Australian Government
Civil Aviation Safety Authority

2025 Review of Flight Information Services in the Pilbara Region

October 2025

Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Inside front cover artwork: James Baban.

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File Reference	FO24/1267
Document number	D25/48862
Version	0.5 – October 2025
Approval Tier	Three
Owner	National Manager, Air Navigation Airways and Aerodromes
Responsible Manager	Section Manager, Office of Airspace Regulation
Intended Audience	External

Executive Summary

The Civil Aviation Safety Authority (CASA)[1] conducted a review of aircraft operations within the Pilbara region to assess the level of safety for aviation activity and the effectiveness of existing control measures. The review confirmed that despite a low number of reportable safety incidents and accidents, industry feedback highlighted cognitive workload as impacting the safety of their operations. This review is a targeted follow-on to the original airspace review and is focussed solely on Flight Information Service (FIS) adequacy and cognitive workload. Consequently, this FIS review is focussed on the adequacy and effectiveness of the existing FIS supporting pilots in the Pilbara region.

This review examined pilot cognitive workload, that is, the mental effort required to complete a task or tasks while being influenced by factors such as task complexity, task load and distractions. Impacts of cognitive workload influence performance measurements which have significant effects on error rates to deliver a safe and efficient operation within aviation. The review focussed on the FIS as a control measure to reduce cognitive workload.

Aviation operations within the Pilbara include a varied mix of aircraft from helicopters to high-capacity jet aircraft associated with 'fly-in fly-out' (FIFO) and mining operations. These aircraft have different configurations, performance capabilities and workloads during each phase of flight which impact and affect cognitive workload when air traffic control (ATC)/FIS is not available. External factors such as weather, aircraft scheduling, communication, surveillance capabilities and equipment limitations also impact cognitive workload.

Airservices Australia (AA) is the air navigation service provider for all Australian airspace which includes the provision of ATC services in controlled airspace around the Pilbara and the provision of a FIS to aircraft operating outside controlled airspace in the Pilbara region.

Issues

The review highlighted limitations with the provision of FIS to aircraft operating outside controlled airspace in the Pilbara region. These limitations impact pilot workload and distract pilots from critical operational functions.

CASA used an assessment process called Present, Suitable, Operating, Effective (PSOE) to assess the FIS in the Pilbara region. This process confirmed there is an existing level of FIS (Present and Operating). However, the Suitability and Effectiveness of the existing FIS is limited or impacted by inadequate VHF and surveillance coverage and capability. The review found the existing FIS fails to meet Effective performance expectations for Timeliness and Accessibility, potentially impacting information Integrity, especially during peak operational periods or demanding conditions.

The analysis assessed that the current FIS often falls below reasonable performance expectations during peak scheduling periods. Consequently, there is an increase in cognitive workload that may detract from operational aspects related to arriving and departing aircraft. Pilots are busy trying to communicate and locate other aircraft or obtaining information relevant to their operation (such as weather, aerodrome conditions and navigation aid status) which may increase potential risks and create other adverse safety outcomes.

CASA Assessment

One of the key controls to reduce risk to aviation safety in uncontrolled airspace is the provision of FIS. The provision of FIS in the Pilbara region is not adequate or effective. CASA will direct AA to resolve the concerns impacting Suitability, Effectiveness, Timeliness, Accessibility, and Integrity of FIS in the Pilbara region.

[1] A full list of acronyms and abbreviations used in this report can be found in Appendix A –Acronyms and Abbreviations.

1. General

1.1 Introduction

The Civil Aviation Safety Authority (CASA) conducted a review of aircraft operations within the Pilbara region to assess the level of safety for aviation activity and the effectiveness of existing control measures. The review confirmed that despite a low number of reportable safety incidents and accidents, industry feedback highlighted cognitive workload as impacting the safety of their operations. This review is a targeted follow-on to the original airspace review and is focussed solely on flight information service (FIS) adequacy and cognitive workload. Consequently, this FIS review is focussed on the adequacy and effectiveness of the existing FIS supporting pilots in the Pilbara region.

When assessing contributing factors that create cognitive workload, CASA considered the impact on pilots operating outside controlled airspace communicating with other pilots to maintain their own separation or to communicate with a third party to exchange relevant information to enable pilots to establish and maintain their own separation. CASA determined that there are regular circumstances where pilots are unable to adequately establish and maintain situational awareness (SA) when operating outside controlled airspace in the Pilbara region. These circumstances may also distract pilots from other safety related operational functions. CASA determined that a pilot's ability to communicate with other aircraft can be impacted by very high frequency (VHF) line of sight limitations, frequency congestion, over transmissions, radio failures, incorrect position information or other priorities on the flightdeck. In uncontrolled airspace, instrument flight rules (IFR) aircraft generally have access to a FIS provided by Airservices Australia (AA). This service provides traffic information to IFR aircraft outside controlled airspace on other IFR aircraft and known visual flight rules (VFR) aircraft.

1.2 Purpose and scope

The purpose of this review was to assess the adequacy and effectiveness of the existing FIS as a control measure for risks associated with safety of aircraft operating outside controlled airspace in the Pilbara region.

The scope of this review included examination of the existing surveillance and communication facilities and services in the Pilbara region, with a focus on airspace around six aerodromes in the Pilbara region that were identified as airspace locations of concern by industry:

- Christmas Creek (YCHK)
- Fortescue Dave Forrest (YFDF)
- Gudai-Darri (YKDD)
- Barimunya (YBRY)
- Coondewanna (YCWA)
- West Angelas (YANG)

1.3 Methodology

This review used a process applied more broadly by CASA when assessing services, facilities and capabilities. This process is known as Present, Suitable, Operating, Effective (PSOE) and was used to assess the presence, suitability, operation and effectiveness of the existing FIS in the Pilbara region. The review methodology included:

- Reviewing and assessing the existing FIS communication and surveillance facilities and services to determine their adequacy, and effectiveness
- Collaboration with industry stakeholders to collect and analyse quantitative data.
- Observing current traffic management practices at the Air Traffic Service Centres (ATSC) in Brisbane and Melbourne.
- Monitoring aircraft transmissions and movements at the specified aerodromes to evaluate frequency congestion, communication limitations and operational effectiveness.

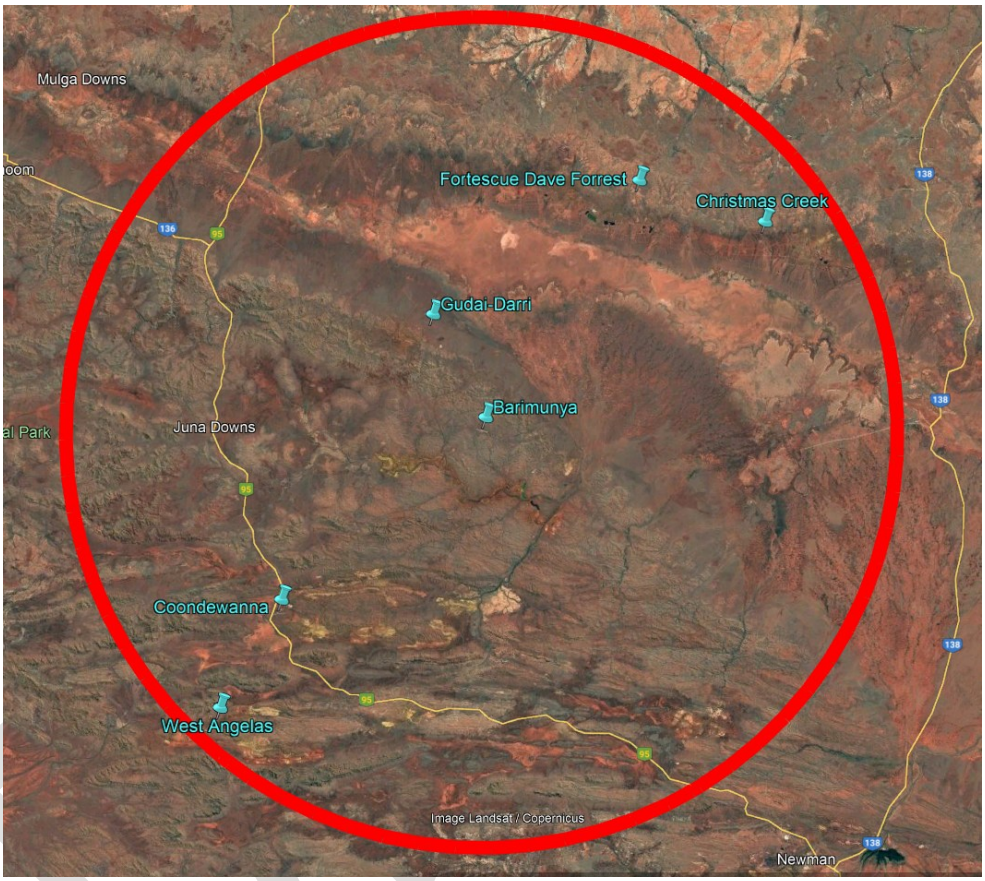
2. Airspace Aspects

2.1 General

Figure 1 displays the aerodromes within the review area. The red circle depicts 40 nautical miles (NM) from Barimunya.

Figure 2 and Figure 3 display an isometric view with an extension of each runway centreline out to five (5) NM to illustrate complexities that may be experienced by airspace users.

Figure 1: Top view diagram of the aerodromes[2]



[2] Pilbara aerodromes review area Google Earth V7.3.4.8248 (16 July 2021) Barimunya, Western Australia 22° 40' 31.0" S 119° 10' 10.0" E. Eye Alt 274.0km. Landsat Copernicus 2024. http://www.earth.google.com [25 January 2025]

Figure 2: Isometric view towards the North[3]

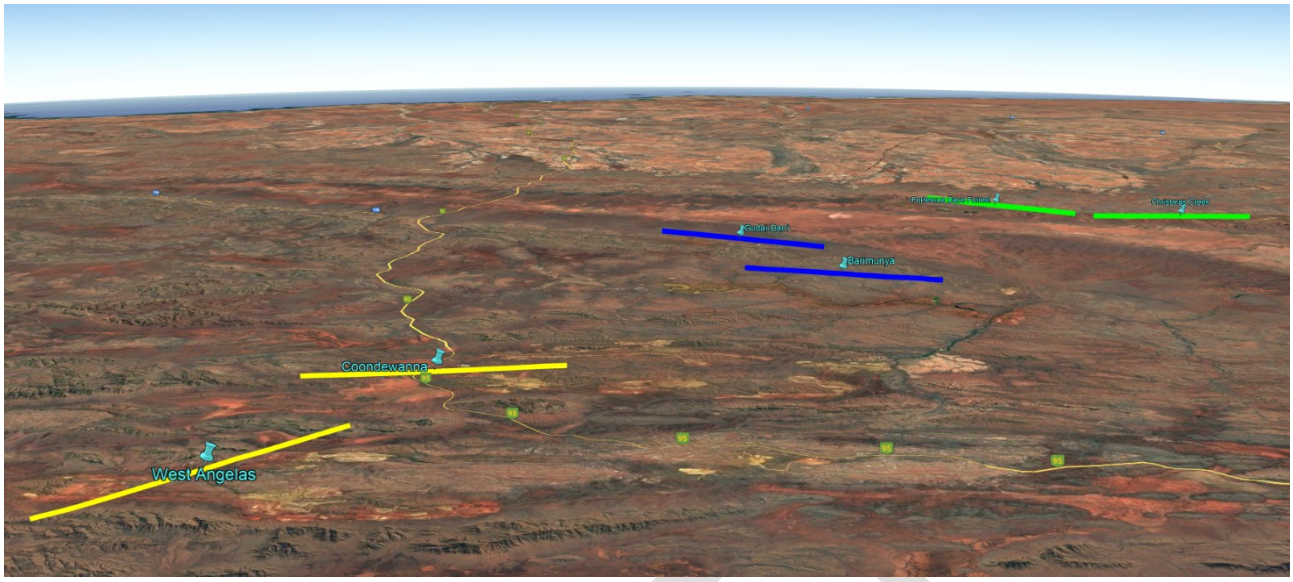
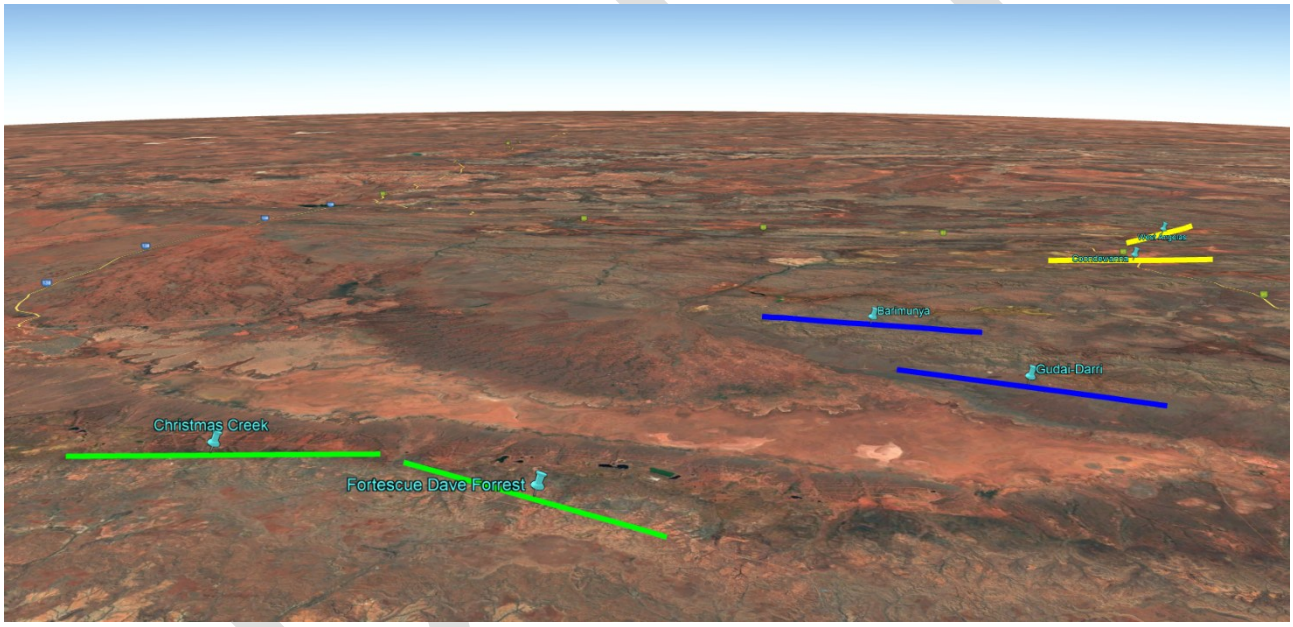


Figure 3: Isometric view towards the South[4]



These figures show approximate flight paths during critical phases of flight that intersect at Christmas Creek (YCHK) and Fortescue Dave Forrest (YFDF), converge at Barimunya (YBRY) and Gudai-Darri (YKDD) and cross at West Angelas (YANG) and Coondewanna (YCWA).

There is no controlled airspace below flight level 125 (FL125). In uncontrolled airspace, IFR aircraft are provided with a FIS (where possible) but pilots are ultimately responsible for their own separation.[5]

[3] Pilbara aerodromes review area Google Earth V7.3.4.8248 (16 July 2021) Barimunya, Western Australia 22° 51' 28.7" S 118° 59' 59.8" E. Eye Alt 30.3km. 2025 Airbus Landsat Copernicus. http://www.earth.google.com [25 January 2025]

[4] Pilbara aerodromes review area Google Earth V7.3.4.8248 (16 July 2021) Barimunya, Western Australia 22° 42' 46.7" S 119° 29' 26.5" E. Eye Alt 30.3km. 2025 Airbus Landsat Copernicus. http://www.earth.google.com [25 January 2025]

[5] A flight level is an altitude at international standard atmospheric pressure (1013 hectopascals (hPa)) that is expressed in hundreds of feet (FT). Flight levels are used to ensure vertical separation between aircraft, despite natural local variations in atmospheric air pressure. In Australia, flight levels are utilised above 10,000 FT above mean sea level (AMSL).

2.2 Aircraft types and characteristics

There is a complex and diverse mix of aviation activity in the review area. Table 1 shows aircraft performance characteristics, specifically aircraft speeds during the critical phases of flight.

Table 1: Operating aircraft speeds in knots[6]

Aircraft type	Cruising speed	Approach speed[7]	Landing speed	Departure/ Initial climb speed
Fokker 100 (F100)	405	250	130	135-165
Airbus A320 (A320)	450	250	137	145-175
Boeing 737 (B737)	453	250	145	145-165
Beech 200 Super King Air (BE20)	260	180	100	115-145
Pilatus PC12 (PC12)	270	180	85	110-130
Fokker 70 (F70)	430	250	129	125-155
De Havilland Canada Dash 8 (DH8D)	360	245	121	115-150

Pilot workload for each aircraft type may vary based on aircraft performance. Speed variations during the approach phase of flight show these aircraft are travelling between 5.56 kilometres (km) per minute to 7.7km per minute, which is three (3) to four (4) nautical miles per minute.

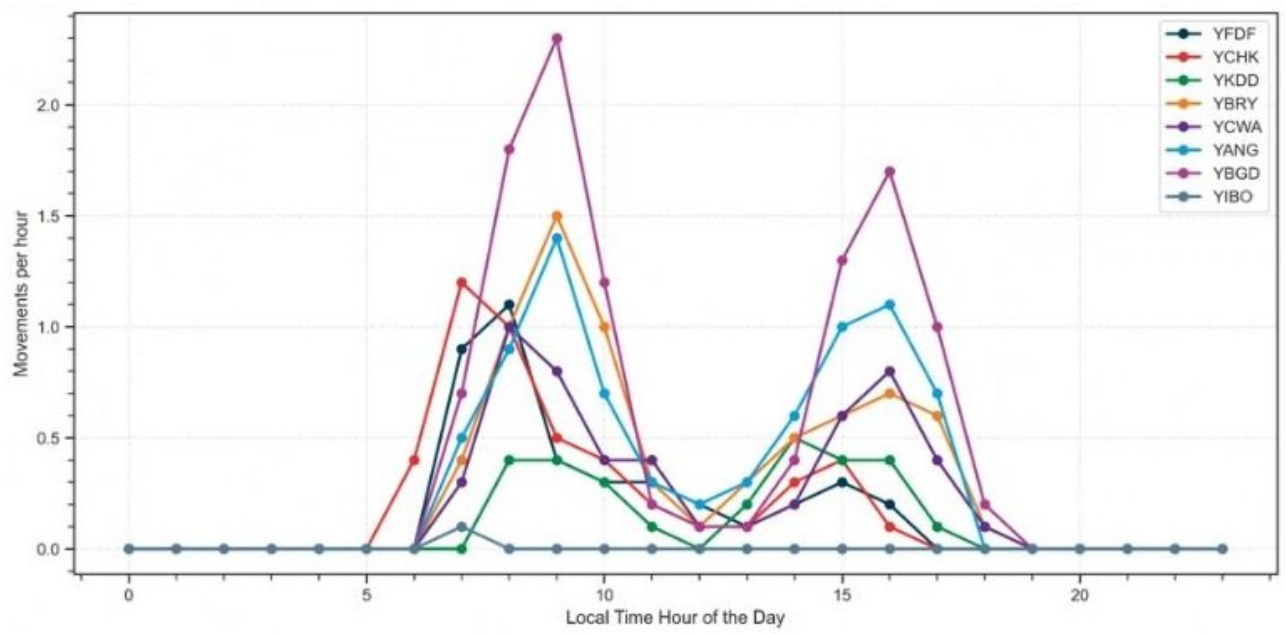
The performance characteristics also create complexity for airspace users given some aircraft such as the F100 can maintain a higher speed for longer before quickly slowing down compared to a B737 or A320. The addition of the Airbus 220 (A220) and Embraer 190 (E190) will increase the mix of aircraft operating into the Pilbara region.

The volume of aircraft operations at the aerodromes in the review area increases between 8am and 10am and 3pm to 5pm Australian Western Standard Time (AWST). Boolgeeda (outside of the review area), Barimunya and West Angelas recorded the highest aircraft movements during these periods as illustrated in Figure 4.

[6] Eurocontrol Aircraft Performance Database Aircraft Performance Database accessed 25 January 2025.

[7] Aircraft, other than military aircraft, below 10,000 FT AMSL are speed limited to 250 KTS indicated air speed (IAS). Instrument approach procedures at locations in the review area provide a maximum initial IAS between 185-230 KTS.

Figure 4: Aircraft movements per hour[8]



[8] Airservices Australia Pilbara Update draft December 2024 as presented to the OAR December 2024.

3. Airspace

3.1 Airspace structure

The review area is centered around Barimunya aerodrome in Western Australia (WA), approximately 55 NM northwest (NW) of Newman airport (YNWN). The airspace structure is classified as follows:

- Class G airspace from the surface (SFC) to FL125.
- Class E airspace commences from the lower level (LL) of FL125 to FL245.
- Class A airspace commences from the lower level of FL245 to FL600.

The purpose of this review is to examine the impacts on cognitive workload and effective performance based on the delivery of a FIS which occurs within Class G airspace (uncontrolled airspace).

3.2 Airspace management

Airservices Australia provides air traffic services[9] from the Melbourne ATSC to aircraft operators the Pilbara region.

In Class G airspace, ATC provide a FIS which includes traffic information and advice for the safe and efficient conduct of flights to IFR aircraft about other IFR aircraft and known VFR aircraft. Upon request and workload permitting the FIS can also be provided to VFR aircraft. A FIS is available to all aircraft within a flight information region (FIR) but is largely dependent on communication coverage (primarily VHF) and any surveillance or position information that may be available:

- Traffic information to IFR aircraft about other IFR aircraft and known VFR aircraft (limited by communication capability and available aircraft position information).
- Weather information.
- Aerodrome information.
- Information regarding the serviceability of navigation aids.
- Information about potential hazards to an aircraft.
- information about the activation and deactivation of special use areas (SUA) including restricted areas (RA) or military operating areas (MOA).
- Other relevant information for the safe and efficient conduct of flight.

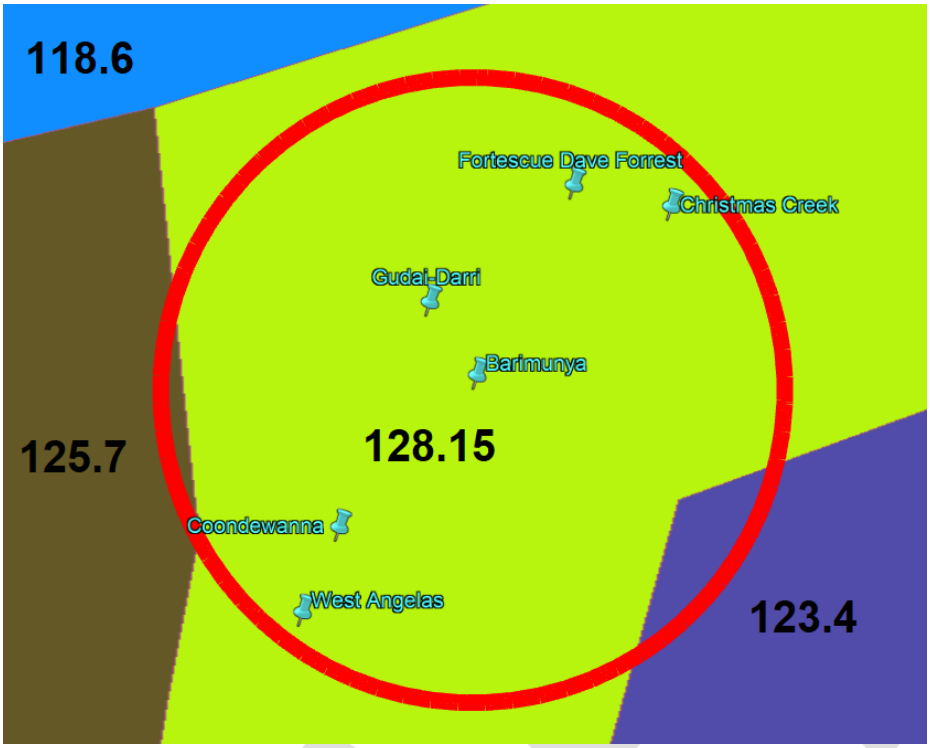
The provision of a FIS reduces the burden on pilots who would otherwise need to rely on other means to obtain information in a timely manner that was important to decision making relevant to the safety of their operation.

ATC do not monitor or broadcast on an aerodrome Common Traffic Advisory Frequency (CTAF) and FIS does not provide a separation service to aircraft operating in Class G airspace. Consequently, pilots are responsible for ensuring their own separation from other aircraft using the principle of “see and avoid” which may be supplemented by “alerted see and avoid” where pilots communicate with each other or the pilot receives information from a third party such as a FIS.

There is normally one ATC sector that provides FIS and ATC in the review area, but multiple sectors can be combined when ATC workload permits which results in one ATC person managing g multiple VHF frequencies. The level of activity within one sector or during combined sector operations may limit the ability of the FIS operator to provide sufficient information to all pilots in the review area due to workload or VHF limitations. The following figure demonstrates the VHF sectors within the Pilbara region. When combining the traffic movement data for those airfields within the one sector it is noticeable that there are significant volume and complexity of operations that rely on FIS to support their operations.

[9] Air traffic services is a generic term meaning variously flight information service, alerting service, air traffic advisory services, air traffic control service. (ICAO Annex 11 – Air Traffic Services Edition 14 July 2016).

Figure 5: ATC VHF frequency sectors[10]



The provision of FIS generally relies on VHF communication with aircraft in the Pilbara region. However, VHF effectiveness, capability and reliability is impacted by limitations associated with infrastructure locations and line of sight issues which means some aircraft are unable to rely on VHF communication with the FIS operator. The FIS is supported by high frequency (HF) operators located in the Brisbane ATSC.

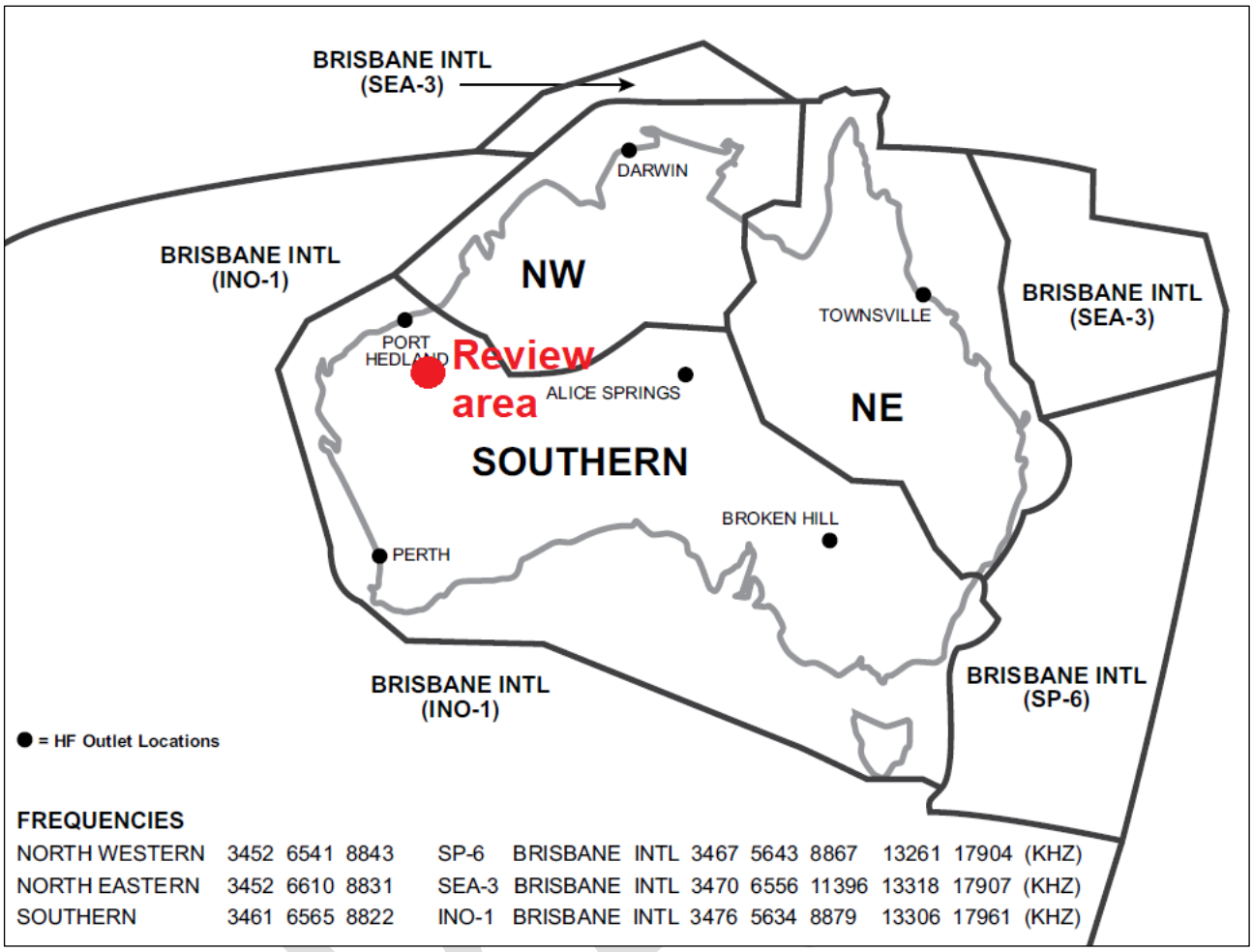
HF operators provide a third-party communication and alerting function. HF operators are not air traffic controllers and are not responsible for aircraft separation. HF operators relay information received from ATC to pilots and vice-versa. This information may include position reports, taxying and departure calls and other relevant information for aviation operations including requests for level changes, route amendments, clearances, weather information and cancelling SARWATCH.[11] The HF operators are not collocated with the FIS operator and there can be delays in relaying information between the HF and FIS operators which impacts the timely and accurate passage of information to or from an aircraft in the Pilbara region.

The following diagram displays the HF boundaries within Australia (not to scale).

[10] Pilbara Region review area frequency sectors Google Earth V 7.3.4.8248 (16 July 2021) Barimunya, Western Australia. 22° 40’ 34.0” S 119° 09’ 59.0” E, Eye Alt 356.0km. Landsat Copernicus 2023. http://www.earth.google.com [25 January 2025]

[11] SARWATCH is a term used to describe search and rescue alerts based on scheduling times, position procedures or a SARTIME which is a time chosen by the pilot for the commencement of search and rescue (SAR) action.

Figure 6: HF area boundaries diagram[12]



3.3 Airspace facilities

3.3.1 Surveillance

FIS provides information to aircraft outside controlled airspace which may include surveillance information or position reports on other aircraft. There are no radars in the Pilbara region that can detect aircraft transponders however aircraft transponders may also transmit automatic dependent surveillance broadcast (ADS-)B. Surveillance capability is limited to the use of ADS-B receivers in some locations in the Pilbara review area.

ADS-B OUT equipped aircraft which includes all IFR aircraft, and some VFR aircraft automatically broadcast their location. The broadcast is received by an ADS-B ground station and displayed on ATC air situation displays (ASDs), enabling ATC to provide a radar-like surveillance service. The effectiveness of ADS-B relies on aircraft being within the detection range of a receiver and being equipped with ADS-B out.

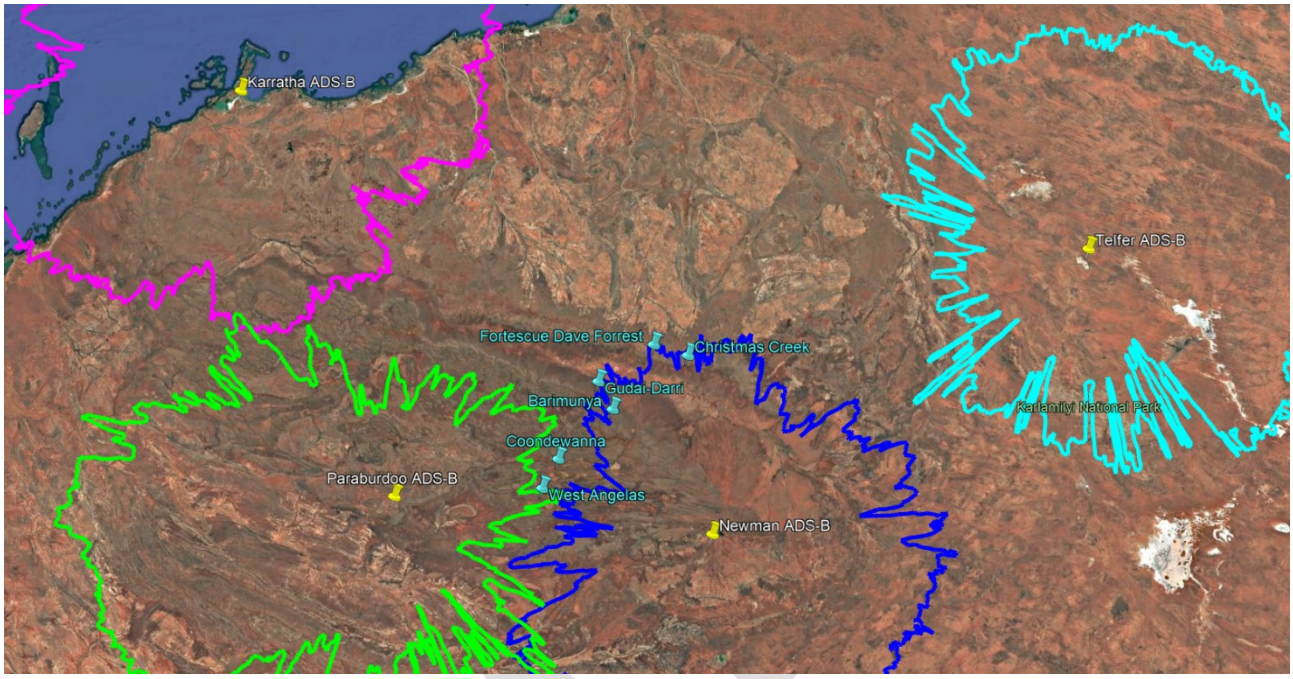
ADS-B ground stations in the vicinity of the review area are located at Paraburdoo and Newman. Other ADS-B ground stations outside the region are located at Karratha and Telfer.

Figure 7 shows the ADS-B ground stations and anticipated coverage at 5,000 feet (FT) AMSL. The diagram shows the aerodromes subject to this review, outside or bordering the anticipated coverage at 5,000 FT and limited or no surveillance coverage below 2,000 FT around each airfield. The provision of FIS based on surveillance information is limited or unavailable below 3,000 FT in the review area and pilots must revert to

[12] Designated Airspace Handbook (DAH) Section 15 – HF Area Boundaries effective 28 November 2024, Airservices Australia, Canberra.

communicating with each other on VHF to establish SA. This means aircraft that are approximately 2,000 – 3,000 FT above an airfield will not be detected by ATC.

Figure 7: ADS-B sites and anticipated coverage at 5,000 FT AMSL[13]



3.3.2 Radio communication

Radio communications within the Pilbara region are achieved through a combination of VHF and HF radio calls. Radio communication enables the passage of information that may be critical to the safety of flight. However, during peak aircraft movement periods, the effectiveness of radio communication may be impacted by frequency congestion on both VHF and HF, resulting in aircraft transmitting at the same time as another aircraft and the calls may not be received or heard, repeated transmissions and delays in relaying messages between radio operators and ATC.

3.3.2.1 VHF communications

VHF communication is limited to line-of-sight where the radio signal needs a clear and unobstructed pathway between the transmitting and receiving antennas of each aircraft and between an aircraft and the ATC VHF ground-based transmitter/receivers located at Paraburdoo and Newman. There are other transmitters at Port Hedland, Karratha and Telfer but these do not offer reliable or effective VHF communication to aircraft in the review area.

Limitations regarding VHF coverage are promulgated in the relevant AIP documents including aircraft not being able to hear other broadcasts at nearby locations due terrain shielding.

Effective VHF coverage can be as low as 3,000 FT AMSL, (around 1,000 FT above the aerodrome) because of terrain shielding or other obstacles in the area. This basically means that aircraft on either side of an obstacle or terrain may not be able to communicate with each other. Or the aircraft cannot communicate with ATC.

[13] ADS-B units at Newman, Paraburdoo, Telfer, and Karratha. Anticipated coverage at 5,000 FT AMSL. Google Earth V7.3.4.8248 (16 July 2021) Christmas Creek, Western Australia 22° 24’ 00.2” S 120° 19’ 54.4” E. Eye Alt 877.3km. Landsat Copernicus 2024. http://www.earth.google.com [5 February 2025]

3.3.2.2 HF communications

HF radios are required for IFR aircraft operating beyond VHF radio coverage. However, due to ionospheric conditions and other factors, HF transmissions may not be as clear when received, compared to VHF operations.

For operations within the review area, when VHF is not available or is limited, IFR pilots must use HF communications which are received by radio operators in the Brisbane ATSC, who relay messages to ATC in the Melbourne centre.

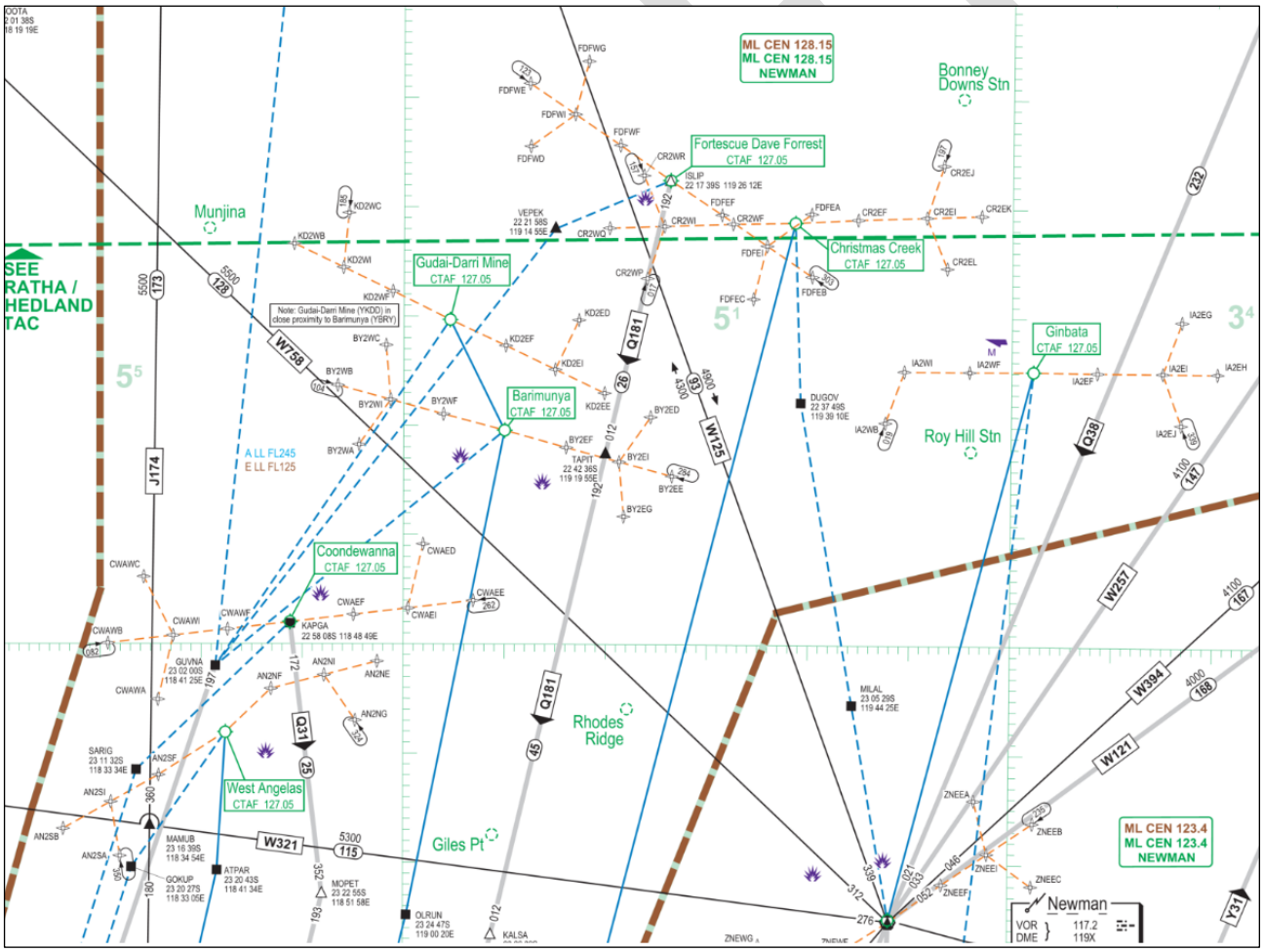
3.3.3 Air routes

While the establishment and publication of air routes in the review area is not specific to issues related to FIS, the air route structure supports air traffic management and aircraft operations by providing information related to expected aircraft position and tracks. The air routes and aerodrome locations can be displayed on the ATC ASD which can then be used to provide accurate traffic information to pilots within VHF coverage in the area.

The Pilbara Terminal Area Chart (TAC) provides information to airspace users of the routes commonly flown by IFR aircraft and flight tracks for Instrument Flight Procedures at an aerodrome.

The following TAC shows the high-level routes, the nominal tracks of the IFPs, the arrival tracks (dotted blue line) and departure tracks (single blue line).

Figure 8: Pilbara TAC - review area air routes[14]



[14] Pilbara TAC effective 28 November 2024, Airservices Australia, Canberra

4. Incidents and occurrences

Analysis of Australian Transport Safety Bureau (ATSB) incident data did not identify any safety trends but it did identify occurrences relating to communication, surveillance or cognitive workload issues. However, CASA is aware that issues of this nature (depending on severity) may not be required to be reported to ATSB.

Based on available information through the Airservices reporting system there are occurrence reports related to cognitive workload or communication issues.

Despite the absence of any formal incident trends related to cognitive workload, airline operators provided CASA with internal airline reports that identified issues related to communication and FIS in the Pilbara region that contributed to concerns about cognitive workload for pilots.

Information provided by the airlines highlighted workload and communication issues during critical phases of flight and the challenges pilots encounter in obtaining information that is important to the safety of their operation. These challenges are exacerbated due to the diverse and complex nature and volume of aircraft activity in the region, limitations on communication and surveillance and limited FIS. Matters involving HF radio transmissions, congestion on HF, the identification of other traffic while on descent and frequency congestion on the CTAF were also contributing to cognitive or cognitive workload for pilots in the region.

While CASA considers there is currently an acceptable level of safety in relation to the provision of information required to support the safety of flight this is predicated on existing activity levels and complexity of aviation activity in the Pilbara region and associated controls. CASA and industry expect the risk level will continue to increase as airspace activity increases and the nature of operations changes. This includes increased volume during peak periods from Perth Airport once the new parallel runway is operational, several new mining site aerodromes, additional instrument flight procedures (IFP) and additional airspace participants such as Defence. CASA considers that the ability for a pilot to safely operate an aircraft within the Pilbara region and avoid collisions may be impacted in future. Despite controls and enhancements (such as new charts, air routes and procedures) to help reduce workload on a pilot there is a view that the situation in the Pilbara will soon reach the point where a pilot will not be able to obtain timely and accurate information critical to the safety of their flight. Refer to Appendix D – Airline reported incidents for the occurrence reports.

The outcomes of CASA engagement with air operators in the Pilbara region are summarised below. Further details regarding stakeholder engagements can be found in Appendix E – Consultations.

While the communications and surveillance coverage areas for the provision of air traffic services in the Pilbara may be considered sufficient during operations at higher levels, stakeholder feedback highlighted that communication and surveillance issues are frequently problematic at lower levels. These issues impact operational efficiency and safety for all airspace users, undermining the purpose of FIS and degrading situational awareness.

4.1 Operator feedback

The Pilbara environment features twenty certified aerodromes with IFPs, that process over two million passengers in large capacity jet aircraft operating primarily under "see and avoid" principles within uncontrolled airspace. Aircraft operators raised concerns about:

- Increasing airspace complexity: New aerodrome developments are leading to more overlapping or in proximity IFPs. This significantly increases the complexity of the airspace and contributes to heightened pilot workload and awareness.
- Airline procedures: Different airline operators have developed varying procedures for operations at the same locations, for example, flying a circuit versus a straight-in procedure. This can lead to inadequate consideration of traffic separation or aircraft performance within some CTAFs.

5. Analysis of Adequacy of FIS in Pilbara airspace

Feedback provided to CASA by industry stakeholders confirmed that a FIS is essential for pilot SA. Any deficiencies in the provision of a FIS may increase pilot cognitive workload.

In the absence of a prescriptive standard, CASA established a process to assess FIS in the Pilbara. The process evaluates FIS adequacy against three primary performance criteria:

1. Integrity: The accuracy, completeness, and reliability of the information provided.
2. Timeliness: The delivery of information promptly enough to be operationally useful.
3. Accessibility: The ease with which pilots can reliably establish communication and obtain the required information when needed.

CASA used an assessment process based on the P-S-O-E (Present, Suitable, Operating, Effective) model to evaluate the FIS against the above criteria:

Present: Verifying that there is a documented requirement and intent to provide FIS within the review area.

Suitable: Assessing whether the FIS adequately meets the operational needs of pilots.

Operating: Confirming that the FIS is being delivered as, when and how intended.

Effective: Evaluating whether the FIS achieves the outcome of assisting pilots in establishing and maintaining SA and managing workload by providing FIS that meets the performance criteria for information integrity, timeliness, and accessibility.

5.1 Evaluation Against Performance Criteria

Integrity (Accuracy, Completeness, Reliability): While the underlying information from ATC sources may be accurate, the delivery via VHF is impacted by line-of-sight limitations and there are areas within the Pilbara (particularly at low level) where VHF communication is not available or has been assessed as unreliable due to terrain. Over-transmissions and repeated calls due to combined frequencies or operator workload, confusion about radio calls and missed details can lead to increased workload for pilots and poor/inaccurate SA. While HF provides a third-party alternative to VHF it has been assessed that HF introduces risks to information integrity, due to poor transmission quality (static, faint signals), garbled information, and delays in relaying information between the HF operator, ATC and pilots. The requirement for HF operators, to manually recall and relay information to ATC or to a pilot introduces potential for error or omission, especially under cognitive overload.

Timeliness (Delivery Promptly Enough to be Operationally Useful): This criterion is frequently not achieved. Delays in establishing and maintaining VHF communication when needed and observed delays in HF communications of up to 11 minutes which contributes to delays in pilots establishing sufficient and timely SA to avoid a potential conflict or a decision point is missed.

Accessibility (Ease of Reliably Establishing Communication and Obtaining Information): Pilots report difficulty using VHF in areas impacted by line-of-sight limitations and delays in being able to make radio calls until sufficient VHF coverage is available. Establishing HF communications, especially at lower levels or on the ground is also difficult given the nature of how HF operates and the third-party arrangement for communicating with ATC. Operators in the Pilbara region identify limitations and issues with VHF and HF communication accessibility as a key issue impacting pilot ability to establish timely SA.

Impact on Situational Awareness

The identified deficiencies in FIS Timeliness and Accessibility impact a pilot's ability to build a timely and accurate mental model of the traffic environment and impact the timely and accurate provision of information relevant to the safety of flight. This forces reliance on:

- Traffic Collision Avoidance System (TCAS) (where available and effective, primarily for equipped aircraft).
- Visual acquisition (limited by visibility, workload, and aircraft blind spots).
- Information from CTAF/Area frequencies (if transmissions are successful and heard).

- Non-standard means (e.g., phones, company frequency relays). The lack of SA extends systemically: ATC acknowledges limited awareness of Class G activity near aerodromes, and HF operators lack the tools to build SA regarding traffic patterns or potential congestion. This fragmentation increases overall airspace risk.

Impact on Cognitive Workload and Performance

The limitations of the existing FIS increase cognitive workload for pilots. Pilots are often required to manage multiple frequencies, make repeated VHF or HF calls, anticipate missing traffic information, manage uncertainty, and potentially perform avoidance manoeuvres based on late or incomplete traffic information adds cognitive load.

Applying the PSOE Model

1. **Present:** There is a clear, documented intent by AA to provide FIS in the Pilbara review area. Services are delivered via VHF where available and supplemented by HF communications relayed through ATC or provided directly by HF operators (Flightwatch). **Finding:** The FIS is Present in terms of documented intent and existing service structures.
2. **Suitable:** The suitability of the intended design, particularly the availability and reliability of VHF and the use of HF for FIS in areas lacking VHF/surveillance coverage (especially at lower altitudes), is problematic for pilots. Operators in the Pilbara region consider the FIS at lower levels is inadequate. Furthermore, the HF system's design (combined frequencies, lack of modern tools for HF operators) appears unsuitable for reliably managing the traffic volume and complexity in the Pilbara region, especially during peak periods. **Finding:** The FIS relies on limited VHF and HF system configuration for critical information delivery despite line-of-sight issues with VHF at low level and inherent issues with HF. The existing FIS does not meet pilot needs consistently.
3. **Operational:** The FIS is being provided using VHF where possible and HF as backup if VHF is not available. Pilots advise that they are often challenged because of limitations to FIS. While FIS is technically operating, it frequently does not function as effectively as intended or required to support pilots with SA, for example, during peak traffic, or adverse weather. **Finding:** The FIS is Operating, but its performance and reliability are limited and inconsistent.
4. **Effective:** The effectiveness of the existing FIS is compromised when evaluated against the core performance criteria, for VHF and HF delivery mechanism. **Finding:** The FIS, particularly components are reliant on limited VHF and problematic HF, which results in deficiencies that impact the effectiveness of the current FIS.

Conclusion

While Present and technically Operating, the FIS within the review area, particularly its reliance on the current HF communication system, demonstrates significant shortcomings in Suitability and Effectiveness. It frequently fails to meet the crucial performance criteria of **Timeliness** and **Accessibility**, with potential impacts on **Integrity**, especially during peak operational periods and at lower altitudes where approach and departure procedures increase workload for pilots.

These failings directly undermine the primary purpose of FIS to support pilots in obtaining information relevant to the safety of flight which includes building and maintaining SA. Consequently, in the absence of a reliable and effective FIS; pilot cognitive workload is increased which may detract from pilot performance and decision making during critical phases of flight. This elevated workload, coupled with possible degraded SA and potential communication delays, demonstrably impacts performance and may contribute to the risks identified by industry stakeholders. The evidence strongly suggests the current FIS configuration, particularly the HF component, falls below reasonable performance expectations and requires significant improvement to adequately support safe and efficient operations in the Pilbara review area.

5.1.1 Implications for Class G airspace

In Class G airspace where pilots are responsible for their own separation and the safe conduct of flight, effective radio communication is critical for pilots obtaining information relevant to the safety of their flight while also establishing and maintaining SA. However, the current FIS has limitations that impact pilot ability to obtain information relayed by ATC. In these circumstances, pilots must rely on their own means of communication to obtain information necessary for the safety of their operation while also applying the basic principle of “see and avoid.” The need for pilots to use their own means to obtain information relevant to their flight and to make all necessary radio calls to establish timely SA may create cognitive workload that impacts other operational safety matters. In some circumstances there may be insufficient time or integrity of information to enable pilots to establish accurate SA. The provision of FIS reduces the need for pilots to source their own information using their own means and reduces the need for pilots to make radio calls.

Operating large capacity jet aircraft in an environment with limited low-level communication and limited surveillance capabilities during periods of bad weather increases the risk to airspace operations. A recent near miss occurrence in December 2024 where aircraft were required to stop their descent and climb to assure separation and avoid a potential mid-air collision (MAC) demonstrates the heightened risks related to pilot SA and the benefit of controls such as FIS (with or without surveillance) to mitigate risks.

6. Next Steps

CASA's analysis of the FIS within the Pilbara region identified limitations and deficiencies related to the Suitability and Effectiveness of the current FIS and highlighted the need to improve FIS performance related to Timeliness. Accessibility and Integrity of information.

- CASA is seeking to ensure there is a minimum level of safety for all operators in the Pilbara region through the provision of FIS that reduces cognitive workload.
- CASA will direct AA to resolve the concerns impacting Suitability, Effectiveness, Timeliness, Accessibility, and Integrity of FIS in the Pilbara region.
- CASA will conduct ongoing assessments of FIS performance in the Pilbara review area.

6.1 Conclusion

CASA has conducted a review of FIS in the Pilbara region to determine the effectiveness of the existing FIS. CASA determined that based on industry feedback and technical analysis of existing FIS capabilities, there was sufficient evidence to indicate that the current FIS is not adequate or effective which creates additional workload on pilots because they that need to compensate for the limitations of FIS which impacts pilot cognitive workload and effective performance. Stakeholder consultation highlighted the complexities during operations as lower levels, outside surveillance and VHF coverage which impact situational awareness and effective performance.

The analysis confirmed that while FIS is present and technically operating within the review area, its suitability and particularly its effectiveness are often compromised. This is primarily due to limitations associated with the HF communication system relied upon when VHF and surveillance are unavailable. The review found the FIS frequently fails to meet crucial performance expectations for timeliness and accessibility, potentially impacting information integrity, especially during peak operational periods or demanding conditions.

These limitations undermine the primary purpose of FIS, demonstrably degrading pilot SA and substantially increasing cognitive workload as pilots compensate for FIS deficiencies. The evidence indicates the current FIS configuration, particularly the limitations on VHF and the HF component, often fall below reasonable performance expectations and requires improvement to adequately support safe and efficient operations.

Appendices

Appendix A – Acronyms and Abbreviations

The following acronyms and abbreviations were used during the airspace review.

Acronym / Abbreviation	Explanation
AA	Airservices Australia
AAPS	Australian Airspace Policy Statement
ADS-B	Automatic dependent surveillance – broadcast
AIP	Aeronautical information publication
AMS	Aerodrome Management Services Pty Ltd
AMSL	Above mean sea level
ANSP	Air navigation service provider
ASD	Air situation display
ATC	Air traffic control
ATS	Air traffic service
ATSB	Australian Transport Safety Bureau
ATSC	Air traffic service centre
AWIS	Aerodrome weather information service
AWST	Australian Western Standard Time
CASA	Civil Aviation Safety Authority
CTAF	Common traffic advisory frequency
DAH	Designated airspace handbook
DAP	Departure and approach procedures
ERSA	En Route Supplement Australia
ETA	Estimated time of arrival
FIR	Flight information region
FIS	Flight information service
FL	Flight level
FT	Feet
HF	High frequency
hPa	Hectopascals
IAS	Indicated air speed
ICAO	International Civil Aviation Organization
IDSAU	IDS Australasia
IFP	Instrument flight procedure
IFR	Instrument flight rules
km	Kilometres
KTS	Knots
LL	Lower level
LSALT	Lowest safe altitude
m	Metres
MAC	Mid-air collision
MHz	Megahertz
MOA	Military operating area
MOS139	Manual of Standards Part 139 - Aerodromes

Acronym / Abbreviation	Explanation
MOS173	Manual of Standards Part 173 - Standards Applicable to Instrument Flight Procedure Design
NM	Nautical miles
OAR	Office of Airspace Regulation
PAL	Pilot activated lighting
POSF	Pilbara Operators Safety Forum
PPR	Prior permission required
PSOE	Present-Suitable-Operating-Effective
RA	Restricted Area
RNP	Required navigation performance
RWY	Runway
SA	Situational awareness
SAR	Search and rescue
SFC	Surface
SID	Standard instrument departure
SIS	Surveillance information service
STAR	Standard arrival route
SUA	Special use airspace
SVFR	Special VFR
TCAS	Traffic collision avoidance system
TCAS-RA	Traffic collision avoidance system – resolution advisory
TCAS-TA	Traffic collision avoidance system – traffic advisory
TCU	Terminal control unit
VFR	Visual flight rules
VHF	Very high frequency
VMC	Visual meteorological conditions
WA	Western Australia
YANG	West Angelas aerodrome
YBDG	Boolgeeda aerodrome
YBRY	Barimunya aerodrome
YCDW	Coondewanna aerodrome
YCHK	Christmas Creek aerodrome
YFDF	Fortescue Dave Forrest aerodrome
YKDD	Gudai-Darri aerodrome
YNWN	Newman aerodrome

Appendix B – References

Airservices Australia - Aeronautical Information Package (AIP) Aeronautical Information Package (AIP) - Airservices (airservicesaustralia.com)

Airspace Act 2007 (Cth), Canberra

Airspace Regulations 2007 (Cth), Canberra

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Civil Aviation Act 1988 (Cth), Canberra

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Civil Aviation Safety Authority Manual of Standards Part 173 – Standards Applicable to Instrument Flight Procedure Design, August 2022, Canberra

Department of Infrastructure, Transport and Regional Development 2021. Australian Airspace Policy Statement 2021, Canberra. Australian Airspace Policy Statement 2021 (legislation.gov.au)

Eurocontrol Aircraft Performance Database Aircraft Performance Database accessed 25 January 2025

Flight Safety Australia https://www.flightsafetyaustralia.com/2017/05/safety-in-mind-normalisation-of-deviance/ Civil Aviation Safety Authority, Canberra accessed 3 January 2025.

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National Aviation White Paper – Towards 2050, August 2024 Australian Government (Cth), Canberra

Appendix C – Australian airspace structure

Australian airspace classifications accord with Annex 11 of the International Civil Aviation Organization (ICAO) and are described in the Australian Airspace Policy Statement.

Australian airspace is classified as Class A, C, D, E and G depending on the level of Air Traffic Service (ATS) required to best manage traffic safety and efficiency. Government policy allows the use of Class B and Class F airspace; however, these are not currently used in Australia.

The airspace classification determines the category of flights permitted, aircraft equipment requirements and the level of ATS provided. Within this classification system, aerodromes are either controlled, that is, within Class C or Class D airspace, or non-controlled, Class G airspace.

App Table 1: Airspace Classifications

Class	Description	Summary of services, procedures, rules
A	All airspace above FL180 (east coast) or FL245 elsewhere.	• IFR only. All aircraft require a clearance from and are separated by ATC. • Continuous two-way radio and transponder^ required. • No speed limitation.
B	Not currently used within Australia.	• IFR and VFR flights are permitted. • All aircraft require a clearance from ATC to enter airspace. All aircraft require continuous two-way radio and transponder^. • All flights are provided with ATS and are separated from each other.
C	In CTRs of defined dimensions and control area steps generally associated with controlled aerodromes.	• All aircraft require a clearance from ATC to enter airspace. All aircraft require continuous two-way radio and transponder^. • IFR separated from IFR, VFR and SVFR by ATC with no speed limitation for IFR operations. • VFR receives traffic information on other VFR but are not separated from each other by ATC. SVFR are separated from SVFR when VIS is less than VMC. • VFR and SVFR speed limited to 250 KTS IAS below 10,000 FT AMSL*.
D	Towered locations such as Bankstown, Jandakot, Archerfield, Parafield and Alice Springs.	• All aircraft require a clearance from ATC to enter airspace. For VFR flights this may be in an abbreviated form. • As in Class C airspace all aircraft are separated on take-off and landing. All aircraft require continuous two-way radio and are speed limited to 200 KTS IAS at or below 2,500 FT AMSL within 4 NM of the primary Class D aerodrome and 250 KTS IAS in the remaining Class D airspace**. • IFR are separated from IFR, SVFR, and provided with traffic information on all VFR. • VFR receives traffic on all other aircraft but is not separated by ATC. • SVFR are separated from SVFR when VIS is less than VMC.
E	Controlled airspace not covered in above classifications.	• All aircraft require continuous two-way radio and transponder^ (unless VFR aircraft are unable to power a transponder). • All aircraft are speed limited to 250 KTS IAS below 10,000 FT AMSL*. • IFR require a clearance from ATC to enter airspace and are separated from IFR by ATC and provided with traffic information as far as practicable on VFR. • VFR do not require a clearance from ATC to enter airspace and are provided with a FIS.

Class	Description	Summary of services, procedures, rules
		• On request from VFR and ATC workload permitting, a SIS is available within surveillance coverage.
F	Non-controlled. Not currently used in Australia.	• IFR and VFR flights are permitted. All IFR flights receive an air traffic advisory service, and all flights receive a FIS if requested.
G	Non-controlled	• Clearance from ATC to enter airspace not required. All aircraft are speed limited to 250 KTS IAS below 10,000 FT AMSL*. • IFR require continuous two-way radio and receive a FIS, including traffic information on other IFR. • VFR receive a FIS. On request and ATC workload permitting, a SIS is available within surveillance coverage. • VHF radio required above 5,000 FT AMSL and at aerodromes where carriage and use of radio is required.

* Not applicable to military aircraft
** If traffic conditions permit, ATC may approve a pilot's request to exceed the 200 KTS speed limit to a maximum limit of 250 KTS unless the pilot informs ATC a higher minimum speed is required.
^ Transponder requirement includes ADS-B OUT.

Appendix D – Airline reported incidents

- 2 December 2024 aircraft inbound to YBRY, and trailing were two other aircraft for YCWA and YANG. All three aircraft were operating up to 25 NM off track due weather. First aircraft was on descent when a second aircraft departed YCWA for Perth. There were several radio transmissions on CTAF. ATC issued a traffic alert on VHF and recorded an event. Aircraft advised they were within 1.9 NM travelling in opposite and crossing directions. Action taken by first aircraft ensured separation, but more effective communication and surveillance would have reduced the risk to users during high workload, off track and descending environments. Both aircraft advised they had a traffic collision avoidance system – resolution advisory (TCAS-RA).
- 24 December 2024: YANG reported poor quality HF transmissions. Several attempts made to make contact. Use of external sources to obtain some situational awareness. Was able to reach HF operator but had to turn down VHF radio to comprehend transmission and missed CTAF call of traffic on final for runway 04. During taxi additional coordination required for respective backtrack on runway.
- 17 December 2024: YANG: Unable to contact HF until backtracking on runway prior to departure. Only static heard on bay and apron area.
- 3 December 2024: YCHK: No traffic given on descent. Melbourne centre frequency on VHF1 and YFDF CTAF on VHF2. Passing 7,000 FT AMSL, aircraft observed on TCAS below and initially maintaining altitude. No call heard from lower aircraft. Attempted to contact – no response. Confirmed on right frequency and frequency operational. Descending aircraft levelled off at 5,000 FT AMSL and requested updated traffic from Centre. No traffic given. Manoeuvred aircraft west of position as departing aircraft appeared to be heading south. Shortly after MEL Centre advised of other aircraft. Other aircraft called on CTAF advised they heard calls from descending aircraft on Centre and CTAF and responded. Their calls could only be heard once passing 5,000 FT AMSL.
- 26 November 2024: YFDF: After arrival, no contact possible with Brisbane Centre on HF (8822 and 6565) to cancel SARWATCH. Also contact available during taxi out and therefore no traffic information available. This affected four sectors flown. This is a safety concern especially considering the proximity of YCHK.
- 19 November 2024: YANG: Contact with Flightwatch on 8822 very faint, strength 1. Unable to copy traffic information, an increased risk considering YCWA only 11 NM to the north-east of the airport. Flightwatch 6565 completely unreadable.
- 31 October 2024: YFDF: Heavily congested HF. Variable winds at both YFDF and YCHK. On arrival there was a late change of runway from RWY30 to RWY12. On backtrack we heard an aircraft taxiing YCHK RWY 27 on HF 8822. YFDF active runway 12. YCHK active runway 27. After engine start, an attempt was made to contact Flightwatch on 8822 to request traffic information. Due to conflicting runway directions at YFDF and YCHK it was important to receive any traffic information. No VHF contact is possible between YFDF and YCHK. HF 8822 was heavily congested with relatively poor reception. An attempt was made on 6565, again without success. The controller regularly had to tell all aircraft to standby due to the high volume. Eventually we had success receiving traffic information however this was 15 minutes after the first attempt was made.
- 23 October 2024: YFDF: Traffic separation issue. Prior to descent into YFDF ATC cleared aircraft to leave controlled airspace on descent with no reported IFR traffic. Traffic observed was VFR helicopter manoeuvring to the south of YFDF at 4,200 FT AMSL, unverified, intentions unknown. Pilot initially selected the grid LSALT of 5,100 FT AMSL, then changed to 5,200 FT AMSL for separation until positive separation was possible after communicating with the helicopter. Aircraft requested to waypoint WD for the RNP RWY12 procedure and to manoeuvre further to west to potentially increase lateral separation. On decent, a broadcast was made on area frequency and then on CTAF with no response from the VFR helicopter. A response was heard from another helicopter that was manoeuvring to land at YFDF, but nothing from the initial helicopter. The First Officer made two more attempts on CTAF and nothing heard. Approaching WD, (10 miles or greater), we located the VFR helicopter on TCAS, and then visually identified the helicopter. Around this time the helicopter then communicated that it was heading in a north westerly direction but no reference in relation to the airport. Descending aircraft stopped descent at 5,800 FT AMSL to assure vertical separation. VFR helicopter flew underneath aircraft. Aircraft had an accompanying TCAS TA. After visually sighting the VFR helicopter north-west of our position. Continued descent in visual conditions to intercept the RNP approach and land without further incident.

Appendix E – Consultations

E.1 Office of Airspace Regulation

A summary of the issues and observations made at each ATSC are as follows:

Melbourne Centre

West Group ATC advised the current surveillance and VHF communication coverage was sufficient for air traffic management within the region. Nevertheless, the addition of other VHF transmitters would require a comprehensive review of existing frequency and airspace sectorisation to maintain operational effectiveness, particularly regarding aerodromes located on or near frequency boundaries.

A critical operational limitation for West Group ATC was the availability of spare ASD consoles. This directly impacts the feasibility of sectorisation and splitting of existing sectors, presenting logistical challenges related to equipment procurement and placement within the ATSC.

ATC in this sector prioritise HF communications for co-ordination, traffic statements and position reports etcetera, but ATC acknowledged an inconsistency across other sectors. Also, ATC reported difficulties at times in establishing contacting HF operators, attributed to their task completion process and overall workload.

ATC revealed a perception of their improved service during instances when HF communication was not available due to atmospheric conditions. This is because aircraft can still depart without a traffic statement provided by ATC but then obtain one by directly contacting ATC on VHF once airborne. It was acknowledged that ATC lacks full awareness of all the traffic within each CTAF or other aircraft operational variables within Class G airspace.

Other observations noted by the OAR were:

- Pilot callsign confusion led to increased frequency congestion due the need for corrections.
- No aircraft experienced delays or denied airspace clearance due to ATC communications or surveillance.
- Pilots did not always acknowledge traffic statements.
- During high workload periods for HF operators, aircraft used other means of communication such as satellite telephones to contact Melbourne ATSC.

Brisbane Centre

Centre staff provided an overview of their HF operations, drawing distinctions between domestic and international operations. A critical incident was the 2023 Inmarsat outage which rendered the Controller Pilot Data Link Communications (CPDLC) unavailable for international aircraft.[15] During this outage, HF became the sole communication channel for international operations outside VHF coverage. This led to a significant increase in HF operators' workload. Without HF capabilities, aircraft would face substantial diversions to remain in VHF coverage, making long over-water flights difficult or impossible.

The Silver sector is responsible for monitoring the Pilbara region. This area covers the Southern HF boundary area, covering most of Western Australia and extends to the east coast of Australia as displayed in Figure 6.

HF Domestic operations use a primary and secondary frequency network. In Silver, 99% of HF operations occur within the 6 and 8 MHz band, specifically 60-70% within the 8 MHz band and 30-40% within the 6 MHz band. A major operational challenge arises because HF operators have these frequencies combined which causes issues when aircraft transmit on either band. Importantly, aircraft operating on one HF band do not hear aircraft operating on another HF band.

The OAR made several additional observations, highlighting challenges for HF operators:

[15] CPDLC is a two-way data-link system where non-urgent preformatted messages are sent by ATC to aircraft and vice-versa, as an alternate means to voice communications.

- **Workload fluctuations**: HF operators experience daily variations in workload, with two consistent periods of extremely high workload.
- **Lack of situational awareness tools for domestic HF operators**: Domestic HF operators lack visual displays like flight strip displays or ASDs like ATC. This limited equipment prevents operators developing any situational awareness, even when high workloads are anticipated. To provide accurate information, HF operators are required to search for flight plans for each aircraft upon every call, often requiring multiple transmissions to confirm callsigns and locations. The OAR noted that visual displays would likely reduce transmissions and improve communication effectiveness.
- **Enunciation difficulties**: Pilot enunciation presented challenges for HF operators, particularly with similar sounding numbers, for example 19/90, 13/30.
- **Impact of high workload periods**:
  - Aircraft sometimes departed locations without obtaining a traffic statement.
  - When additional staff were available to support the HF operator, most transactions were completed within two minutes.
  - Without additional staff, transactions typically took 3-4 minutes to complete but some delays extending to 7-11 minutes.
- **Specific high workload durations**: The OAR recorded 90-minute-high level work periods during both morning and afternoon events.
- **High volume of SARTIME calls**: The OAR was advised HF operators completed more than 500 SARTIME calls each day of their attendance. The high number of these calls occur each day.
- **Proposed improvements**: HF operators believe the ability to split frequencies and have equipment to assist with situational awareness would significantly improve service delivery and reduce response times.

E.2 Airservices Australia

Airservices Australia has consistently communicated throughout this review process, a system-view provides the best approach for understanding appropriate risk mitigations for Pilbara airspace and specifically the Iron Triangle region.[16] The Pilbara Operators Safety Forum (POSF) has proved successful for a better understanding and exploring new and/or strengthened control options.

Additionally given the growth and potential increase in aerodromes in the region, future aerodrome planning is a key component to ensuring ongoing effectiveness of risk management action and is an important consideration for this review. A summary of the feedback regarding Pilbara is as follows:

Traffic growth and industry engagement

- Airservices participated in the monthly POSF throughout 2024, and have provided regular updates to our analysis on the traffic growth in the Pilbara region, including concentration of traffic during similar peak morning and afternoon periods, increases in B737 and A320 jet operations in the region (when the pilot crews are less familiar with CTAF/Class G conditions), and options of enhancing communications and ADS-B surveillance coverage starting with the Iron Triangle. Airservices also provided a barrier model to prompt airlines to consider opportunities to tighten their controls, such as scheduling practices, seeking Part 173 providers' support to reduce conflicts in instrument flight procedures at the design stage, and working with the mining industry to improve aerodromes planning.
- Airservices also engaged with industry stakeholders on Pilbara related issues through forums such as Regional Aviation Association of Australia regional roadshows and the Australia Airports Association mining aerodromes forum.
- Airservices conducted two Pilbara workshops in 2024 with Qantas Group representatives reaffirming the opportunity across the industry to enhance various risk controls in Pilbara.

[16] The Iron Triangle is reference to the Pilbara region where a high number of aerodromes are located for the provision of mining operations. The Iron Triangle boundary is the area between Newman, Paraburdoo and Iron Bridge and includes the aerodromes subject to this review.

- Airservices will continue to encourage airlines to seek reduced concentration of demand during peak periods through their network/scheduling planning and engagement of instrument flight procedures designers to ensure strategic deconflictions. We are also planning to engage with the owners of the airports (e.g. major mining companies) to obtain support/contribution to investment of enhanced communications and surveillance infrastructure.
- Airservices presentation on aircraft movements, ADS-B and VHF coverage presented at the POSF has been provided to CASA OAR.

ATC/Airspace management

- As a result of frequent holding into Boolgeeda (YBDG) (multiple times per week) due to the number of flights/airline schedules/available aircraft parking, a meeting was held in 2024 where Airservices was advised that more parking bays were being built, however at this stage it is believed this remains incomplete.
- Lack of VHF communications in the region increases workload for ATC, due to reliance on HF operators which must be managed.
- A workload assessment was conducted on West controllers and Silver HF radio operators in February 2024, however it was impacted by aviation strike action resulting in lower-than-normal traffic. Nonetheless the assessment found that while workload was manageable, reduced surveillance increased workload. Industry reports of a delay in getting traffic prior to departing were investigated and found to be less than 2 minutes, however the strike action may have influenced the outcome. It was found that if traffic were to increase, VHF availability on the ground would help reduce workload.
- There is still limited safety reporting data for the region however a recent report regarding a TCAS RA has been submitted. No trends have been identified through occurrence reporting.

Recent changes to the ATC training pathway have been made due to the complexity and volume of traffic in the airspace. The airspace has been divided so trainees train on half the airspace before progressing to more sectors and airspace volumes.

Flight Path Design

- IDS are leading the Pilbara flight path design work with Airservices is supporting (preliminary design provided to CASA by IDSAU). IDSAU engaged with CASA regarding the redesign and consulted To70 to ensure appropriate consideration of ATC procedures. Positive feedback was received from ATC regarding the proposed redesign.
- IDSAU will coordinate with Airservices about publication of relevant charts.
- The redesign of flight procedures addresses issues that were identified in the Draft Airspace Review for Pilbara 2023. The solution is intended to support future aerodrome growth in the region and will help reduce pilot workload and improve situational/traffic awareness.
- IDSAU will apply for a Part 173 exemption for overlapping primary protection areas Ginbata (YGIA) (YGIA RNP RWY 09 and YFDF RNP RWY 30).

Planning

- Airservices conducted a meeting with operators in 2024 outlining design considerations. The option of having one VHF installation covering multiple airports around West Angelas at or around 2,000 FT AMSL of coverage (given terrain) was discussed. However, the rate of change in airport infrastructure, uncertainty around the locations and lifecycle of mining development highlights the planning complexity for VHF transmitters in the Pilbara (i.e. where/how many installations, the required capital and operating investment outlays, risk of stranded assets due to changes in traffic flows outside the Pilbara).
- Conflict risk assessment conducted to inform site prioritisation in the region (subject to other data and Subject Matter Expert inputs) was shown to CASA OAR in December 2024.
- Airservices continues its planning including the completion of a rough order of magnitude (ROM) estimate for VHF and ADS-B installations within the Pilbara region.
- Redesign of flight procedures addresses issues in the Draft Airspace Review for Pilbara 2023. The solution is intended to support future aerodrome growth in the region and will help reduce pilot workload and improve situational/traffic awareness.

E.3 Consultancy service providers

Issues raised by consultancy service providers AMS and IDSAU were:

- The landscape in the area provides challenges for existing aerodromes and the development of new ones. Because of the landscape the only place to build aerodromes is amongst the hollows, having minimal impact on where the mineral resources can be extracted.
- A significant issue related to the line of sight to make the most of the infrastructure.
- The development of new locations will result in overlapping IFPs or IFPs operating near other locations. The Pilbara region will get busier.
- Pilots who do not normally operate within the region, find a significant difference to their normal operations elsewhere, particularly with workload management.
- An appreciation regarding the installation and commissioning of new aviation facilities and the time required from starting the project to using the facilities, however the ongoing issues within the Pilbara require further mitigation to reduce the risk to airspace operations.
- Developing the infrastructure to improve surveillance and radio communications will assist in airspace operations.
- Challenges for consultancy services includes the ability to effective plan and anticipate client needs. In relation to aerodrome planning, the initial investment cost is significant including reviewing airspace issues such as development of IFPs, which could ultimately determine runway orientation.
- The development of IFPs including SIDs and STARs remains an ongoing process. This arrangement is akin to a partnership between various aerodrome operators, airlines and the Part 173 designer.
- The SIDs and STARs will provide some traffic predictability for pilot awareness.
- SIDs and STARs are expected to be submitted to CASA during 2025.

E.4 Aerodrome operators

Issues raised by aerodrome operators were:

- Very supportive of the steps Airservices Australia are taking to examine what additional VHF and/or ADS-B units can be installed to increase coverage within the network.
- Traffic within the Iron Triangle is quite significant compared to other locations in the Pilbara. The use of HF can be problematic for airline operations in the area.
- Aerodrome infrastructure has usage limitations such as available parking and apron size. Scheduling, prior permission requirements and notifying the aerodrome reporting officer when at least 20 minutes out from landing, helps mitigate availability issues. However, should an aircraft become unserviceable, that impacts operations at that location.
- Education should be undertaken for pilots operating in the Pilbara, not just remote locations. This can include airmanship, having pilots understand the time required for backtracking, the spacing between flights arriving at the same location etcetera.
- Operations from the East coast into the Pilbara region is going to increase.
- Survey activity is an ongoing operation in the area. Smaller aircraft are undertaking survey work within the Pilbara region.
- The change in aircraft and the amount of traffic operating in the region has significantly changed over time. Previous Metroliner and BA146 aircraft have been replaced by B737s and A320s. Currently airlines are changing the types of aircraft operating in the Pilbara.
- Aerodromes, which are operated by various mines, are not flexible regarding the transport of staff. Each flight carries staff from different operations of the mine. There is a significant cost differential should times be readjusted. The personnel are needed at those times and those times are used for transporting them by aircraft to each location.
- Existing operations is cost-efficient and beneficial for staff. The establishment of a slot system or something like the region.

- The uniqueness of region, globally, presents challenges. Currently in a remote location of Australia, in uncontrolled airspace there are 20 certified aerodromes with flight procedures and aircraft flying at 300 knots, carrying two million passengers, operating on see and avoid.
- There is an expectation the Regulator will appropriately address the issues impacting the Pilbara and a developing frustration due to a lack or delay in actions.
- The perception that normal deviation is normal in the Pilbara and results in no reports being filed.
- Consideration could be given for higher route charges when operating in or around Pilbara aerodromes to cover infrastructure and service costs.
- Consideration for CPDLC to be used for domestic purposes due to inadequate HF reception.
- Aerodrome operators, in principle, would assist with the cost of installing new facilities at their aerodromes, however this requires senior management approval on a more detailed submission.

E.5 Airline Operators

Issues raised by aerodrome operators were:

- There is an immediate need for better communication and surveillance systems within the Pilbara region.
- Pilot workload varies across the different aircraft operating in the review area. However, the receipt of a FIS during high workload periods is not effective. For example, pilots can miss a checklist, not provide a full briefing due to FIS delivery and engaging with other air traffic, while monitoring multiple frequencies and establishing HF communications.
- Pilots are working harder for ports in the Pilbara compared to other locations nationally. Workload is further increased during the wet season where aircraft are regularly off-track to avoid weather.
- Frequencies pilots manage include:
  - CTAF
  - Company frequency
  - Melbourne Centre (ATC)
  - Inbound call to the aerodrome
  - Weather/aerodrome weather information system (AWIS)
  - Aerodrome lighting, and
  - HF.
- The performance of the B737 on hot days is limiting. A change in fleet aircraft will reduce or remove the number of B737s operating in the area.
- The lack of surveillance on the west coast compared to the east coast is noted by operators.
- Briefings held by Airservices in the terminal control unit at Perth airport had stopped. There were seen to be good refresher training for staff as to the operations and expected conditions in the area.
- The lack of reports could be based on pilots adapting to each scenario and that has become a normal standard action.
- Industry perceives the Regulator is being reactive and waiting for an incident instead of being proactive. A perception that the industry is dealing with multiple issues and by coincidence these have not manifested into more serious incidents.
- Different operators develop different procedures for operations at the same location. For example, one operator could fly a circuit prior to landing, while another provides a straight-in approach using the IFP. Some CTAF operations do not consider traffic separation or performance of other aircraft.
- Delays experienced on the ground, impacts other airborne aircraft due to available space on the ground and limited parking bays/no alternative taxiways.
- Pilots are using phones and information from other sources to develop situational awareness.
- There is no need to change the air routes.

- Lowering controlled airspace will not resolve existing issues within the area.
- VHF communications provide direct contact with ATC. HF operations currently during busy periods results in delays from 1 to 7 minutes. HF is a good back-up but not suitable as a primary means of communication within this area, especially during busy periods.
- Pilots have experienced callsign confusion.
- The development of more aerodromes in the region will increase the risk to operations.
- Pilot briefing packages for operations in the Pilbara are extensive. The amount of information included will impact available cognitive capacity.
- Changes implemented to procedures in the region will need to address expectation bias at other locations.
- Airlines are actively engaging with aircrews to undertake survey information or submit reports.

Appendix F – Stakeholders

The following stakeholders were contacted and contributed to this review.

Organisation	Section / Position
Aerodrome Management Services	Aerodrome engineering, design, and planning
Airservices Australia	Aviation Regulatory Engagement Melbourne ATSC – West Group Brisbane ATSC – HF Operations
Alliance Airlines	Flying Operations Fleet Technical Pilots
Civil Aviation Safety Authority	Aerodromes Aviation Safety Advisors Risk Oversight Office Airspace Regulation
Fortescue Metals Group	Manager, Aerodromes
Network Aviation	Head of Safety
Mineral Resources Limited	Aerodrome Compliance A320/319 Captain
Pilbara Operators Safety Forum	Forum members – Aerodrome, airline, consultants, Airservices and CASA representatives
Qantas Group	Air Traffic Management Group Compliance Fleet Operations Other safety and risk personnel
Rio Tinto	Aerodrome engineering Demand forecasting optimisation Aviation Superintendent
Virgin Australia	Safety Systems and Operations Support Operations Risk and Business Support
Virgin Australia Regional Airlines	Chief Pilot First Officer operational Manager Line Operations

Appendix G – Aerodrome ERSA entries

The following extracts are from ERSA effective 28 November 2024 and identifies the quantity of information regarding the environment and operations at each aerodrome in the review area.

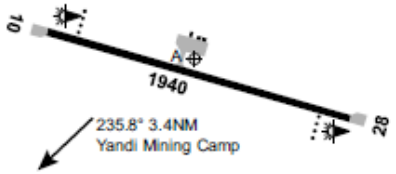
G.1 Barimunya

BARIMUNYA **ELEV 2082**

AVFAX CODE 6826

WA		UTC +8	YBRY
224026S	1190958E	VAR 1 DEG E	CERT

AD OPR Barimunya Aerodrome Joint Venture, Brookfield Place, 125 St Georges Terrace, Perth, WA, 6000. ARO 0408 427 212: Email 1 - barimunya.airport@bhp.com: Email 2 - barimunya.supervisor@bhp.com.



REMARKS

1. Restricted OPS. PPR from AD OPR.
2. All OPS - advise AD OPR at least 20 MIN prior to ETA on 129.75.
3. PRI source of power is derived from a generator.

HANDLING SERVICES AND FACILITIES

AIR BP: JET A1, CTC ARO.
Marshalling, parking allocation and ground handling by prior arrangement with AD OPR.

PASSENGER FACILITIES

LG/RF/WC. Telstra 4G mobile reception.

AERODROME OBSTACLES

1. CAUTION: OBST lights NOT provided on Hills infringing N and S of AD inner HZS and CNS.
2. Extensive infringements N of AD, approx 1.6NM - 2.3NM, 287DEG MAG to 090DEG MAG FM ARP. MAX inner HZS infringement 345FT (2574.6FT AMSL).
3. Inner HZS infringed 33FT (2262.6FT AMSL), 275DEG MAG 1.6NM FM ARP.
4. Inner HZS infringed 66FT (2295.6FT AMSL), 307DEG MAG 1.9NM FM ARP.
5. Transitional SFC infringed 7FT, 150M S of RWY CL to S of APN/TWY.
6. Facility Infringements:
   a. Transitional SFC infringed 8FT by Western IWI. Marked with red OBS light.
   b. Transitional SFC infringed 1FT by Eastern IWI. Not marked.

METEOROLOGICAL INFORMATION PROVIDED

1. TAF CAT C, METAR/SPECI.
2. AWIS FREQ 122.075 - Requires one one-second pulse to activate. Report faults to AD OPR.

PHYSICAL CHARACTERISTICS

10/28 104 64a PCN 41 /F /A /1250 (181PSI) /T WID 30 RWS 150

AERODROME AND APPROACH LIGHTING

RWY 10/28	LIRL		SDBY PWR AVBL
RWY 10/28	PAPI(2)	3.0 DEG42FT	SDBY PWR AVBL
RWY 10/28	PTBL(1)		BY PRIOR ARRANGEMENT

(1) 90MIN PN.
(2) Left Side. Special wheel clearance for ACFT in 5M to 8M eye-to-wheel group.
RWY edge light spacing: 10/28: 60M.

OTHER LIGHTING

1. For aerodrome lighting activation outside of HS a minimum of 90 minutes prior notice is required.
2. SDBY PWR switchover time: Manually activated, 30 MIN PN required.
3. TWY LGT: Blue edge.

ATS AND AERODROME COMMUNICATION FACILITIES

FIA MELBOURNE CENTRE 128.15 3500FT

LOCAL TRAFFIC REGULATIONS

1. RWY 10/28: All ACFT ABV 5,700KG must make MAX RAD turns at MNM speed at turning nodes to avoid SFC damage.
2. All ACFT are required to backtrack on RWY centreline.
3. ACFT at opposite ends of RWY may not be visible to each other.
4. All ACFT to follow APN markings.
5. F100 - Use lead in/out Line A.
6. F70 - Use lead in/out Line B.
7. A320 - Use Bay 2A or 4 only. CAUTION: jet blast when ACFT powering out of Bay 2A.
8. Bays 3 and 4 not AVBL concurrently and HN due no illumination.
9. No fuel AVBL Bay 1. Overwing refuelling Bay 3 only.

FLIGHT PROCEDURES

RWY 10 - right hand circuits required.

CTAF - AFRU 127.05

AFRU signal not AVBL on ground at Barimunya.

ADDITIONAL INFORMATION

Mine blasting sites located 4.87NM SW of AD (224325.02S 1190536.00E) and in a line 4.75NM to the W and 4.2NM to the SE for the BHP Billiton site and 6.3NM SE of the AD (224548.12S 1191341.88E) and in a line 4NM to the SE for the Rio Tinto site. Regular blasting at 1000, 1400 and 1600 Local DLY. CTC the ARO for additional BHP Iron Ore and Rio Tinto Iron Ore blasting times.

CHARTS RELATED TO THE AERODROME

1. WAC 3229.
2. Also refer to AIP Departure and Approach Procedures.

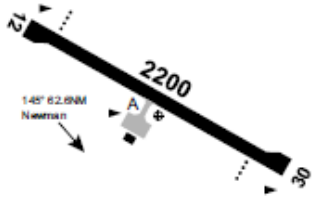
G.2 Gudai-Darri

GUDAI-DARRI MINE **ELEV 1473**

AVFAX CODE 6838

WA		UTC +8	YKDD
223019S	1190434E	VAR 1 DEG E	CERT

AD OPR Mount Bruce Mining Pty Ltd, Level 18, 152-158 St Georges Terrace, Perth, WA, 6000.
Email: gudaidarri.airport@amsaustralia.com. PH 08 9327 2000. ARO AH 0428 868 947.



REMARKS
1. Restricted OPS, HJ only. 24 HR PPR FM AD OPR.
2. All OPS – Advise AD OPR at least 20 MINS prior ETA on 127.925. CS "Gudai-Darri Base".

HANDLING SERVICES AND FACILITIES
Viva Energy Aviation: 2230-1000 UTC DLY, AH with 2HR PN. PH 0448 680 573. JET A1 - Fuel2Sky Carnet Cards, V or MC.
Marshalling, parking allocation and ground handling services by prior arrangement with AD OPR.

PASSENGER FACILITIES
WC, LG, RF, Telstra 4G mobile reception.

APRONS AND TAXIWAYS
TWY A, Code C WID 18M bitumen seal.

AERODROME OBSTACLES
There are a large number of obstacles in the VCY of the AD. CTC ARO for details.

METEOROLOGICAL INFORMATION PROVIDED
1. TAF CAT C, METAR/SPECI.
2. AWIS FREQ 133.350 (requires three one-second pulses to activate) - Report faults to AD OPR.

PHYSICAL CHARACTERISTICS
12/30 114 72a PCN 45 /F /B /1440 (209PSI) /T Sealed. WID 45 RWS 300

AERODROME AND APPROACH LIGHTING
RWY 12/30 PAPI(1) PAL+AA 119.6 3.0 DEG54FT SDBY PWR AVBL
RWY 12/30 PTBL(2) BY PRIOR ARRANGEMENT
(1) AVBL HJ only. Left side only. PAL+AA requires three three-second pulses to activate.
(2) AVBL for EMERG (mercy flights) only. 2HR PN to ARO.
RWY 12/30 edge light spacing: 60M (PTBL).

OTHER LIGHTING
SDBY PWR switchover time: 10 SEC.

ATS AND AERODROME COMMUNICATION FACILITIES
FIA MELBOURNE CENTRE 128.15 Circuit area

LOCAL TRAFFIC REGULATIONS
1. RWY 12/30: All fixed wing ACFT ABV 5,700KG must make MAX RAD turns at MNM speed at turning nodes to avoid SFC damage.
2. All ACFT 5,700KG and BLW are permitted to perform MAX RAD mid RWY turns.
3. All ACFT are required to backtrack on RWY centreline.
4. All ACFT to follow APN markings.
5. All jet ACFT to use idle power for movements on the APN with the exception of breakaway thrust to initiate taxi.

FLIGHT PROCEDURES
Right hand circuit on RWY 30 due to high terrain to the S of the AD.

CTAF - AFRU 127.05
1. AFRU not AVBL on ground.
2. AFRU at Fortescue Dave Forrest (YFDF).

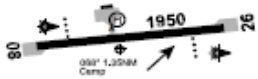
ADDITIONAL INFORMATION
Blasting occurs BTN BRG 209 MAG and BRG 248 MAG, 2.0NM to 4.2NM FM ARP.
CTC ARO for blasting times.

CHARTS RELATED TO THE AERODROME
1. WAC 3229.
2. Also refer to AIP Departure and Approach Procedures.

G.3 Coondewanna

COONDEWANNA **ELEV 2327**

AVFAX CODE 6829



WA UTC +8 YCWA
225800S 1184848E VAR 1 DEG E CERT
AD OPR BHP Iron Ore Pty Ltd, 125 St Georges Terrace, Perth, WA, 6000.
Email: macairportsup@bhp.com. Email: coondewanna.mail@bhp.com.
ARO 0400 387 986.

REMARKS

1. Restricted OPS. PPR from AD OPR.
2. All OPS - advise AD OPR at least 20 MIN prior to ETA on 129.75.

HANDLING SERVICES AND FACILITIES

AIR BP: JET A1 CTC ARO.
Marshalling is provided for all fixed wing aircraft.

PASSENGER FACILITIES

LG/RF/WC. Telstra 4G mobile reception.

AERODROME OBSTACLES

1. Significant high terrain WI circuit area.
2. Numerous OBST penetrate inner HZS:
   a. LCA BTN 050DEG M and 075DEG M, 2.16NM FM ARP, 2,600FT; and
   b. LCA BTN 100DEG M and 270DEG M, 1.24NM FM ARP, 2,950FT.
3. Numerous OBST penetrate conical SFC:
   a. LCA BTN 308DEG M and 030DEG M, 2.64NM FM ARP, 2,670FT;
   b. LCA BTN 110DEG M and 135DEG M, 2.64NM FM ARP, 2,950FT; and
4. Lit TWR 164FT AGL BRG 121 MAG 3.12NM FM ARP, 390FT.

METEOROLOGICAL INFORMATION PROVIDED

1. TAF CAT C, METAR/SPECI.
2. AWIS FREQ 122.325 (requires one one-second pulse to activate) - Report faults to ARO.

PHYSICAL CHARACTERISTICS

08/26	082	64a	PCN 44 /F /A /1440 (209PSI) /T Grooved.		WID 30	RWS 150

AERODROME AND APPROACH LIGHTING

RWY 08/26	LIRL(1)	PAL+AA 120.2		SDBY PWR AVBL
RWY 08	PAPI(2)	PAL+AA 120.2	3.1 DEG45FT	SDBY PWR AVBL
RWY 26	PAPI(2)	PAL+AA 120.2	3.1 DEG43FT	SDBY PWR AVBL

(1) Spacing 60M
(2) Left side.

1. PWR supplied by mains - SDBY PWR auto switchover 14 SEC.
2. IWI will activate on PAL and PRI IWI will flash in last 10MIN of 30MIN cycle.
3. PAL activation INTER at LSALT to N of AD.
4. All lighting manually activated by ARO 30MIN prior to scheduled arrival and deactivated 15MIN after departure.

OTHER LIGHTING

TWY LGT: Blue edge.

ATS AND AERODROME COMMUNICATION FACILITIES

FIA MELBOURNE CENTRE 128.15 Circuit area

LOCAL TRAFFIC REGULATIONS

1. RWY 08/26: All ACFT ABV 5,700KG must make MAX RAD turns at MNM speed at turning nodes to avoid SFC damage.
2. All ACFT are required to backtrack on RWY centreline.
3. All ACFT to follow APN markings.
4. Marked HEL landing/lift-off area – located right hand side upon entry to APN.
5. No fuel AVBL Bay 3 or HEL landing/lift-off area.
6. Night OPS – Code C ACFT PRKG Bays 1 and 2.

FLIGHT PROCEDURES

Right hand CCTS RWY26.

CTAF 127.05

AFRU at Fortescue Dave Forrest AD (YFDF). AFRU not heard on ground at Coondewanna.

ADDITIONAL INFORMATION

Blasting occurs within 3.5NM NE and SE of AD, and then in a line 10NM to the E. SFC to 3,000FT. Blasting can occur between 0600 and 1800 Local. Dust plumes may occur following a blast, ARO will contact ACFT on 129.75 if there are visibility concerns due to lingering dust.

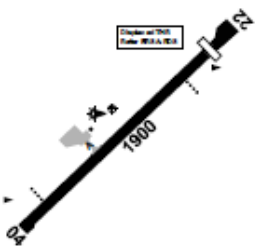
CHARTS RELATED TO THE AERODROME

1. WAC 3229.
2. Also refer to AIP Departure and Approach Procedures.

G.4 West Angelas

WEST ANGELAS **ELEV 2346**

AVFAX CODE 6824



WA UTC +8 YANG
230806S 1184224E VAR 1 DEG E CERT

AD OPR Robe River Mining Company Pty Ltd, West Angelas Mine, PO Box 675, Newman, WA, 6753. Email: westangairport@amsaustralia.com. ARO 0498 553 652.

REMARKS

1. Restricted OPS: PPR from AD OPR.
2. All OPS - advise AD OPR at least 20 MIN prior to ETA on FREQ 129.25 MHz, CS "West Angelas Base".

HANDLING SERVICES AND FACILITIES

Viva Energy Aviation: PH 0427 574 127, JET A1. Fuel2Sky Carnet card or credit cards (V and MC).

METEOROLOGICAL INFORMATION PROVIDED

1. TAF CAT C, METAR/SPECI.
2. AWIS PH 08 6332 8175 - Report faults to AD OPR.
3. AWIS FREQ 133.875 - (requires three one-second pulses to activate) - Report faults to AD OPR.

AERODROME OBSTACLES

1. Perimeter fence unmarked and unlit entire LEN of RWY 04/22.
   a. BTN BRG 217-051 DEG 973-1,048M FM ARP north of RWY CL infringes TNS 7.5FT
   b. BTN BRG 209-059 DEG 1,003-1,129M ARP south of RWY CL infringes TNS 7.5FT and 1FT.
2. Masts:
   a. 2,497FT AMSL BRG 296 DEG MAG 0.63NM FM ARP. Infringes HZS by 39FT. Lit.
   b. 2,589FT AMSL BRG 115 DEG MAG 1.5NM FM ARP. Infringes HZS by 130FT.
3. Unlit waste dumps:
   a. 2,641FT AMSL BRG 067 DEG MAG 2.29NM FM ARP. Infringes inner HZS by 182FT.
   b. 2,740FT AMSL BRG 088 DEG MAG 3.14NM FM ARP. Infringes COS by 162FT.
4. Terrain:
   a. 3,340FT AMSL PSN BTN BRG 290-021 DEG MAG 2,000M-4,000M FM ARP. Extensive.
   b. 3,241FT AMSL BRG 219 DEG MAG 5.11NM FM ARP. Infringes RWY 04 APCH SFC.
5. Transient OBST BRG 047 DEG MAG 979M FM ARP. Vehicles MAX height 4.5M AGL. Transiting across the road H24.
6. Communications TWR lit 2,589FT AMSL BRG 115 DEG MAG 1.5NM FM ARP. Infringes inner HZS by 130FT.

7. Power poles:
   a. 2,573FT AMSL BRG 010 DEG MAG 2.85NM FM ARP. Infringes COS by 6FT.
   b. 2,585FT AMSL BRG 016 DEG MAG 2.72NM FM ARP. Infringes COS by 80FT.
   c. 2,534FT AMSL BRG 024 DEG MAG 2.61NM FM ARP. Infringes COS by 74FT.
   d. 2,511FT AMSL BRG 028 DEG MAG 2.44NM FM ARP. Infringes HZS by 54FT.
   e. 2,526FT AMSL BRG 034 DEG MAG 2.29NM FM ARP. Infringes HZS by 70FT.
   f. 2,492FT AMSL BRG 039 DEG MAG 2.17NM FM ARP. Infringes HZS by 35FT.
   g. 2,474FT AMSL BRG 041 DEG MAG 1.96NM FM ARP. Infringes APCH SFC by 16FT.
   h. 2,468FT AMSL BRG 045 DEG MAG 1.79NM FM ARP. Infringes APCH SFC by 11FT.
   i. 2,468FT AMSL BRG 048 DEG MAG 1.64NM FM ARP. Infringes APCH SFC by 11FT.
   j. 2,468FT AMSL BRG 052 DEG MAG 1.46NM FM ARP. Infringes APCH SFC by 11FT.
   k. 2,468FT AMSL BRG 057 DEG MAG 1.3NM FM ARP. Infringes HZS by 11FT.
   l. 2,520FT AMSL BRG 066 DEG MAG 1.12NM FM ARP. Infringes HZS by 63FT.
   m. 2,469FT AMSL BRG 079 DEG MAG 0.96NM FM ARP. Infringes HZS by 12FT.
   n. 2,476FT AMSL BRG 095 DEG MAG 0.88NM FM ARP. Infringes inner HZS by 19FT.
8. Power station transmission line:
   a. 2,470FT AMSL BRG 136 DEG MAG 1.5NM FM ARP. Infringes HZS by 13FT.
   b. 2,470FT AMSL BRG 140 DEG MAG 1.23NM FM ARP. Infringes HZS by 13FT.
   c. 2,470FT AMSL BRG 140 DEG MAG 1.06NM FM ARP. Infringes HZS by 13FT.

PHYSICAL CHARACTERISTICS

04/22 045 62a PCN 44 /F /A /1480 (215PSI) /T Grooved WID 30 RWS 150

AERODROME AND APPROACH LIGHTING

RWY 04/22	LIRL(1)	PAL+AA 119.65		SDBY PWR AVBL
RWY 04/22	PAPI(2)	PAL+AA 119.65	3.3 DEG53FT	SDBY PWR AVBL

(1) NOT COMMISSIONED. EMERG use only.
(2) Left side. PAL activates all lighting.

OTHER LIGHTING

1. SDBY PWR switchover time: 10 SEC.
2. TWY LGT: Blue edge.

ATS AND AERODROME COMMUNICATION FACILITIES

FIA MELBOURNE CENTRE 128.15 Circuit area

LOCAL TRAFFIC REGULATIONS

ACFT over 5,700KG to turn at RWY ends or APN movement area. MAX radius at MNM speed.

FLIGHT PROCEDURES

Right hand CCTS RWY 04. Significant high terrain within CCT area.

CTAF - AFRU 127.05

AFRU signal not AVBL on ground West Angelas.

ADDITIONAL INFORMATION

1. Intermittent blasting will take place WI 5NM of ARP, details AVBL from ARO. Dust plumes may exist after blasting.
2. Increased bird activity during and post rainfall events. Straw-necked ibis flocking in close vicinity to AD.

CHARTS RELATED TO THE AERODROME

1. WAC 3229.
2. Also refer to AIP Departure and Approach procedures.

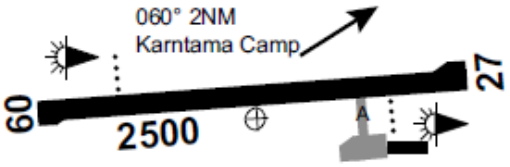
G.5 Christmas Creek

CHRISTMAS CREEK **ELEV 1454**

AVFAX CODE 6827

WA		UTC +8	YCHK
222121S	1193833E	VAR 1 DEG E	CERT

AD OPR Chichester Metals Pty Ltd, PO Box 6915, East Perth, WA, 6892.
Email: AD Manager: ccairport@fmgl.com.au. PH 08 9177 7290. ARO 08 9177 7291: 0458 580 570 H24.



REMARKS

1. PPR 24HR prior notice required for all unscheduled ACFT.
2. All OPS: Advise AD OPR at least 20 MIN prior to ETA on 132.025, CS 'Christmas Creek Base'.

HANDLING SERVICES AND FACILITIES

AIR BP - JET A1 CTC AD Manager/ARO.

General

ACFT marshalling is provided for all ACFT ABV 5,700KG MTOW.

AERODROME OBSTACLES

1. Terrain penetrations of the inner HZS and COS to 1,720FT AMSL BTN BRG 293 DEG MAG and 052 DEG MAG FM ARP.
2. Lit terrain marked by flashing MIOL.
   a. 1,626FT AMSL BRG 293 DEG MAG 2.4NM FM ARP. infringes inner HZS.
   b. 1,644FT AMSL BRG 304 DEG MAG 2.2NM FM ARP. infringes inner HZS.
   c. 1,674FT AMSL BRG 345 DEG MAG 2.0NM FM ARP. infringes inner HZS.
   d. 1,613FT AMSL BRG 038 DEG MAG 1.7NM FM ARP. infringes inner HZS.
   e. 1,634FT AMSL BRG 052 DEG MAG 2.7NM FM ARP. infringes inner HZS.
3. Lit tower - marked by flashing MIOL 1,708FT AMSL BRG 069 DEG MAG 2.2NM FM ARP. Infringes inner HZS.

METEOROLOGICAL INFORMATION PROVIDED

1. TAF CAT C, METAR/SPECI.
2. AWIS FREQ 122.125 (requires three one-second pulses to activate) - Report faults to AD OPR.

PHYSICAL CHARACTERISTICS

09/27 087 82a PCN 43 /F /A /1400 (203PSI) /U Grooved WID 45 RWS 300

AERODROME AND APPROACH LIGHTING

RWY 09/27	LIRL	PAL+AA 120.15		SDBY PWR AVBL
RWY 09/27	PAPI(1)	PAL+AA 120.15	3.0 DEG53FT	SDBY PWR AVBL

(1) Left side only.

1. RWY edge light spacing: 09/27: 60M.
2. Main and SDBY PWR supply by AD generators.
3. Manual activation of lighting will be performed by the ARO 30 MIN prior to scheduled ACFT arrival and deactivated 15 MIN after departure.

OTHER LIGHTING

1. SDBY PWR switchover time: 42 SEC.
2. TWY LGT: Blue edge.

ATS AND AERODROME COMMUNICATION FACILITIES

FIA	MELBOURNE CENTRE	128.15 Circuit Area
UNICOM	CHRISTMAS CREEK UNICOM	127.05 (1)

(1) CS "Christmas Creek UNICOM". AVBL for scheduled movements.

LOCAL TRAFFIC REGULATIONS

1. ACFT ABV 5,700KG MTOW use RWY ends only for 180DEG turns.
2. Limited Itinerant PRKG to NE edge of APN. CTC AD Manager.
3. APN PRKG Position 3 for Dash 8 OPS only (HJ).
4. ACFT PRKG Position 2 Night OPS only for F100 and below.

FLIGHT PROCEDURES

1. Due terrain no circling to the north of RWY 09/27.
2. LEFT hand CCTS ONLY RWY 27.
3. DEP RWY 27 left hand turn as soon as practicable after TKOF. North bound TFC to intercept track overhead YCHK.
4. RIGHT hand CCTS ONLY RWY 09.
5. DEP ACFT to use RWY 09 in calm wind conditions.
6. All ACFT to call airborne on CTAF FREQ as soon as practicable after TKOF.

CTAF - AFRU 127.05

1. AFRU not AVBL on ground.
2. FREQ confirmation by (YCHK) UNICOM on receipt of taxi departure call (YCHK UNICOM confirm 127.05).

ADDITIONAL INFORMATION

1. Blasting occurs to the E and SE quadrants outside 6,000M from ARP.
2. Blasting occurs to the SW and SSE quadrants outside 5,000M from ARP.
3. Dust plumes may occur following blasting.
4. YFDF is in close proximity and the APCH/DEP tracks cross close to the ground. Due to terrain shielding, VHF contact with ACFT on or close to the ground at YFDF is not possible.

CHARTS RELATED TO THE AERODROME

1. WAC 3229.
2. Also refer to AIP Departure and Approach Procedures.

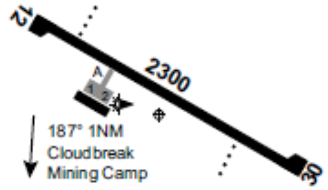
G.6 Fortescue Dave Forrest

FORTESCUE DAVE FORREST **ELEV 1563**

AVFAX CODE 6830

WA		UTC +8	YFDF
221731S	1192614E	VAR 1 DEG E	CERT

AD OPR Chichester Metals Pty Ltd, PO Box 6915, East Perth, WA, 6892.
Email: cbairport@fortescue.com. PH AD Manager 08 9176 6038. ARO H24 0437 488 818.



REMARKS

1. PPR 24HR PN required for all unscheduled ACFT.
2. All OPS: Advise AD OPR at least 20 MIN prior to ETA on 132.025, CS 'Fortescue Base'.

HANDLING SERVICES AND FACILITIES

Air BP JET A1 CTC AD Manager/ARO.

General

ACFT marshalling is provided for all ACFT ABV 5,700KG MTOW.

AERODROME OBSTACLES

1. Terrain (hills) lit-LIOL,1,769FT AMSL, BRG 330 MAG 2.6NM FM ARP.
2. Extensive terrain penetration of inner HZS to 1,800FT AMSL in N quadrant, BRG 324 MAG to 052 MAG, 2NM to 2.92NM FM ARP.
3. Boundary Fence, infringing transitional SFC by 2FT to 5.25FT AGL, offset 77M FM RWY CL.
4. AWS mast (Lit), 32.8FT AGL, infringing transitional SFC by 23FT, PSN 740M FM RWY 12 SOT 111M right of RWY CL.

METEOROLOGICAL INFORMATION PROVIDED

1. TAF CAT C, METAR/SPECI.
2. AWIS FREQ 130.3 (requires 3 one-second pulses to activate) - Report faults to AD OPR.

PHYSICAL CHARACTERISTICS

12/30	123	75a	PCN 27 /F /A /1200 (174PSI) /T	WID 30	RWS 150

AERODROME AND APPROACH LIGHTING

RWY 12/30	LIRL	AFRU+PAL 127.05		SDBY PWR AVBL
RWY 12/30	PAPI(1)	AFRU+PAL 127.05	3.0 DEG54FT	SDBY PWR AVBL
RWY 12/30	PTBL(2)			BY PRIOR ARRANGEMENT

(1) Left side.
(2) 90 MIN PN.

1. PAL Activation - allow for a 5 SEC delay for notification of successful activation before a second attempt.
2. Main and SDBY PWR supplied by AD generators.
3. RWY edge light spacing: 59M.

OTHER LIGHTING

1. TWY LGT: Blue edge.
2. SDBY PWR switchover time: 45 SEC.

ATS AND AERODROME COMMUNICATION FACILITIES

FIA	MELBOURNE CENTRE	128.15 Circuit area
UNICOM	FORTESCUE DAVE FORREST UNICOM	127.05 (1)

(1) CS "Fortescue UNICOM". AVBL for scheduled movements.

LOCAL TRAFFIC REGULATIONS

1. ACFT ABV 5,700KG MTOW use RWY end 45M nodes for 180DEG turns.
2. All traffic to access the APN via TWY A
3. Dual lead in lines on PRKG Bay 1. Lead in lines marked as 1 or 1A.
   a. ACFT to use lead in 1: PC24 and A319.
   b. ACFT to use lead in 1A: A320, B738, F100 and E190.
4. No fuel AVBL on Bay 2.

FLIGHT PROCEDURES

1. DEP RWY 12 left hand turn only as soon as practicable after TKOF. South bound TFC to intercept track overhead YFDF.
2. DEP ACFT to use RWY 30 in calm wind conditions.
3. All ACFT to call airborne on CTAF FREQ as soon as practicable after TKOF.

CTAF - AFRU 127.05

ADDITIONAL INFORMATION

1. Blasting occurs BTN 4.3NM and 13NM to SE and W of ARP BTW 115 and 273 DEG MAG.
2. Dust plumes may occur following blasting.
3. CAUTION: YCHK is in close proximity and the APCH/DEP tracks cross close to the ground. Due to terrain shielding, VHF contact with ACFT on or close to the ground at YCHK is not possible.

CHARTS RELATED TO THE AERODROME

1. WAC 3229.
2. Also refer to AIP Departure and Approach Procedures.

Appendix H – PSOE Criteria Evaluation

		Integrity	Timeliness	Accessibility
		Accuracy *Completeness* *Reliability*	*Prompt Delivery* *Operationally Useful*	*Establish access* *Obtain information*
Present	*Intent to provide a FIS*	*The FIS has documented intent and existing service structures to provide SA without negatively impacting cognitive workload.*	*The FIS has intent for the timeliness of information delivery to provide SA without negatively impacting cognitive workload.*	*The FIS has documented intent and processes for information exchange to provide SA without negatively impacting cognitive workload.*
Suitable	*Design addresses operational needs*	*The FIS design, primarily its reliance on the current HF system configuration for critical information delivery in certain contexts, demonstrates questionable Suitability of the FIS for meeting aircrew needs consistently by providing SA and reducing cognitive workload.*	*The FIS design, primarily its reliance on the current HF system configuration for critical information delivery in certain contexts, demonstrates questionable Suitability of the FIS for meeting aircrew needs consistently by providing SA and reducing cognitive workload*	*The FIS design, primarily its reliance on the current HF system configuration for critical information delivery in certain contexts, demonstrates questionable Suitability of the FIS for meeting aircrew needs consistently by providing SA and reducing cognitive workload*
Operating	*Delivered and functioning*	*Limitations in the delivery mechanism of the HF component of the FIS undermines integrity, negatively impacting on SA and cognitive workload*	*The FIS faces challenges in consistently meeting the Timeliness criterion during peak periods when delivered via HF reducing SA and increasing cognitive workload*	*The FIS faces challenges in consistently demonstrating Accessibility, particularly for HF-dependent communications during critical flight phases and at lower altitudes, reducing SA and increasing cognitive workload.*
Effective	*Achieves desired outcome of enhancing SA and minimal impact of cognitive workload*	*A FIS service is available with questionable integrity, potentially compromising SA, and cognitive workload*	*The use of HF for FIS delivery compromises the timeliness and effectiveness of this service and degrades SA and increases cognitive workload.*	*The use of HF for FIS delivery compromises the accessibility and effectiveness of this service and degrades SA and increases cognitive workload.*

PSOE Criteria Evaluation illustrates the criteria evaluated against the PSOE methodology.

Green = Acceptable, Amber = Caution and Red = Deficient.

Appendix I – Stakeholder feedback from Consultation Hub

Placeholder: To be completed.