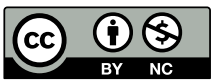
Australian Government
Civil Aviation Safety Authority



Stay OnTrack:

FLYING THE DARWIN REGION

Procedures
Ground operations
Hotspots
Radio frequencies
Tracking points



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This guide is an aid for VFR pilots to use when flying into, out of and around the Darwin region.
It is designed to help you in planning and conducting your flight.

The guide was developed with the assistance of operators in the Darwin region.

For comments and suggestions on improving this guide, contact CASA Safety Promotion at
safety.promotion@casa.gov.au

NOTICE: The information contained in this booklet was correct at the time of publishing and is subject to change without notice. The Civil Aviation Safety Authority of Australia makes no representation as to its accuracy. The booklet has been prepared by CASA Safety Promotion for information purposes only.

Plan your route thoroughly and carry current charts and documents.
Always check ERSA, NOTAMs and the weather before you fly.

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Contents

Darwin procedures overview

Darwin is the main hub of the Northern Territory and hosts a wide variety of civil and military aviation users, including medical transport, regional air transport, parachuting, scenic tours and military fast jets. Darwin ATC provides a Class C service to all traffic operating within their airspace and is surrounded by Class G airspace below the CTA steps. Before flying to or around Darwin, make sure you are familiar with the controlled airspace boundaries and altitudes, as shown on the VTC/VNC. If unfamiliar, advise ATC on first contact or phone the TWR on 08 7929 4816.

ERSA-FPR details routes to simplify the tracking of arriving and departing VFR aircraft. All VFR aircraft are to flight plan via one of the 5 published VFR routes, with the exception of aircraft operating to or from the Tiwi Islands. Familiarity with Darwin's ERSA entry will assist your operations. If ATC issues an instruction or tracking point you are unfamiliar with or you can not comply with due to operational conditions such as weather, immediately tell them and an alternate solution will be found.

Lee Point parachute operations

Parachuting operations may occur in the vicinity of Lee Point. For aircraft arriving via a visual approach for Runway 36 during parachute drop area activation – in the event of a go around, ATC will issue tracking instructions or a requirement to hold south of Casuarina Square Shopping Centre. Check ERSA for further details.

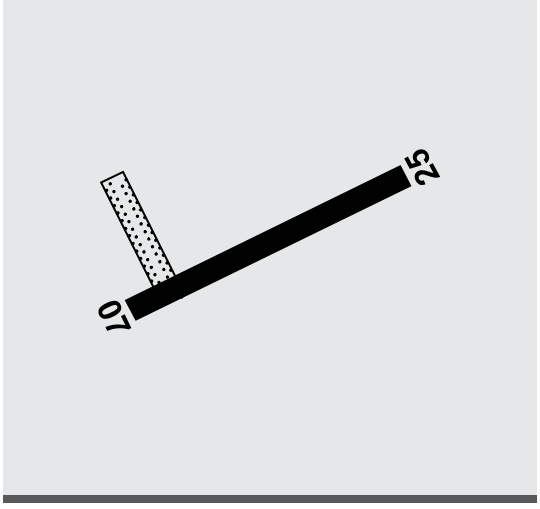
Emkaytee procedures overview

Emkaytee aerodrome (known as MKT) is a privately owned, uncertified airfield in Class G airspace, approximately 16 nm south-east of Darwin.

Pilots need to be aware that Class C airspace with a lower limit of 2,500 ft overlays the aerodrome, with a 1,000 ft step approximately 5 nm to the north-east.

Training aircraft, along with ultralight, commercial fixed-wing, rotary wing, aerobatic and military aircraft, use this aerodrome.

It is the pilot-in-command's responsibility to check permission requirements for use, charts, ERSA and NOTAMS for flights in this area.

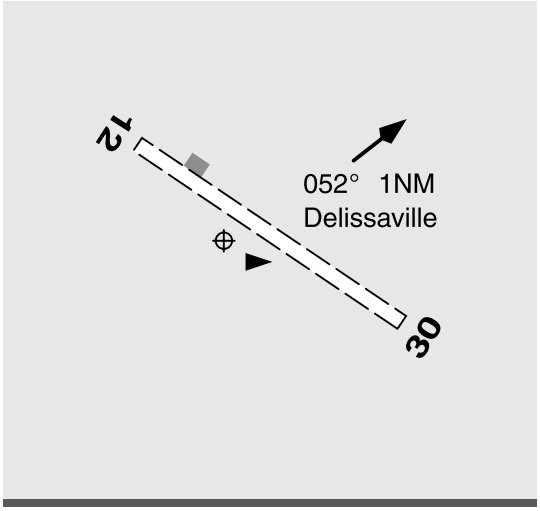


Delissaville procedures overview

Delissaville aerodrome is an uncertified airfield in Class G airspace, approximately 13 nm south-west of Darwin.

Pilots need to be aware that Class C airspace with a lower limit of 2,500 ft overlays the aerodrome, with a 1,000 ft step less than 5 nm to the north and east, and is in close proximity to the Darwin CTR. Delissaville is a busy training aerodrome for Darwin-based aircraft.

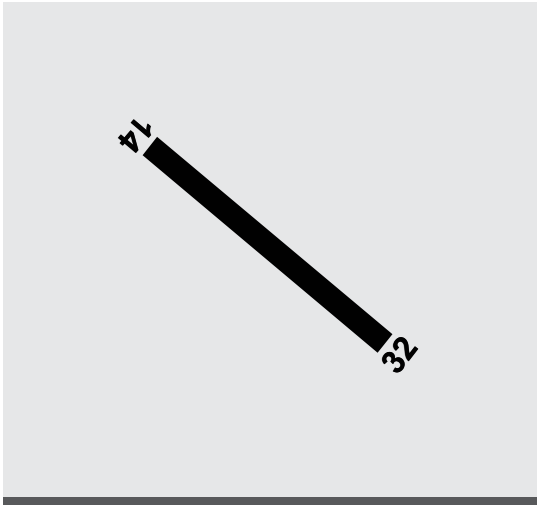
It is the pilot-in-command's responsibility to check permission requirements for use, charts, ERSA and NOTAMS for flights in this area.



Batchelor procedures overview

Batchelor Airfield, (YBCR) is an uncertified airfield located approximately 40 nm south of Darwin. It is utilised for aerial application and fire operations, gliding and as a flight training base. Parachute operations mainly take place on the weekends, with some operations during the week, up to 14,000 ft AMSL. A variety of aircraft operate to the airfield including, recreational, rotary, small air transport and military aircraft.

It is the pilot-in-command's responsibility to check permission requirements for use, charts, ERSA and NOTAMS for flights in this area.



General military information

Conditional RA (restricted area) status

The status of restricted areas (RAs) appears in the DAH and ERSA and is presented in a table on the VTC/VNC. This status indicates which types of restricted airspace it is possible to get a clearance through. NOTAMS are issued to list activation times and levels for military restricted airspace and **must always** be consulted before flights through these areas to avoid airspace infringements.

RA conditional status legend

RA1: Pilots may flight plan through the RA and, under normal circumstances, expect a clearance from ATC.

RA2: Pilots must not flight plan through the RA unless on a route specified in ERSA GEN FPR, or by agreement with the Department of Defence. However, a clearance from ATC is not assured. Other tracking may be offered through the RA on a tactical basis.

RA3: Pilots must not flight plan through the RA and clearances will not be available.

Various military operations at and around Darwin can affect civil aviation, including major exercises such as Pitch Black and Diamond Storm. This can cause taxi delays, alternate tracking or airborne holding to ensure the safe and expeditious operations of all airspace users. When possible, this is communicated well in advance through AIP supplements, NOTAMs and ATC. If you are uncertain about how the exercises may affect your operations, please contact ATC.

During periods of high activity such as major exercises, there are often changes in the priority given to military aircraft to ensure safety is maintained and operational objectives are met. Prior briefing about such exercises can allow you to avoid operating during these periods. At all times you can expect ATC to process you in accordance with the priorities detailed in AIP or any current AIP Supplements.

Mount Bundey

The Mount Bundey training area is 60 nm south-east of Darwin, south of the Arnhem Highway, between the Mary River and Kakadu National Park. Restricted Airspace (R224A and R244B) are activated regularly for military flying and firing activities. Check NOTAMs for activation periods and levels.

R230 and R264

R230 and R264 are commonly activated for both flying and non-flying activities. It is important to thoroughly read the NOTAMs as there are often partial activations of these sections of airspace which may not line up with the maps shown on VTC/VNC or EFBs. Inside CTA, ATC is required to provide a buffer with the edge of the airspace, which may affect operations during the wet season when weather deviations are required.

Robertson Barracks

Robertson Barracks (YRBK) is approximately 5 nm East of YPDN, located just below the CTA 1,500 ft step.

Helicopters will operate to YRBK at all times of day and night conducting training sorties in the greater Darwin area.

Caution must be taken when transiting OCTA between Hope Inlet and Emkaytee due to the proximity of YRBK and this common tracking route. Pilots should note the discrete CTAF frequency of 126.6 for YRBK when transiting this area.

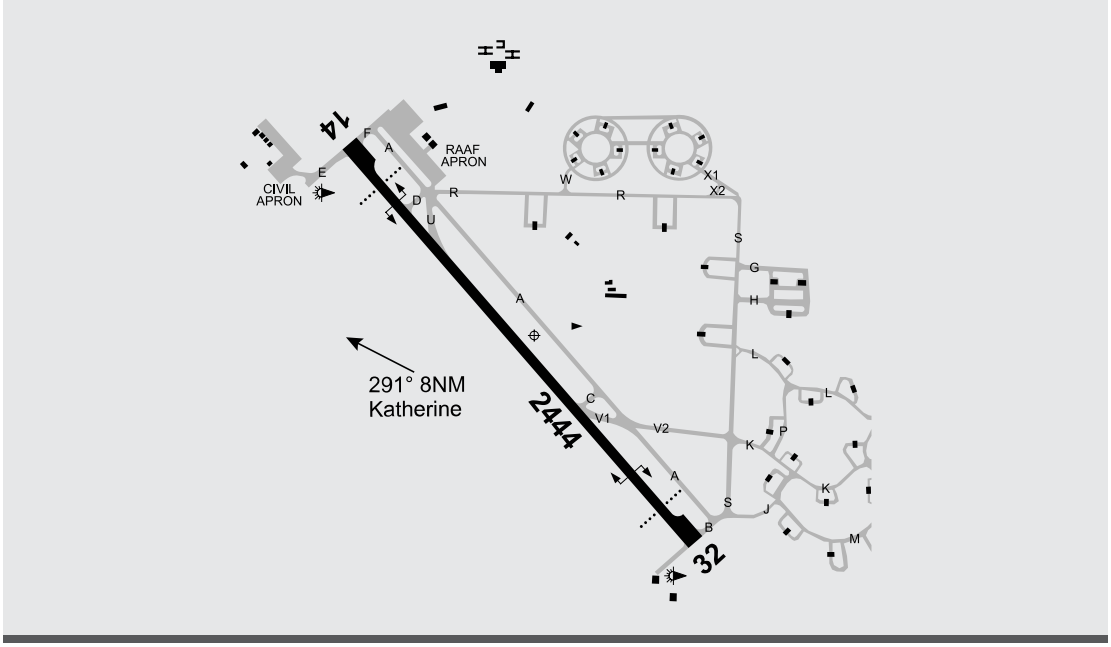
At times foreign military aircraft such as the MV22 Osprey will also operate to YBRK. Pilots need to be aware of wake turbulence effects from these larger aircraft.

Tindal military airspace information

RAAF Base Tindal is situated approximately 150 nm south-west of Darwin. It is an operational fast jet base and accommodates international partners during large exercises. Tindal is a military controlled aerodrome with large areas of prohibited and restricted airspace to the east and west. Restricted airspace activation times are published by NOTAM and can be active anytime.

During large military exercises such as Pitch Black, temporary restricted airspace may also be activated by NOTAM and will be detailed in the relevant AIP SUP. The control zone is also subject to a NOTAM; however, it can be activated/deactivated at short notice.

The following restricted and danger areas need to be considered when flying south of Darwin as they can extend laterally to 150 nm and vertically to FL600: R225ABCDEF, R250, Bradshaw (R268, 269, 270), Delamere (R232, R211, R212) and R241, R244, R245, R247, R248, R251, R252AB, R253, D223, D229. Outside ATC hours, CTAF procedures are on 119.7. Further Tindal procedures can be found in ERSA.



Airspace infringement: Hotspots – north

1. Airspace infringement hotspot

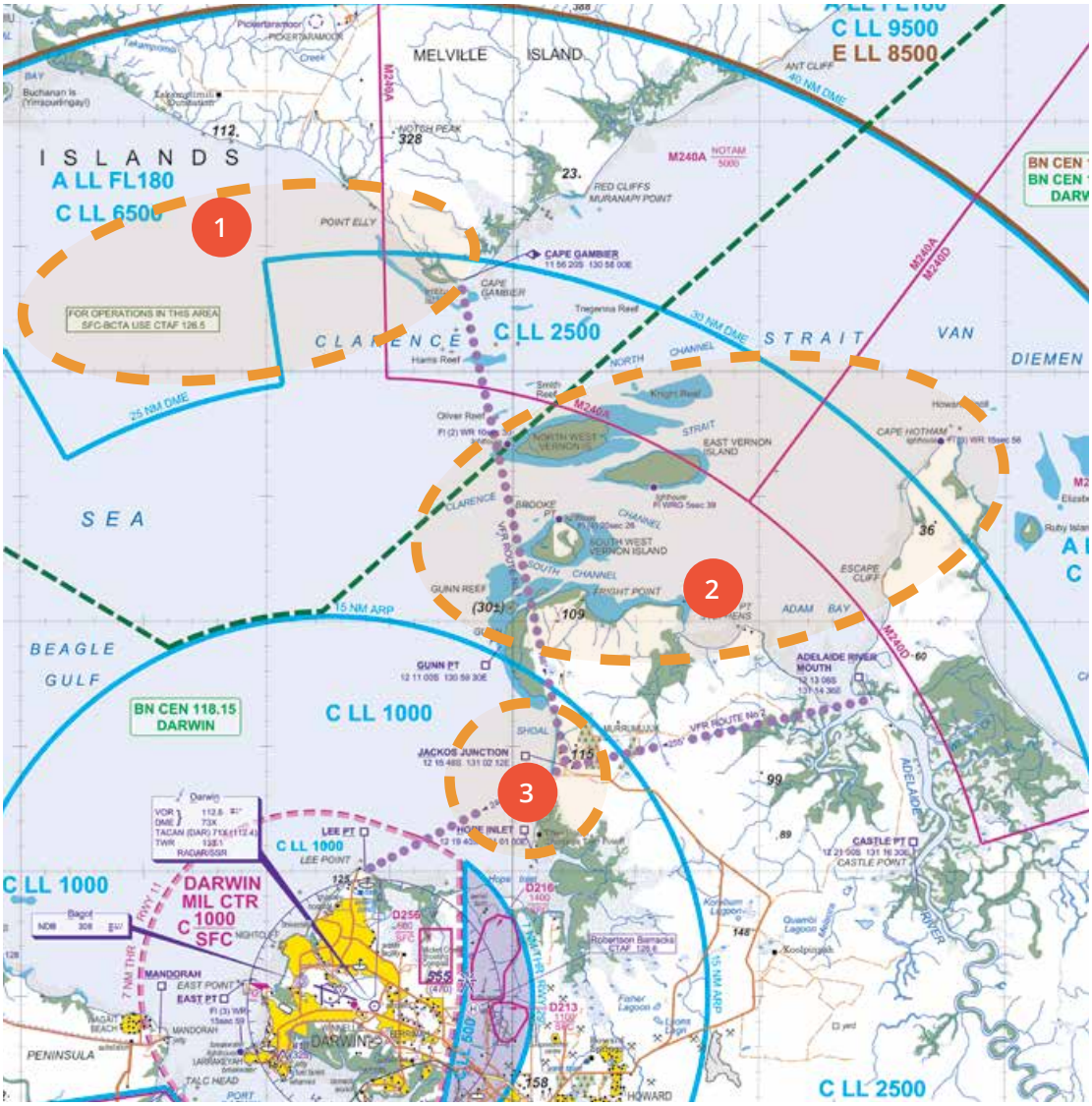
Approaching from the Tiwi Islands, YBTI airfield is only 17 nm from the CTA boundary for aircraft above A025. Anticipate frequency congestion and obtain clearance from Darwin Approach before entering CTA.

2. Airspace infringement hotspot

Cape Hotham is often confused with Gunn Point when pilots arrive from the north-east.

3. Airspace infringement hotspot

Jackos Junction is the published VFR approach point for traffic using VFR routes 1 and 2 and separates arrivals and departures north of the airport. ATC may track aircraft via Hope Inlet. Do not confuse this area with the mouth of the Adelaide River, further to the east.



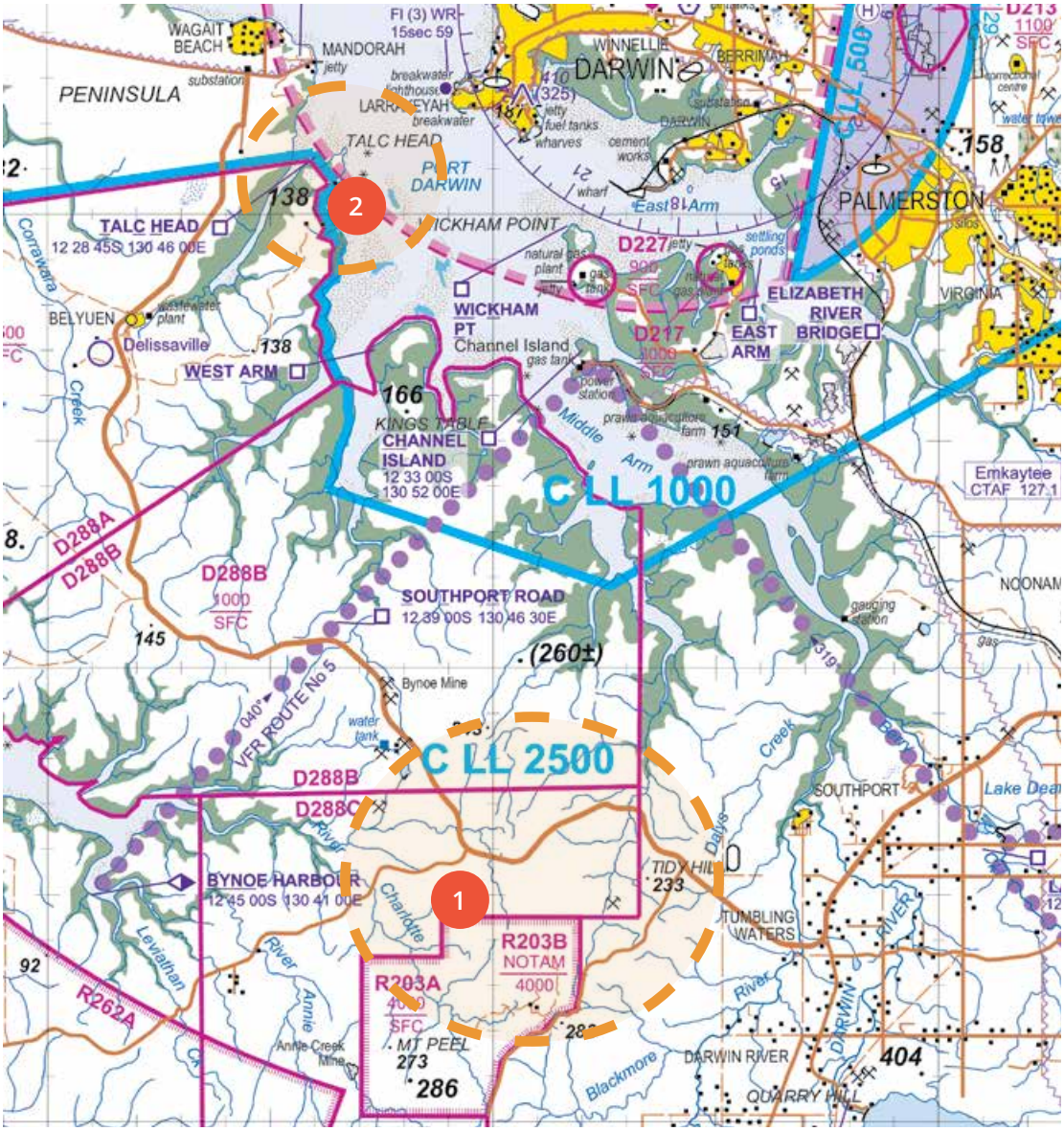
Airspace infringement: Hotspots – south

1. Airspace infringement hotspot

Restricted Areas 203A and B to the south are not bound by any clearly defined features and can be difficult to identify.

2. Airspace infringement hotspot

Entering CTA transiting between Darwin and D288A due to aircraft climbing prior to the port coastline above 1000 ft.



Darwin ground operations

After landing, vacate the runway onto the most suitable taxiway without delay. If you are unsure whether to vacate south or north off RWY 29, or onto taxiway Alpha for RWY 36, seek clarification from Darwin Tower 133.10. Once vacated and clear of the runway, contact Darwin Ground 121.80 for onwards taxi clearance.

Remember that you need clearance to cross any runway on your taxi path. Do not stop on your landing runway to request clearance to cross the other runway. Unless instructed otherwise, you are permitted to roll through without clearance.

When landing RWY11, non-local aircraft commonly confuse RWY36 with either TWY C or TWY V and vacate there without the required approval from TWR.

Aircraft may taxi between the western, northern and southern GA aprons without notifying ATC as long as they remain clear of TWY V and Y. If aircraft require use of the run-up bays on TWY V or Y, or are taxiing for departure, they must contact ATC for taxi clearance.

If unfamiliar with the aerodrome, notify ATC on first contact so they can provide taxi guidance. Standard taxi route out of the GA is via TWY V, so aircraft parked in the western GA should taxi past the northern and southern aprons to get onto Victor. Standard inbound route to the GA is via TWY Y.

Land and hold short operations

Some pilots might not have come across the term LAHSO, for land and hold short operations. It is a procedure where dependent operations are conducted on 2 intersecting runways – aircraft land and depart on one runway while aircraft landing on the other runway hold short of the intersection.

On first contact with Darwin, ATC may ask you whether you are LAHSO approved. You may be active, passive or negative LAHSO approved.

Active LAHSO: You hold a current LAHSO endorsement. You can safely carry out a landing with a hold short requirement, while a crossing runway is simultaneously being used by another aircraft. (The LAHSO approval/endorsement involves a pilot, under supervision, completing a series of landings where they hold short of the other runway. Successful completion of this endorsement is stamped into the pilot's logbook.)

Passive LAHSO (negative active LAHSO): You can safely accept and carry out a landing where you will have the full runway length available on your runway, while another aircraft holds short on the crossing runway. This is the default position of all Australian registered aircraft. You can safely carry out a landing where you will have the full runway length available, while another aircraft holds short on the crossing runway.

Negative LAHSO: You are unable to partake in any LAHSO. ATC cannot sequence you with another aircraft holding short on the crossing runway. Familiarity with this terminology is the key. ATC will ask you to confirm you are negative LAHSO, when in fact you might be passive LAHSO.

Most pilots use passive LAHSO routinely, for example, at a CTAFs where you hold short while another aircraft takes off. So, although a dedicated endorsement is required for you to be active LAHSO approved, this is not the case for passive LAHSO.

To determine if LAHSO are in place, listen to the ATIS which will include, for example: 'Darwin terminal information Bravo, Runways 29 and 36, land and hold short operations in progress, (wind, temperature, etc.)'.

In this case, ATC can give a pilot a take-off clearance on RWY 29 while another pilot with a LAHSO approval is given a landing clearance on RWY 36, with the proviso they hold short of RWY 29. Because of the crossing runways at Darwin, LAHSO gives ATC considerably more flexibility in being able to use both runways at once, thus greatly improving traffic flow. The benefit to pilots is that it gets them on the ground more quickly, with no delays while waiting for another aircraft's movement. Flashing LAHSO lights at the hold-short point of both runways will be illuminated.

Passive LAHSO runway – The runway used during LAHSO for arriving and departing aircraft that have the full length available.

LAHSO runway lighting at Darwin Airport

Darwin helicopter operations

For departing helicopters, contact Darwin Ground with your tracking request. Prior to taxi, they will issue you with an airways clearance as per your requested tracking at or below 1,000 ft. There is no requirement to contact Clearance Delivery unless you are operating IFR or above 1,000 ft.

Helicopters departing from remote Helicopter Landing Site (HLS) within the CTR need to remain on the ground until specifically instructed by ATC to 'report airborne'. Some remote HLS may struggle with radio communications due to ground shielding of the transmissions. If this is the case, telephone ATC to discuss.

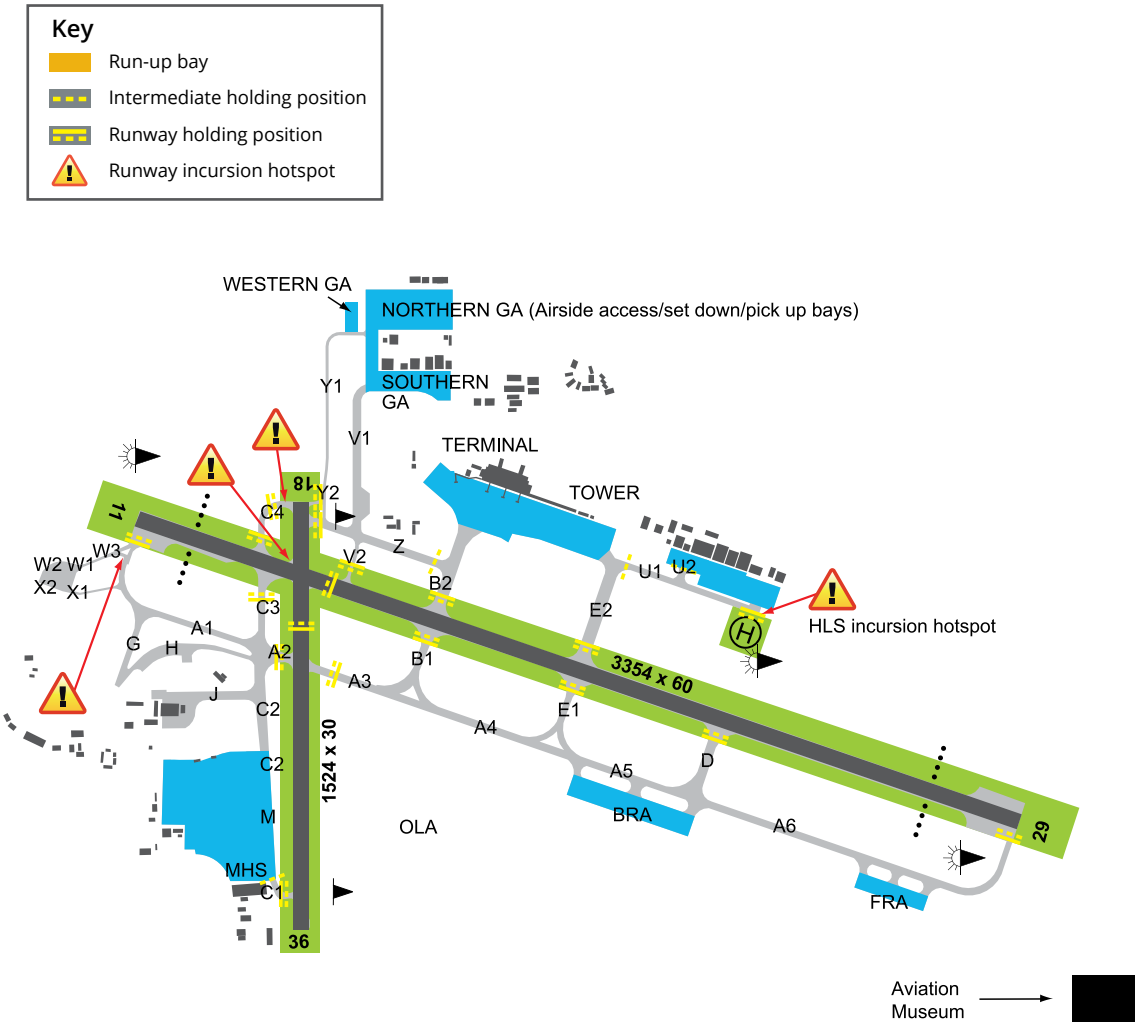
For helicopters arriving not above 1,000 ft and VFR, contact Darwin Tower prior to 10 nm YPDN for an airways clearance. You can expect clearance to track to either a helicopter landing site or via alternative tracking to one of a number of prominent topographical features, commonly used for the processing of low-level helicopters within the Darwin circuit area.

It is critically important to remain outside of the CTA/CTR until issued a clearance inbound. There may be delays due to IFR traffic.

Helicopters intending to operate within the CIRA not above 1,000 ft AMSL are to contact SMC if on the ground or TWR if airborne, for a clearance. This reduces delays – you can expect a clearance and tracking based on common points within or near the CIRA. If operating near the aerodrome, ensure you do not cross the runway without an explicit clearance or tracking instruction to a point on the other side.

The only helipad at the aerodrome is the eastern helipad – it is a designated manoeuvring area and cannot be entered without a clearance to line up or take off.

Helicopters arriving to and departing from the Aviation Heritage Museum are required to remain south of the extended centreline of Taxiway A at all times unless issued a clearance to/from a point north of Taxiway A or otherwise instructed by ATC.



Operations on the aerodrome

Apron area – no taxi clearance required. Monitor Ground on 121.8 MHz.

Taxiway – taxi clearance from Ground required before entering this area.

Runway – specific clearance required from ATC before entering this area.

Definitions

Apron area

A defined area intended to accommodate aircraft for purposes of loading or unloading passengers, mail, cargo, fueling, parking or maintenance.

Taxiway

A defined path established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another.

Runway

A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

Ground operations

Key areas when planning to navigate around an aerodrome are:

- study the layout, paying particular attention to complex intersections and RWY incursion hotspots in ERSA
- anticipate your taxi route to and from the RWY in use based on information from the ATIS, NOTAMs, ERSA, recent experience and the aerodrome chart
- have the aerodrome chart or diagram readily available to use during the planning phase and while taxiing
- check the route on which you are taxiing against the chart or ERSA and again, pay special attention to complex intersections
- continually scan for conflicting traffic and holding point markings
- confirm your assigned route if you are in doubt about the taxi instructions received from a controller.

A specific clearance is required to enter, backtrack, line-up on, cross or take-off from a runway. When taxiing, ensure you have received a specific clearance to cross any runway on your taxi route.

The clearance will include your callsign and the words 'CROSS RWY XX'. An ATC clearance to line-up does not authorise the pilot to backtrack on the runway.

While taxiing, the use of standard operating procedures and your radio will increase the safety of operations. This includes following instructions from ATC, confirming your understanding of ATC instructions by ensuring correct readbacks, maintaining situational awareness, using all resources available and ensuring effective pilot/controller communication practices. At the holding point, ensure your 'ready' call is on the correct frequency.

Using non-standard radio calls or readbacks affects the ability of ATC to understand your intentions and confirm you have understood your clearance.

The principle of good communication is to effectively articulate:

- who you are
- where you are
- what you want.

When landing, runway confusion can be avoided by:

- paying careful attention to runways in clearances
- always reading back an assigned runway in full
- taking sufficient time during the approach briefing to determine how positive runway identification will be achieved, particularly if using a non-precision, circling or visual approach
- visually identifying the correct runway before entering or landing on it, depending on weather conditions
- distinguishing between runway lighting and taxiway lighting, which are coloured differently.

Radio use – requesting airways and taxi clearance

ATIS available on 128.25, NDB 308, telephone (H24) 08 79294787 or via NAIPs

Darwin terminal information _____ **Runway** _____ **Wind**_____

X-Wind_____ **Visibility**_____ **Cloud**_____**Temperature** _____

QNH _____

Requesting airways clearance:

Aircraft requiring clearance to depart into Darwin CTR/CTA should contact Darwin Delivery on 126.8 prior to taxi.

Aircraft requesting circuits require prior approval via telephone to ensure traffic situation will allow. Once in the aircraft, contact 121.8 with details, no requirement for 119.55 or 126.8.

Clearance delivery FREQ 126.8

Darwin clearance delivery, _____

(*Aircraft type & callsign*), for _____

(*training area/flight planned destination)*

_____

(*Altitude*), **Request clearance.**

read back

Cleared to, _____

(*destination via tracking details*),

_____ (Altitude), **Squawk**

_____(*Transponder Code*),

_____ (*Callsign*).

Requesting taxi clearance

Before calling surface movement control, check your radio receiver is functioning correctly and obtain the current ATIS. The preferred method for checking your radio is to monitor the ATIS.

Ground FREQ 121.8

Darwin ground, _____

(*Aircraft callsign*), _____ **P.O.B**

(_____ (*Dual/Solo if applicable*))

Received _____ (*ATIS*),

at _____ (*Location on*

Airfield e.g. GA), **request taxi to** _____.

read back

Cleared to taxi, runway

_____ **via Taxiway**

_____ (*Taxi route*

Details), **Cross/Hold at**

_____ (*Holding point*

Instructions). _____ (*Callsign*).

Radio use – holding points and take-off clearance

Ground FREQ 121.8

Darwin Ground, _____

(*Aircraft callsign*), _____

_____ **Request cross holding point**

_____ (*Holding point identifier*)

read back

Cross holding point _____

_____ (*callsign*).

Tower FREQ 133.1

Darwin tower, _____ (*aircraft callsign*)

ready runway _____ (*runway number*).

read back

Approach 123.0/Remain this frequency, turn right/left/

_____ (*assigned heading/ turn direction/tracking instructions*),

track via_____(*if applicable*),

Runway_____**Cleared for**

Take-off_____(*callsign*).

LAHSO traffic information

_____ (*aircraft callsign*) (*aircraft type(traffic*)) landing on crossing runway will hold short – runway _____ (*number*) cleared for take-off.

read back

Take-off_____ (*callsign*)

LAHSO

_____ (*aircraft callsign*) (*aircraft type*) departing (or landing) on crossing runway, hold short – runway _____(*number*) cleared to land runway _____(*number*).

read back

Hold short _____ (*runway number*), cleared to land _____(runway number) _____ (callsign).

The following components of an ATC transmission require accurate readback:

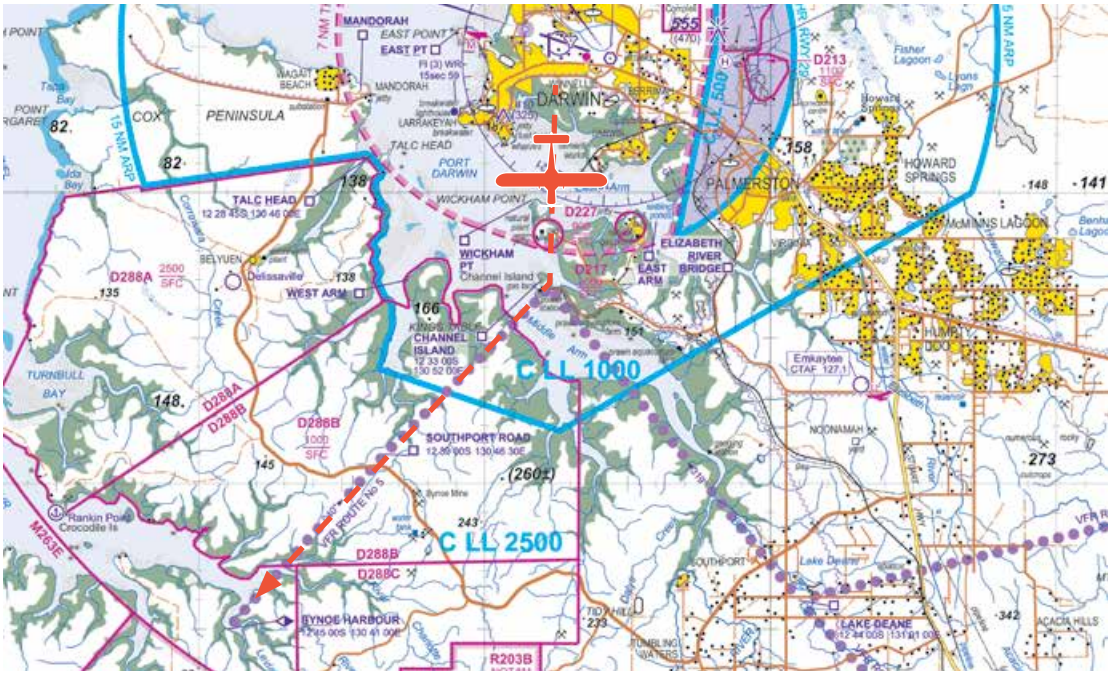
1. an ATC route clearance in its entirety, and any amendments
2. en route holding instructions
3. any route and holding point specified in a taxi clearance
4. any clearances, conditional clearances or instructions to hold short of, enter, land on, line-up on, wait, take-off from, cross, taxi or backtrack on any runway
5. any approach clearance
6. assigned runway, altimeter settings directed to specific aircraft, radio and radio navigation, aid frequency instructions
7. SSR codes, data link logon codes
8. level instructions, direction of turn, heading and speed instructions.

Departure and tracking – south-west

All VFR aircraft departing Darwin CTR to the south are required to track via Channel Island and Bynoe Harbour via VFR Route 5. Aircraft tracking via the VFR route can expect to be issued an initial heading on departure (e.g. heading 250) on climb to 2,000 ft. Expect to contact Darwin departures on 123.0 on direction from TWR. Keep a good lookout at all times around Channel Island, as it is a well-used reporting point for helicopters as well as fixed-wing aircraft.

If issued a heading by TWR, maintain that until ATC uses the phrase 'resume own navigation', at which point they will say where to track next.

Ensure you have checked the status of the various restricted areas south of Bynoe Harbour before you take up your desired onward track. Monitor Brisbane Centre 118.15 when clear of controlled airspace.




Channel Island

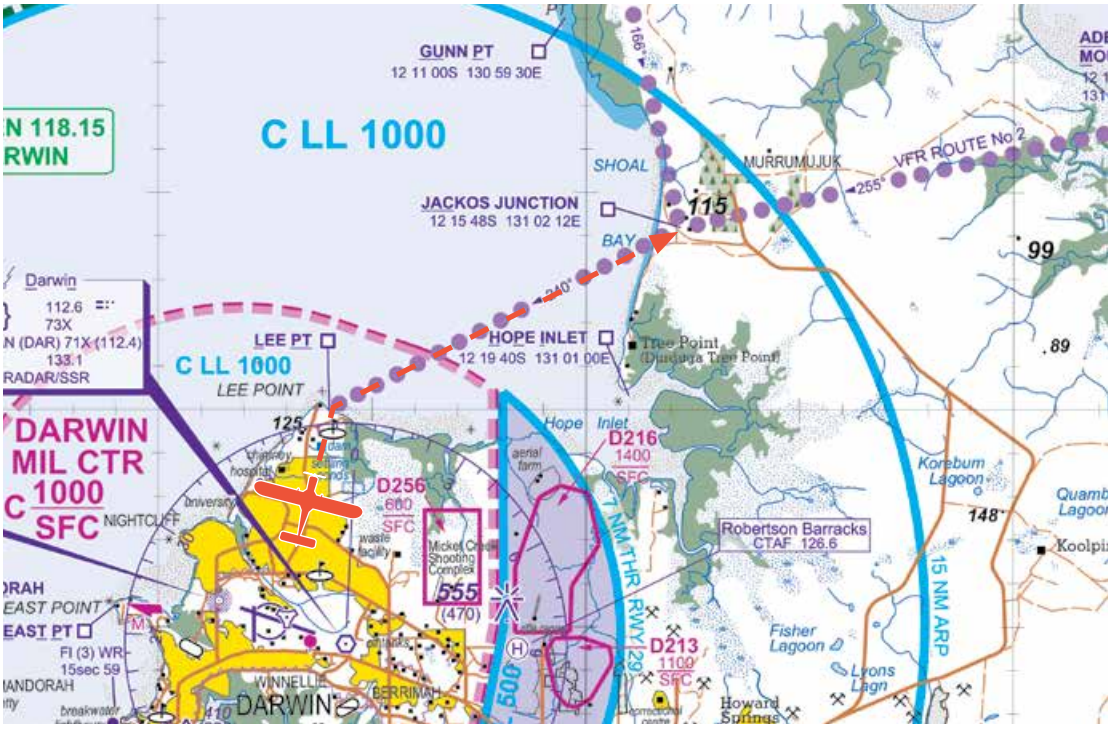

Bynoe Harbour

Departure and tracking – north/north-east

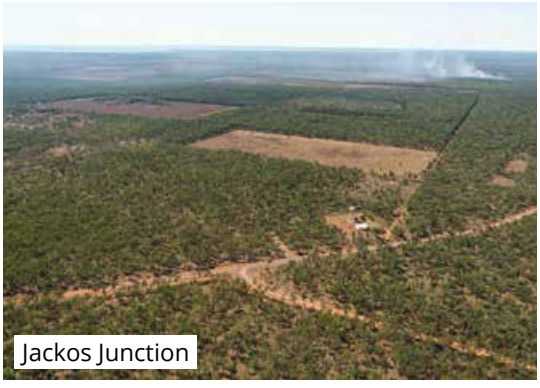
All VFR aircraft are required to depart Darwin CTR to the north via Lee Point and Jackos Junction, then via VFR route 1 or 2. Aircraft for Port Hurd, Bathurst Island, Snake Bay or Garden Point may get cleared direct.

Aircraft tracking via the VFR route can expect to be issued an initial heading on departure (e.g. heading 320) on climb to 2,000 ft. Expect to contact Darwin Departures on 123.0 on direction from TWR.

If issued a heading by TWR, maintain that until ATC uses the phrase, 'Resume own navigation' at which point they will state where to track next.




Lee Point

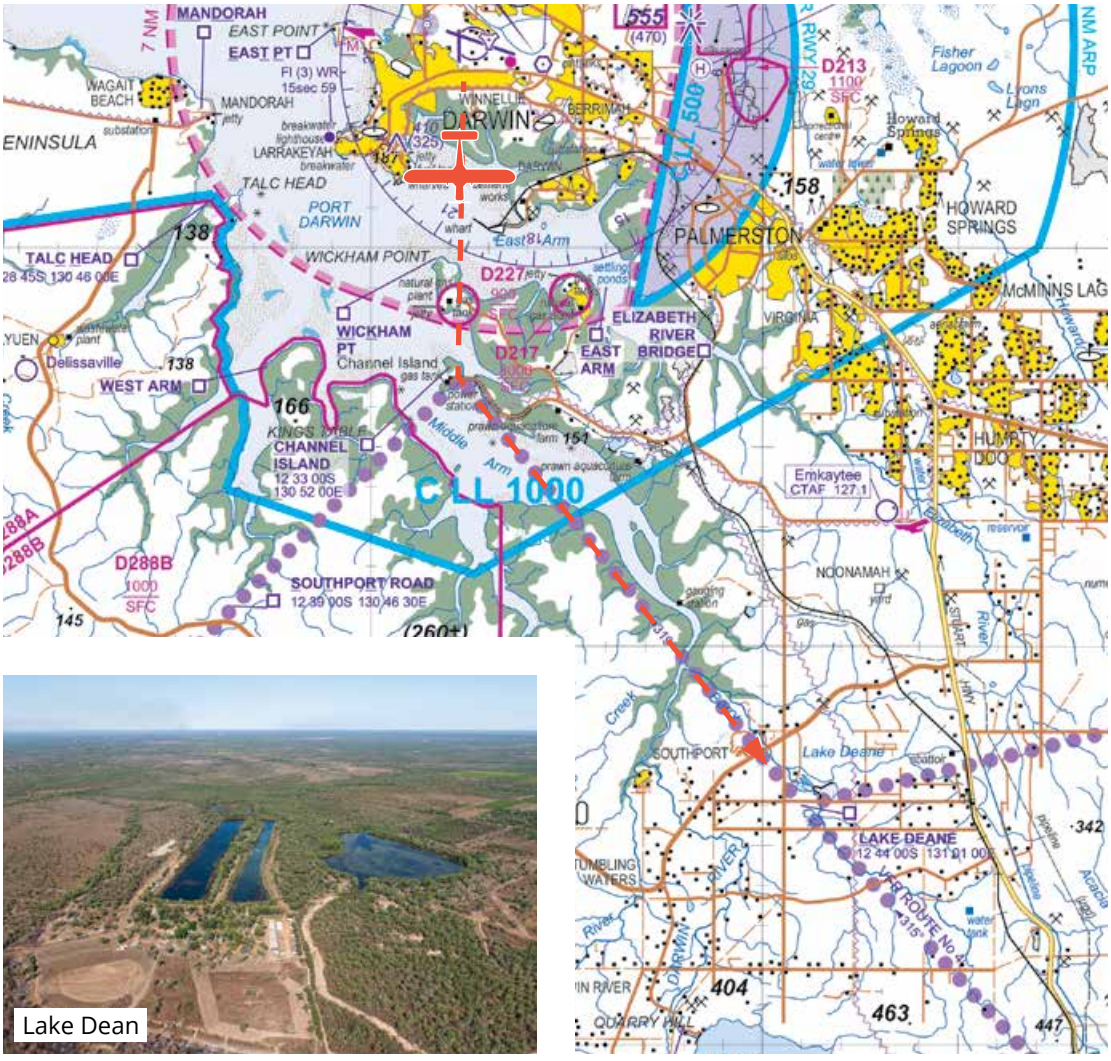

Jackos Junction

Departure and tracking – south-east

All VFR aircraft are required to depart Darwin CTR to the south-east via Channel Island and Lake Dean and then via VFR route 3 (Adelaide River Bridge) or 4 (Manton Dam). Aircraft tracking via the VFR route can expect to be issued an initial heading on departure (e.g. Heading 250) on climb to 2,000 ft. Expect to contact Darwin departures on 123.0 on direction from TWR. Keep a good lookout at all times around Channel Island as it is a well-used reporting point for helicopters as well as fixed-wing aircraft.

If issued a heading by TWR, maintain that until ATC uses the phrase 'Resume own navigation' at which point they will state where to track next.

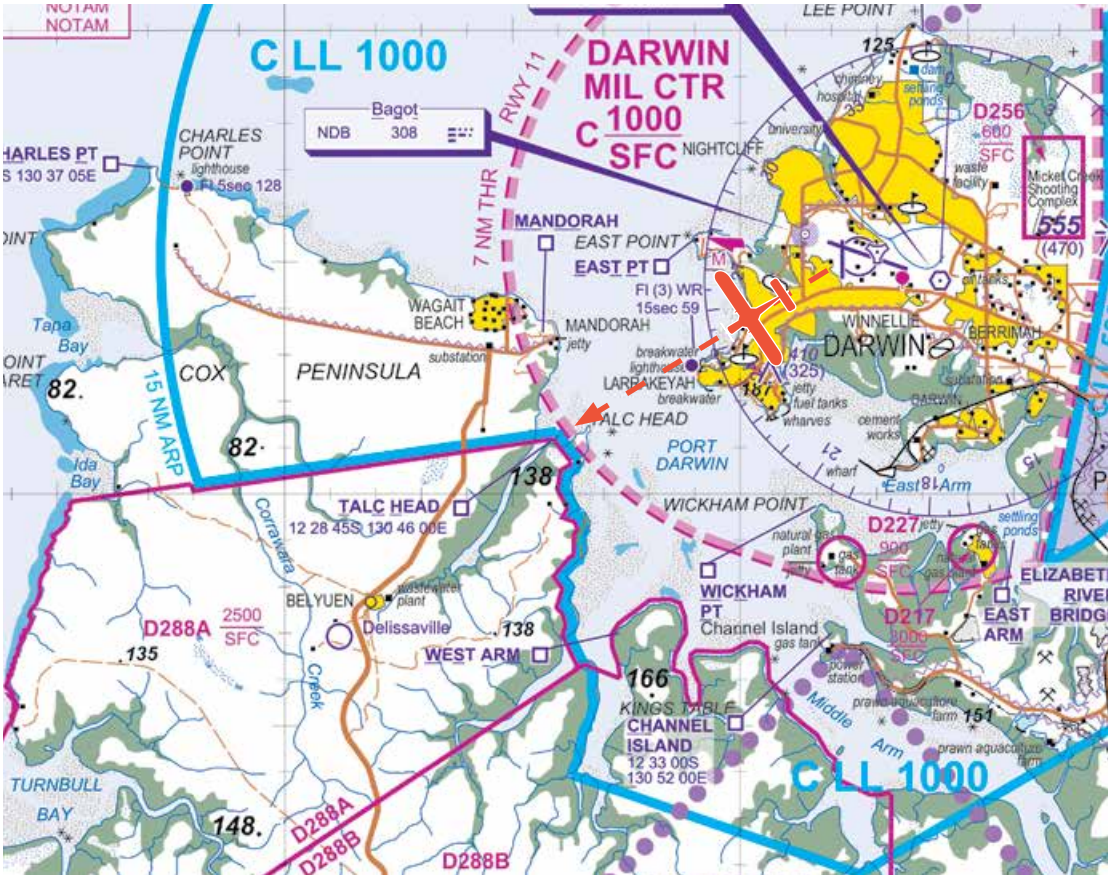
Ensure you have checked the status of the various restricted areas south of Bynoe Harbour before you take up your desired onward track. Monitor Brisbane Centre 118.15 when clear of controlled airspace.



Lake Dean

Departure and tracking – west (Delissaville and D288A)

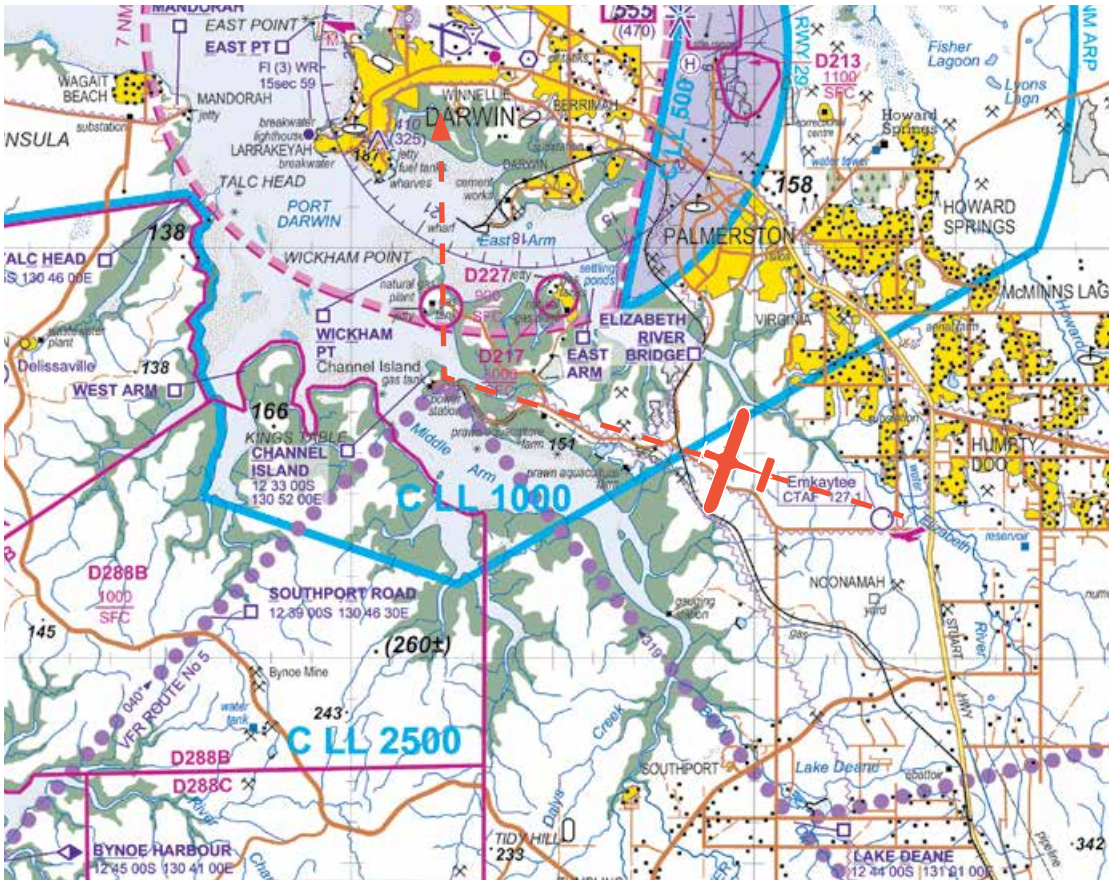
Aircraft departing Darwin CTR to the Delissaville/D288A can expect direct tracking. Aircraft should be aware of controlled airspace lower limits when transiting to the airspace and proximity of the CTR to Talc Head.



Talc Head

Arrival and tracking – from the south-east

Listen to the ATIS on 128.25 and call at least 15 nm before reaching the controlled airspace boundary. Aircraft inbound to Darwin from the south-east should plan via the appropriate VFR route. Track shortening may be available via Emkaytee then Channel Island to Darwin.

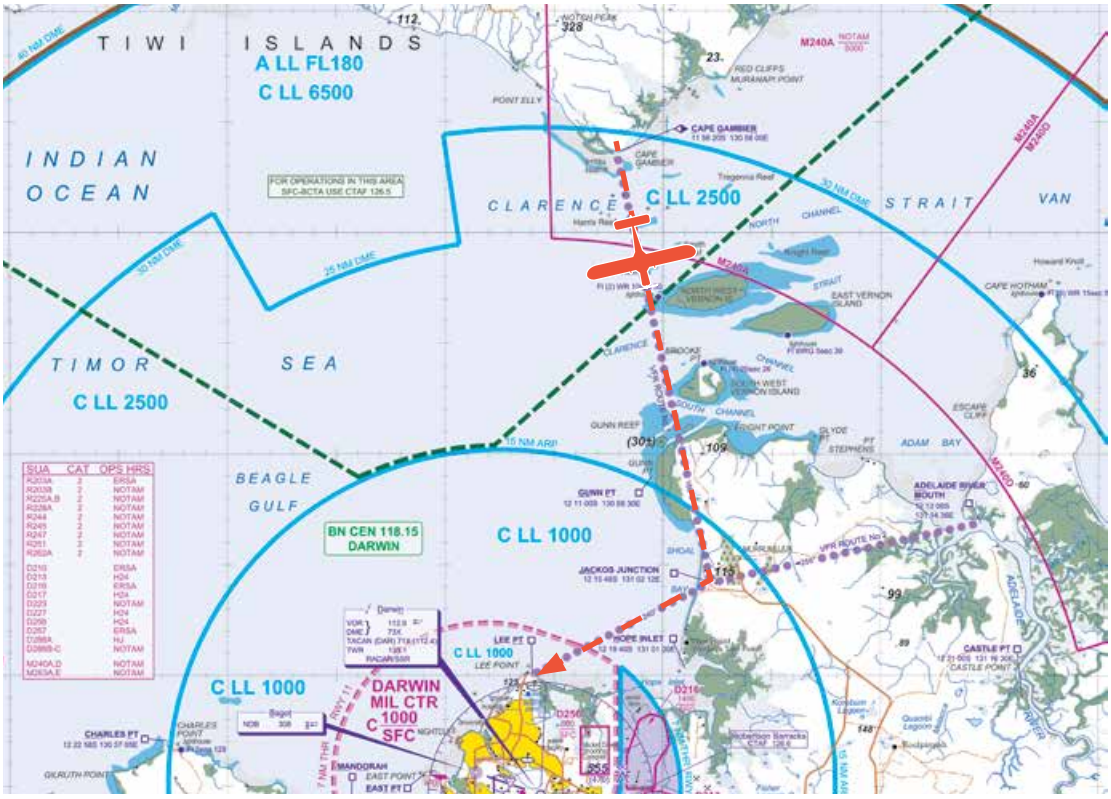



Emkaytee

Arrival and tracking – from the Tiwi Islands

Aircraft tracking to Darwin from Melville Island should plan via VFR route 1 – Cape Gambier, Jackos Junction, Lee Point. Aircraft arriving from Bathurst Island may plan direct. Aircraft should listen to the ATIS on 128.25 and call at least 15 nm before reaching the controlled airspace boundary. Be aware that this track can be quite congested.

Aircraft are recommended to contact ATC early to prevent holding at the airspace boundary as well as receiving traffic information on potential conflicts in the vicinity.

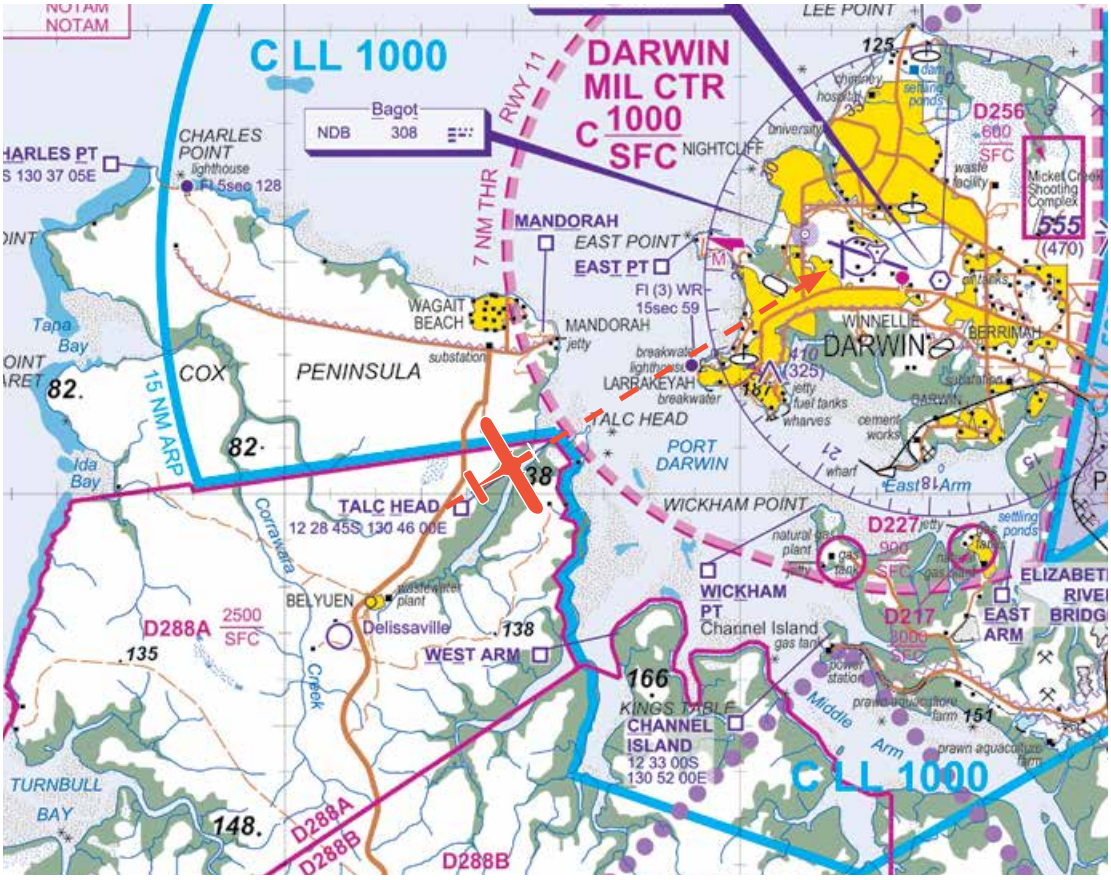



Cape Gambier


Gunn Point

Arrival and tracking – from the west

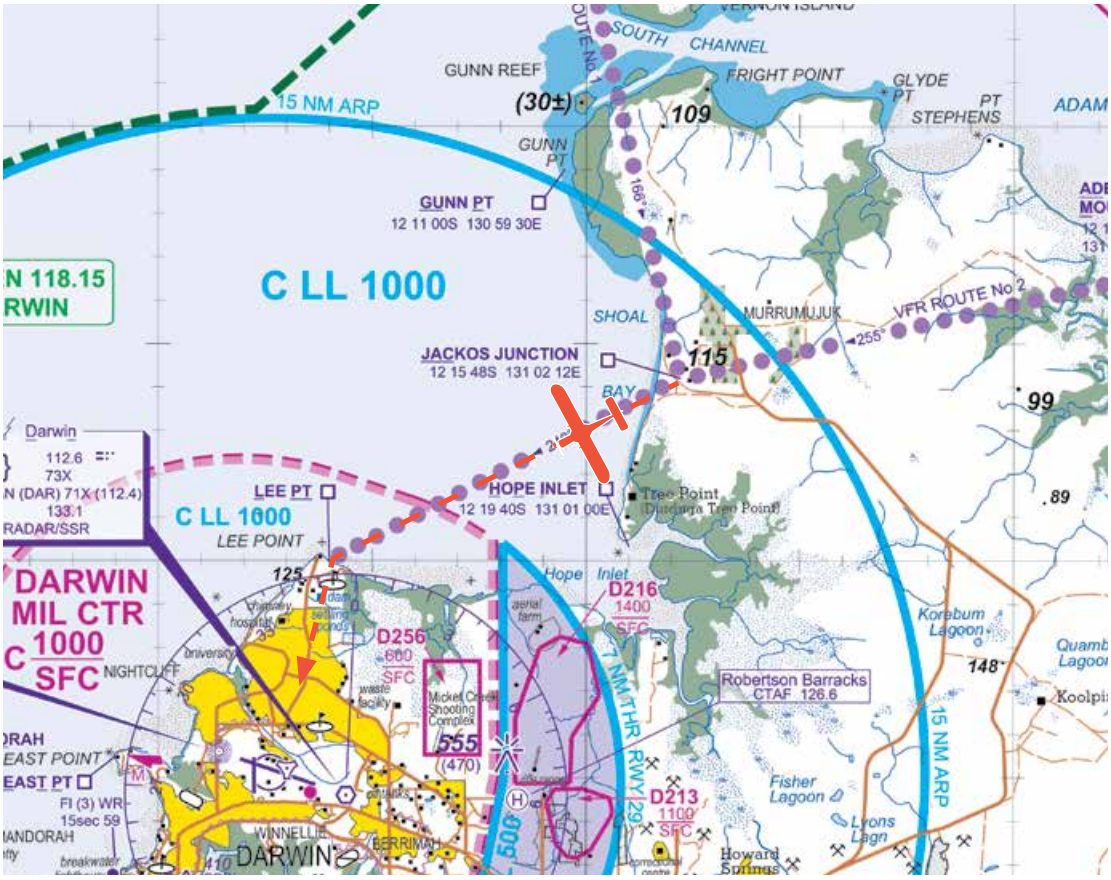
Aircraft tracking to Darwin from Delissaville/D288 should expect tracking via Talc Head or Channel Island. Aircraft should be aware that due to the proximity to the CTR, aircraft may be asked to hold outside class C airspace prior to clearance being issued.




Talc Head

Arrival and tracking – from the east

Aircraft tracking via to Darwin from the east should plan via VFR route 2 – Castle Point, Jackos Junction, Lee Point. Aircraft should listen to the ATIS on 128.25 and call at least 15 nm before reaching the controlled airspace boundary.




Lee Point


Jackos Junction

Weather

The weather over the Top End, specifically in the greater Darwin area, can be broadly divided into 2 distinct seasons. Hazards to aviation are possible in both seasons, albeit different in nature.

Wet season

This season typically runs from 1 October to 30 April and is broadly divided into the Build-Up, Monsoon and Monsoon Break Periods.

Monsoon

The first monsoon burst of the season usually occurs after mid-December, when the monsoon trough moves south of Darwin and the Top End. The monsoon is characterised by west to north-west winds from the surface to at least FL 200 and is accompanied by widespread rain, squally showers and some thunderstorm activity.

The intensity of the rain can vary, but generally results in periods of low visibility as well as extensive areas of low cloud that may persist through the day. When the monsoonal flow is strong, gusty winds and squally showers moving eastwards off the water can be experienced at any time of the day. Thunderstorms can occur at any time but are more likely around the Darwin area during the night and usually move eastwards off the water. Watch for organised lines of showers and storms on the radar, called squall lines, that move into the Top End off the Timor and Arafura Seas, mostly at night. Squall lines have the potential for very strong wind gusts, potentially in excess of 41 knots.

Daytime thunderstorms are more likely inland around Jabiru and Tindal Airports and the Kakadu region.

Build-up and monsoon break

The Build-Up occurs in the wet season prior to the first monsoon burst, while the monsoon break occurs in periods between and following monsoon bursts. Both periods are characterised by hot, humid and unstable conditions, resulting in thunderstorms being the primary aviation hazard.

While thunderstorms can occur at any time, the most likely time for thunderstorms about the Darwin area is the afternoon and early evening, as well as the early hours of the morning.

While they can form directly over Darwin, afternoon thunderstorms usually form inland, then move back towards the coast with the upper-level steering winds, if they are strong enough. Look for well-formed thunderstorms on radar anywhere from Batchelor to Humpty Doo, or even as far east as Jabiru. If the cells are well-developed, they can overcome the sea breeze and affect the greater Darwin area. In some situations, squall lines can form well east of Darwin, even as far away as Arnhem Land, then move quickly to the west. Look for long lines of organized storms on radar moving to the west. These storms can have wind gusts greater than 41 knots.

Early morning storms over Darwin are often the result of Gulf lines that start on the west coast of Cape York in Queensland and move across the Gulf of Carpentaria 24 hours earlier. These lines continue to move though the eastern Top End during the afternoon and arrive at Darwin in the early morning. Look for obvious cloud lines on satellite during the previous night and morning, as well as showers and storms moving west on the Gove radar through the day.

Through the late morning and afternoon, a westerly sea breeze usually moves over the Darwin area, easing into the evening hours.

Dry season

While the threat of thunderstorms is rare during the dry season, other aviation hazards occur.

Turbulence: Strong easterly winds occur when a large high over southern Australia extends a strong ridge into the Northern Territory. Winds at 1,000 to 2,000 ft in excess of 35 knots can occur at times, mostly during overnight and morning periods. Wind shear warnings for Darwin Airport are issued when these winds are at their strongest, usually between 22 Z and 02 Z. An area to be particularly mindful of is to the west of the Arnhem Plateau about the Kakadu area, where even moderate strength easterly winds can create turbulence.

Smoke: The dry season is utilised extensively to burn off excess grasses and weeds, resulting in widespread areas of smoke. The fires usually intensify during the afternoon due to gustier winds and warm, dry conditions. Visibility is usually lowest close to the fires, but inversions forming in the early morning period before sunrise can trap smoke near the surface, causing widespread visibility reductions.

Fog: Fog forms in the hours before dawn and can persist into the late morning. Generally, the conditions required for fog to form are clear skies, light winds and plenty of moisture near the ground. These conditions mostly occur during the mid to late dry season and are often more prevalent closer to the coast due to the sea breeze transporting in moisture during the previous afternoon. Fog is rare at Darwin airport, occurring on average twice a year, mostly likely during August.

Additional ATC information

Pilots should be prepared to land at YDLV, YMKT, YBCR or YBTI and return to Darwin when weather has cleared. Sometimes weather will affect the aerodrome for greater than 60 minutes, after which ATC has to clear the backlog of aircraft. VFR aircraft will not get priority landing when severe weather is in the vicinity, so planning for an alternate is critical.

Radio use and general procedures at non-towered aerodromes

Recommended calls

Situation	Example broadcast
1. Before take-off or during taxi	Kununurra traffic, C172, ZTQ taxiing runway 30 for Darwin, Kununurra.
2. Inbound at least 10 nm from the aerodrome or further for high performance aircraft or busy aerodromes	Kununurra traffic, C172, ZTQ one zero miles north inbound 1,500, estimating circuit at two five, Kununurra.
3. Overflying or in the vicinity of Tindal outside tower hours, but not landing, or further for high performance aircraft	Tindal traffic, C172, ZTQ one zero miles southwest, 2,000, overflying, estimating overhead two five, Tindal.
4. Entering a runway	Emkaytee traffic, C172, ZTQ lining up 07, Emkaytee.
5. Joining the circuit	Emkaytee traffic, C172, ZTQ joining crosswind, runway 07, Emkaytee.
6. Making a straight-in approach, not less than 3 nm from the touch-down threshold*	Kununurra traffic, C172, ZTQ joining 3 nm final, straight-in approach runway 13, Kununurra.
7. Joining on base leg	Delissaville traffic, C172, ZTQ joining base, runway 30, Delissaville.
8. During an instrument approach, either when established at the final approach fix, or when commencing the missed approach	Tindal traffic, C172, ZTQ conducting missed approach, runway 14, tracking to the south east, climbing 2,300, Tindal.
9. Once clear of the active runway(s)	Emkaytee traffic, C172, ZTQ clear of runway 25, Emkaytee.

*Pilots should be aware that a GNSS indication of 3 from an aerodrome may not be 3 nm to the runway threshold.

Frequencies	
Darwin Ground	**121.8**
Darwin Tower	**133.1**
Darwin Approach East	**125.2**
Darwin Approach West	**134.1**
Darwin Departures	**123.0**
ATIS	**128.25**
Brisbane Centre	**118.15**
Emkaytee CTAF	**127.1**
Bathurst Island CTAF	**126.5**
Delissaville CTAF	**126.7**

Contact phone numbers	
Darwin Tower	**08 7929 4816**
Darwin Approach	**08 7929 4817**
ATIS	**08 7929 4787**
CENSAR	**1800 814 931**

Notes

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