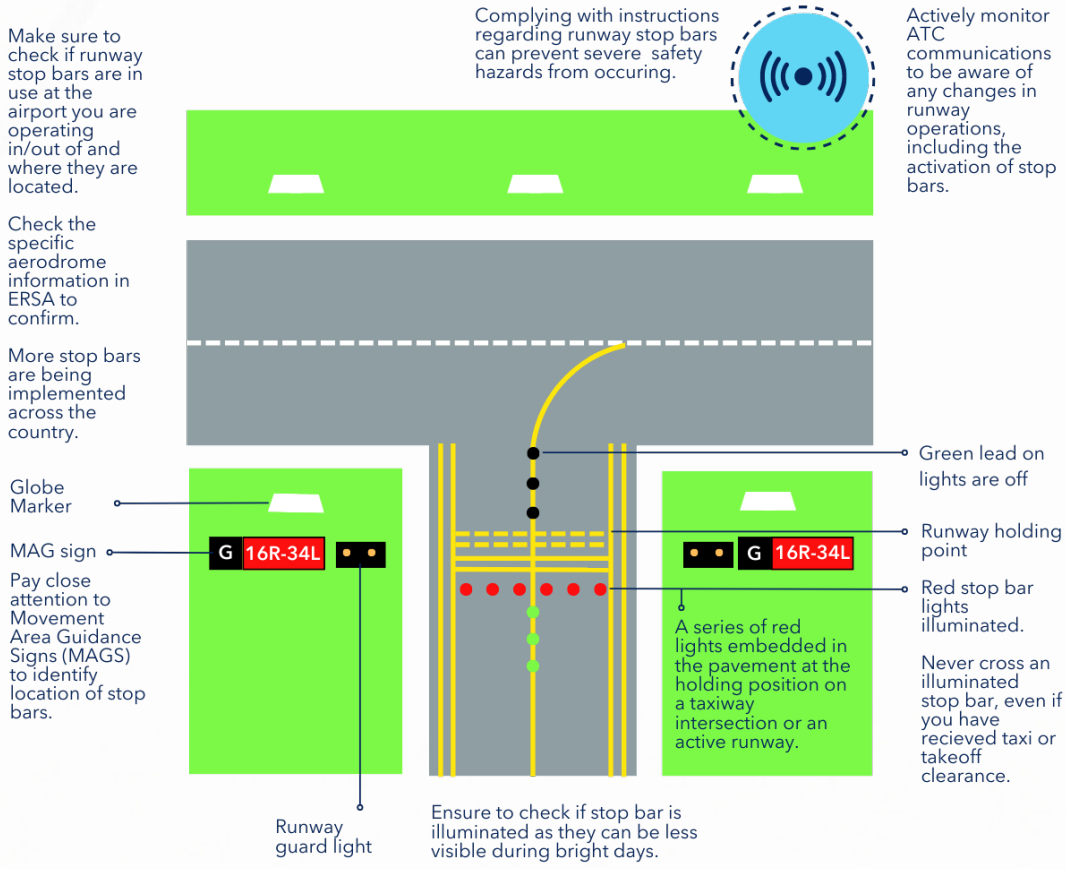


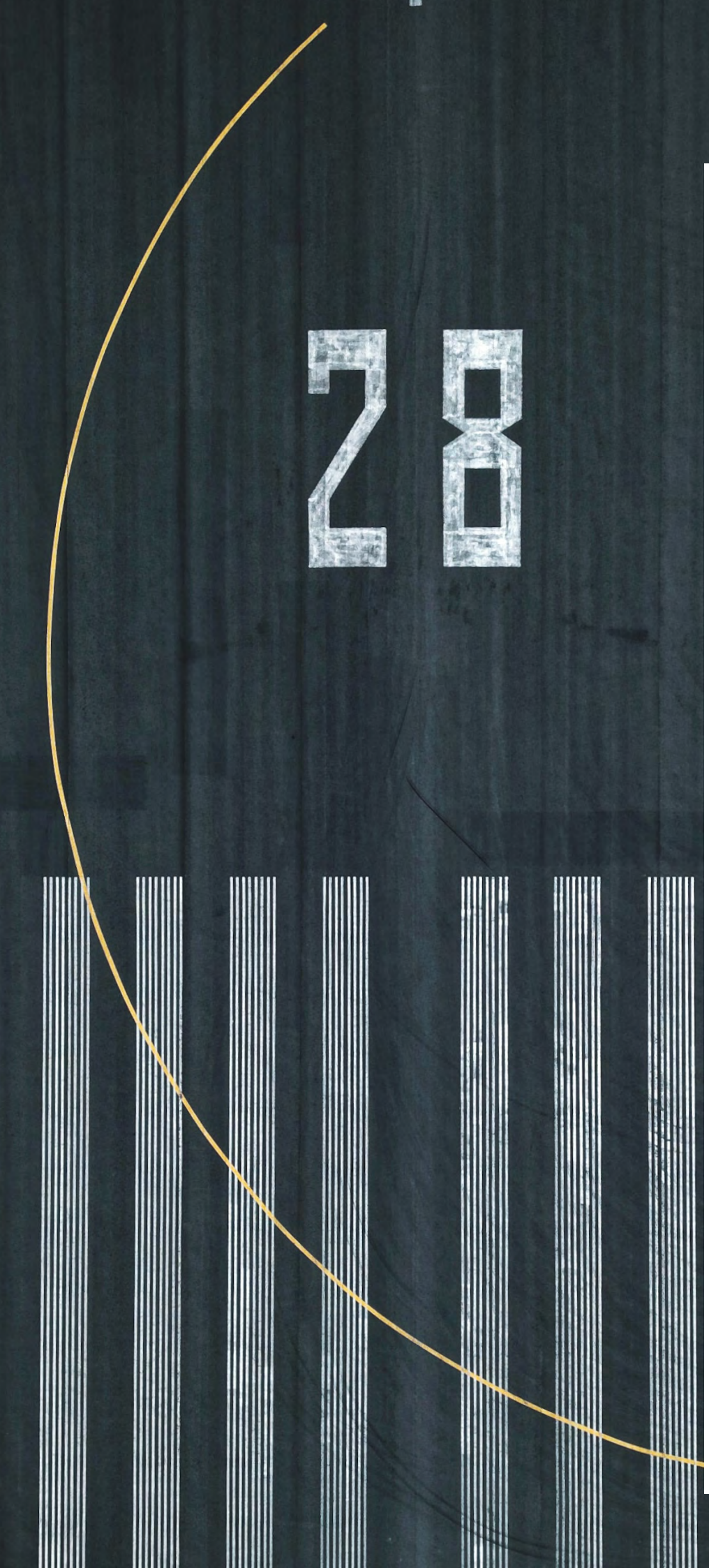
Stop bar lights are red and unidirectional, shown in direction of approach to stop bar.

Crossing the stop bar is only permissible after ATC switches off the stop bar light and instructs you to cross.

Phraseology for stop bar contingency can be found in the phraseologies section of AIP GEN.

Remember, never cross a lit stop bar, even if ATC has cleared you to do so (as shown above).





Runway incursions

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, runway guard lights and possibly a stop bar).

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 any point of the runway holding point marking, dashed or solid.

Ensure to stop in a position where you can see the stop bar lights where installed.

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.

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.

ILS or GBAS interference

At aerodromes with an Instrument Landing System (ILS) or Ground Based Augmentation System (GBAS), it is important that drivers and pilots are aware of the effect that their aircraft/vehicle can have if it enters the critical area established around the equipment.

Aircraft or vehicles inside the critical area can distort the signal, which could have significant operational or safety consequences on an aircraft relying on those signals to land. It is important that you remain outside of the critical areas unless you are cleared to enter by ATC.

If you are operating on a taxiway and the equipment is in use, ATC will direct you, through your taxi clearances and use of aerodrome signs and markings, to keep you clear of the area. If you are operating outside of the taxiway system (for example, operating on aerodrome grassed areas), the critical area will be marked by signage or frangible posts with markings on them. It is important that you remain outside of these areas unless you are approved to operate within them by ATC.

Aerodrome lighting

There are many different lighting combinations that may exist on 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. Picture also shows runway centreline and touchdown zone. In the case of a displaced threshold, runway lights will show red in the approach direction.

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 point.

High intensity approach lighting (HIAL) is red and white. They are designed for when aircraft are transitioning from instrument to visual flight on a precision instrument approach.

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.

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.

More resources

Airservices provides information for aerospace users on current and emerging safety risks in Australian aerospace and how to avoid them.

For more information or to provide us with feedback about this resource, please visit

www.bit.ly/pilotsafety.

If you have any questions about this publication, please email

safetypromotions@airservicesaustralia.com.

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