Temporary Danger Area Proposal

Enabling flight testing for Dawn Aerospace Mk-II Aurora RPAS

Version 1.0

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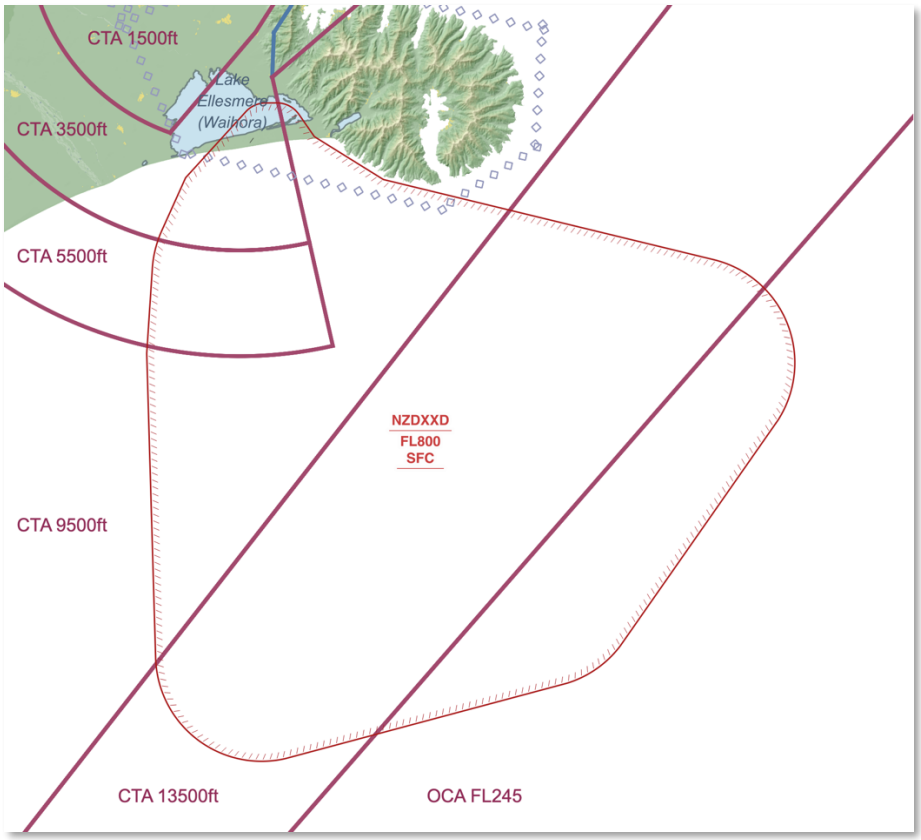
1 Proposal Summary

Dawn Aerospace proposes a temporary danger area to support flight testing of the Mk-II Aurora Remotely Piloted Aircraft System (RPAS) from the Tāwhaki National Aerospace Centre at Kaitorete.

The following table summarises the proposed temporary danger area. Full details are in the remainder of this document.

Requested Airspace	
Location	In the vicinity of Kaitorete and offshore over the Canterbury Bight.
Identifier in this document	NZDXXD.
Using Agency	Dawn Aerospace New Zealand Ltd.
Effective Period	5 September 2024 to 5 March 2025
Activation	Activation by NOTAM 24 hours prior.
Frequency of Activation	Up to 30 times in a six-month period.
Activation Period	Active for one, or at most two, 90-minute periods per day. Activation times selected to minimise impact to scheduled IFR flights.
Altitude	SFC to FL800.



2 Proposed Danger Area and Flight Activity

In the interests of flight safety, Dawn Aerospace requests a temporary danger area be designated for the purpose of flight testing the MK-II Aurora RPAS. The proposed test flights will take-off and land at the Tāwhaki runway on Kaitorete and operate up to FL800 over the sea to the southeast of the aerodrome.

The danger area is designed to enclose the airspace volume required by the test flight programme. It has been aligned to minimise any impact on other airspace users as far as practicable and will be activated at times to minimise the effect on scheduled Instrument Flight Rules (IFR) traffic.

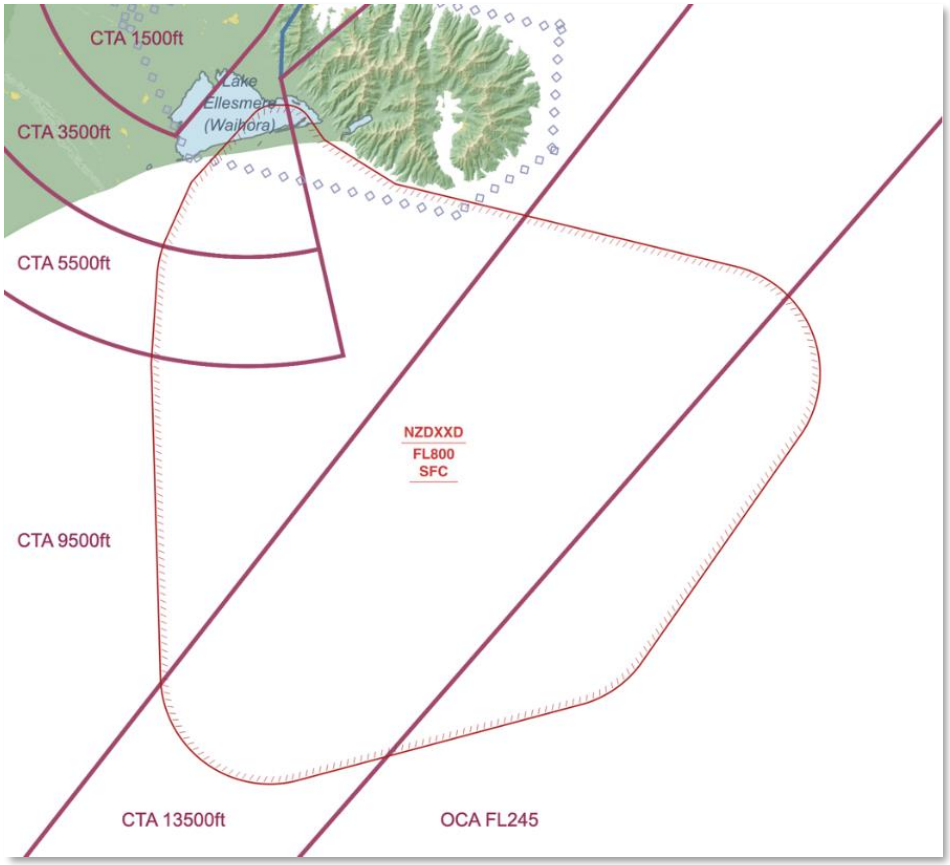


Figure 1 Proposed Danger Area

Figure 2: Location of Kaitorete and Tāwhaki Joint Venture

2.1 Flight Operations

2.1.1 Mk-II Aurora

Dawn aerospace intends to conduct flight test activities to progressively verify the performance and capabilities of the Mk-II Aurora, associated systems, and procedures.

The Dawn Mk-II Aurora is an aircraft with the performance of a rocket, and the reliability and reusability aspects of conventional aircraft. It is flown remotely by a pilot in a ground control station.

2.1.2 Flight Profile

Immediately after take-off the aircraft will turn and pitch up to climb at an ascent angle typically between 75 and 85 degrees on a path directly out to sea. Full duration test flights aim to reach top of climb at no greater than FL800 in less than three minutes.

From top of climb, the aircraft will glide to land at the runway. The glide descent will take place offshore, with the aircraft progressively moving closer to the coast as altitude decreases. The total flight duration is expected to be in the range of 45 to 55 minutes.

Initial test flights will be to lower altitudes and of shorter duration.

2.1.3 Flight Cadence

Dawn Aerospace anticipate operating up to 30 test flights over a 6-month period.

2.1.4 Flight Safety

All normal and abnormal operations would be contained within the proposed danger area.

Operational risks have been assessed using the Joint Authorities on Rulemaking for Unmanned Systems (JARUS) Specific Operational Risk Assessment (SORA) methodology. The resulting airspace request will contain all normal and emergency operations.

The flights tests will be operated under part 102 authorisation from the Civil Aviation Authority. The operational requirements of the authorisation are expected to incorporate any operational constraints arising from the SORA risk analysis.

Dawn Aerospace test flights will be conducted in Visual Meteorological Conditions (VMC).

For situational awareness, the Mk-II Aurora is equipped with ADS-B IN/OUT. Operations will use the appropriate Air Traffic Control (ATC) VHF frequency. Banks Peninsula Common Frequency Zone (CFZ) and other adjacent airspace frequencies will be monitored. The operator will also visually observe uncontrolled airspace surrounding the take-off, ascent, and approach area.

As a reminder to aircraft operators in uncontrolled airspace, the danger area activation timing will be pre-announced by broadcast on the Banks Peninsula CFZ and other uncontrolled airspace frequencies adjacent to the operation.

2.2 Danger Area

2.2.1 Necessity

The danger area is requested to enable ATC to separate other traffic from the flight test aircraft in controlled airspace. ATC standards separate aircraft based on their Visual Flight Rules (VFR) or IFR capability. Remotely piloted aircraft operations are not currently considered VFR or IFR capable. ATC therefore have no ongoing criteria applicable to separating RPAS from other traffic.

ATC can separate controlled flights from special use airspace. To enable ATC separation, test flights will be conducted entirely within the danger area. ATC will thus be able to separate other aircraft from the test flight by separating other aircraft from the danger area itself.

The danger area is extended to uncontrolled airspace to ensure that VFR traffic operating without a radio or ADS-B OUT are aware of the operation.

2.2.2 Activation

The danger area will be activated for each operating day by NOTAM with the required 24-hour notice. The danger area would be activated in one, or at most two, 90-minute periods on any day, one period for each anticipated test flight.

The activation periods will be timed to minimise any effect on scheduled IFR flights. Dawn Aerospace intend to review schedules of airlines and Antarctic operators 48 hours in advance and commit to activation times for the danger area that minimise any overlap with known scheduled traffic.

3 Effect on Other Air Traffic

3.1 Effect on IFR Traffic

3.1.1 IFR Context

The proposed danger area unavoidably conflicts with four IFR routes or approach/departure procedures. When active, the danger area will affect traffic on:

- All Antarctic arrivals and departures via PEHRR
- Overflights on Y890 and Y727
- NZDN-NZCH flights arriving to land on CH runway 20 via LADIS2F or LADIS6B

The danger area is laterally separated from Y545 and all other routes and procedures, by more than 3nmi. It is also laterally separated from a direct track between HELGE and LADIS, and between AKAMO and VEPLO.

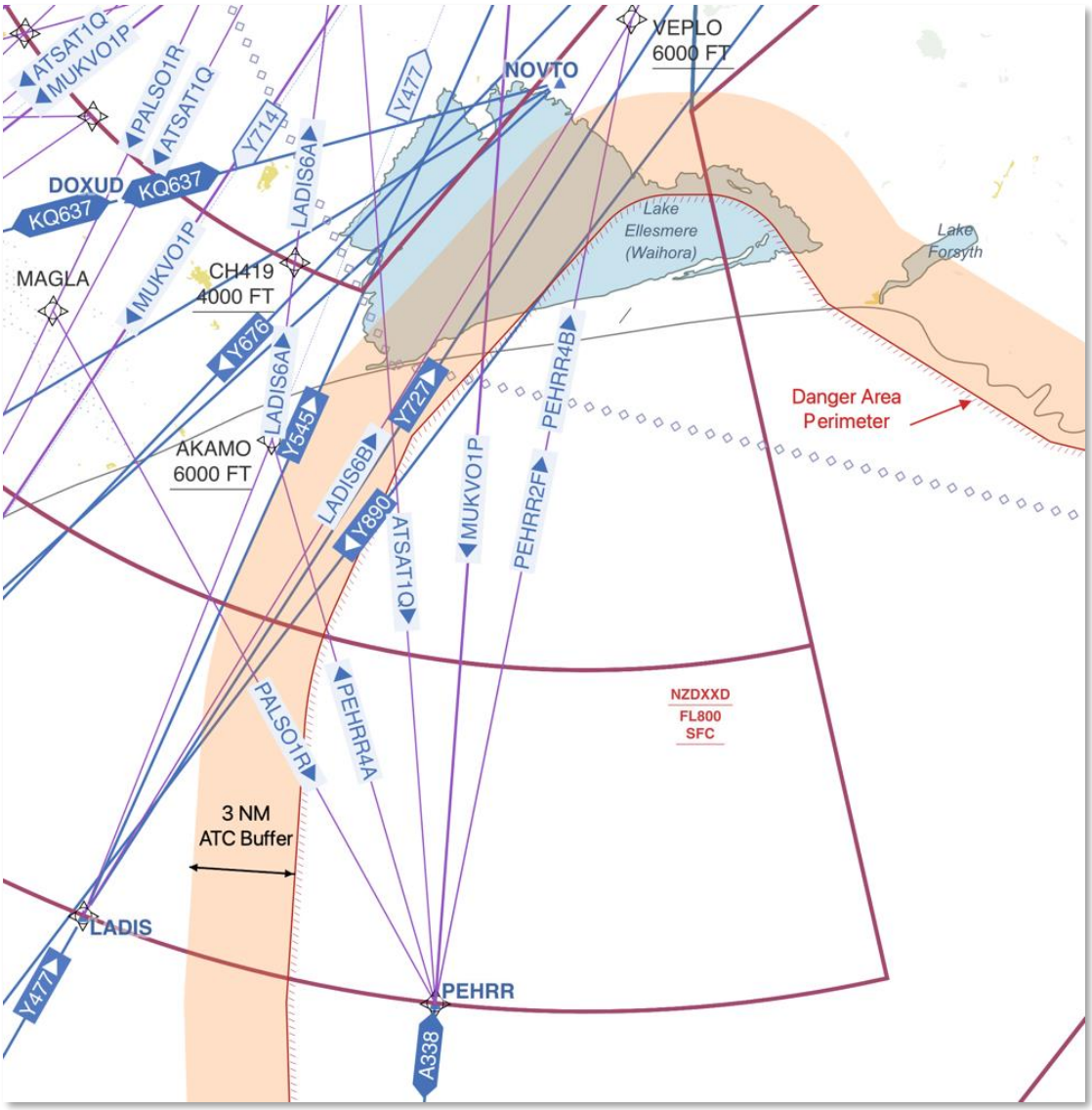


Figure 3: IFR Context

3.1.2 Domestic IFR Traffic

Dawn would schedule danger area activation times to minimise any impact to scheduled IFR traffic. There would be no impact to traffic operating up to 25 minutes behind schedule. IFR traffic operating more than 25 minutes behind schedule could avoid the danger area via a minor re-route.

Appendix B lists the timing of all regularly operated scheduled flights operating on affected routes, and indicative danger area activation times. Appendix C illustrates possible re-routing options.

Route/Procedure	Traffic Volume	Affected Traffic	Mitigation
Y890	Nil scheduled. ~5 GA flights/year	All during DA activation	Minor re-route
Y727	2-3 daily scheduled. NZDN-NZWN	Nil if operating within 2 hrs of schedule	Minor re-route
LADIS2F / LADIS6B (STAR when CH 20 is duty runway)	5-7 daily scheduled. NZDN-NZCH	Nil if operating within 25 minutes of schedule. Up to two flights affected if running later.	Minor re-route.
All SID/STAR via PEHRR	Seasonal Antarctic traffic. Up to ~4 flights daily on up to ~16 days per month December through February. Fewer flights in adjacent shoulder season months.	Any movements during danger area activation periods (2x ~90mins/day).	Minor re-route or vectoring under surveillance control.

Table 1 Effect of Danger Area Activation on Scheduled IFR Traffic

3.1.3 International Overflights

Qantas schedules 4 flights per week between Sydney and Santiago. The flight path differs daily, making the most of enroute winds. Flights may pass well south of New Zealand, or across the country on different paths each time. On average, a flight might pass close to or through the danger area between zero and three times per year.

With advance warning via NOTAM, (at least 2 hours prior to ETD) Qantas can make an efficient minor alteration to the planned trajectory, to avoid the danger area at negligible cost.

3.2 Effect on VFR Traffic

The danger area overlaps part of Banks Peninsula CFZ and may have a minor effect for some general aviation flights.

VFR traffic around Banks Peninsula can avoid the danger area by remaining inland of the southeastern coastline of Banks Peninsula, and northeast of the Lake Ellesmere (Te Waihora) shoreline.

The danger area allows a 4nmi wide passage for itinerant traffic transiting north/south past Christchurch CTA – 1500ft over Lake Ellesmere.

Operators may contact Dawn via VHF to be advised of Dawn intentions before transiting the danger area in uncontrolled airspace. Email and telephone details will be supplied in the activation NOTAM.

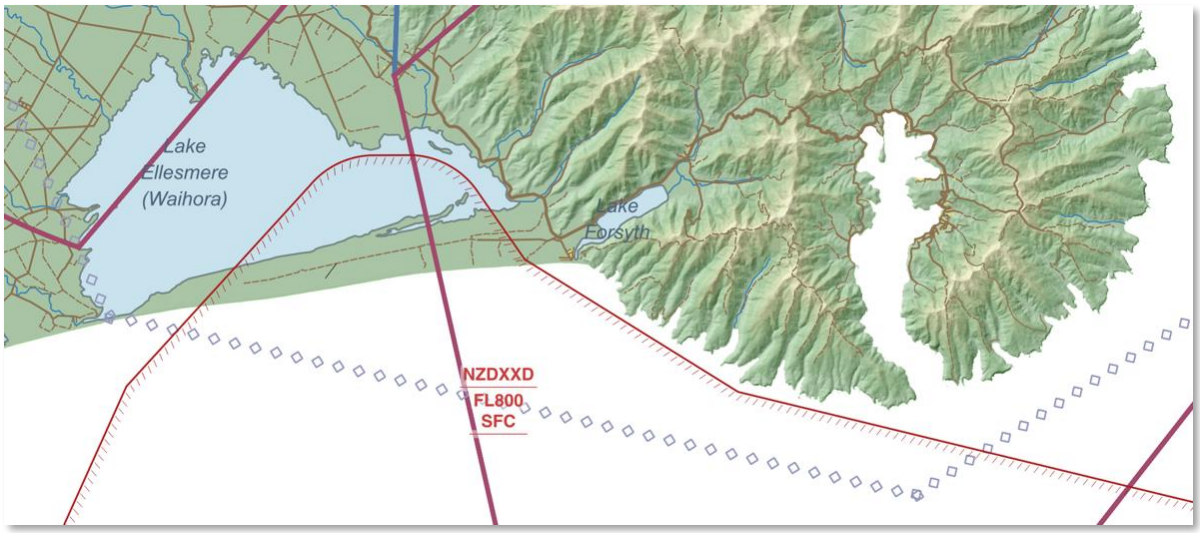


Figure 4: VFR Context

4 Consultation with Stakeholders

Organisation	Relevant	Point of Contact	Response	Notes
Airways	ANSP	Geoff Hounsell Head of Terminal Airspace	No objection. MoU between Dawn and Airways to be updated for operations at Tāwhaki.	1, 10
Christchurch International Airport	Airport	Ford Robertson	No objection.	
Air Transport Operators				
Air New Zealand	Airline	Steve Kelly – Manager Flight Operations Regulatory Affairs Scott Calder – Manager Turboprop Fleet	No objection.	2,3,4,9
Qantas and Jetstar	Airline	Daniel Smith	Awaiting response.	8
RNZAF	Antarctic Flights and Maritime Surveillance	Richard “Dicko” Beaton – Wing Commander	Supported.	3
National Science Foundation	Antarctic Flights	Gary James	No objection.	5
General Aviation				
Canterbury Airspace Users Group (CAUG)	Collective of local airspace users	Ford Robertson - Chairman	Supported.	6,9
Canterbury Aero Club and International Aviation Academy	Flight Training	Jeremy Ford – CEO Ross Sparks – Head of Training	No objection to temporary Danger Area. Tripartite MoU (Dawn, Tāwhaki, CAC) to be created for tactical coordination.	6
Garden City Helicopters Aviation	Rotary and Fixed Wing Operator	Daniel Currie - Owner	No objection	
Christchurch Helicopters	Helicopter Operator	Terry Murdoch – CEO Tim Murdoch - Pilot	No objection.	7

Organisation	Relevant	Point of Contact	Response	Notes
Parapro Ltd	Paragliding	David Dennis - Director	No objection.	
SkyFarmers	Agricultural Operator	Duncan Hart	No objection.	
SuperAir	Crop Spraying	Andrew Kemp - Pilot	No objection.	7
Kea Aerospace Ltd	OEM and HAPS operator	Phillip Stott – Chief Operating Officer	No objection.	
Aerosearch	OEM and UAS operator	Michael Pervan - CEO	No objection.	9
Recreational Aviation				
Canterbury Recreational Aircraft Club	General aviation club	Iain McPhail - President	Supported.	
Air New Zealand Flying Club	Flying Club	Errol Smart - CFI	Awaiting response.	
Canterbury Hang Gliding and Paragliding Club	Hang gliding and paragliding	James Morris – President Alex Comford – Airspace Officer	No objection.	
Canterbury Gliding Club	Gliding	Kevin Bethwaite	Supported.	
Gliding New Zealand	Gliding	Kevin Bethwaite – Airspace committee member (Southern)	Supported.	
Other				
New Zealand Airline Pilots Association (ALPA)	Union	John Hall Andrew Lindup Robin Parsons	Awaiting response.	10
University of Canterbury (UC)	R902 Administering Authority	Adriel Kind	No objections.	2

Table 2 Summary of Stakeholder Consultations

Notes

1. An MoU between Airways and Dawn Aerospace is to be updated for these operations at Tāwhaki National Aerospace Centre.
2. The proposed danger area will not be activated at the same time as the danger areas designated for use by Kea Aerospace, nor with R902. An MoU between Tāwhaki and UC is being established to ensure no simultaneous activation of the proposed DA, R902 and/or the Kea DA can occur.
3. In case of emergencies needing access to the danger area airspace, Dawn would cease operations. The MoU with Airways will include coordinating this.
4. Air New Zealand sought confirmation that the suggested minor IFR re-route options are acceptable to Airways. This is the case.
5. Dawn Aerospace will include Antarctic flight schedules when selecting the timing of the danger area activation.
6. A tripartite MoU is to be established between Canterbury Aero Club, Dawn, and Tāwhaki to tactically coordinate the Danger Area activation with CAC operations.
7. Agricultural operators servicing farmland on Kaitorete Spit are keen to coordinate with Tāwhaki to reduce any confliction between their operations and any danger area activation.
8. The danger area does not conflict with any routes currently operated by Jetstar. Although a response has not yet been received, Dawn do not anticipate any objection from Qantas. The effect on Qantas operations is identical to that of the Kea danger areas, which Qantas found to be acceptable.
9. A number of stakeholders recommended or strongly preferred that a single harmonised set of special use airspaces be established, managed by Tāwhaki for use by all operators at the Tāwhaki National Aerospace Centre, rather than the multiple separate SUA per operator that are currently emerging. This is definitely the preferred long-term arrangement for Tāwhaki and its partner organisations. The current proposal in this document is a stand-alone interim request for temporary airspace to enable Dawn's immediate operational needs in the meantime.
10. Although a formal response has not been received from NZALPA at application time, Dawn and Tāwhaki believe this proposal addresses feedback from NZALPA and Airways regarding a previous proposal. The airspace has a single using agency (Dawn Aerospace), would contain all normal and abnormal operations, and will be operated in accordance with an MoU agreed with Airways. Tāwhaki are continuing to engage with NZALPA to advance the relationship.

Appendix A Airspace Description

Dawn Aerospace - Proposed Danger Area for Mk-II Aurora Test Flights

NOTES: Upper Limit and Lower Limit are expressed in FT (AMSL) or FL (Flight Level)							
Identifier	Name	Upper Limit		Lower Limit		Remarks	Remarks to Working Hours
NZDXXD	DAWN ONE	FL800		SFC		[Activity or Purpose:] RPAS testing [Organisation or Authority:] Dawn Aerospace New Zealand Ltd. flightops@dawnaerospace.com	[Active:] When advised by NOTAM.

Table 3 Airspace Description

Dawn Aerospace - Proposed Danger Area Boundary for Mk-II Aurora Test Flights

Boundary line types **CIR** *(Circle)*, **CWA** *(Clockwise Arc)*, **CCA** *(Counterclockwise Arc)*, **GRC** *(Great Circle)*, **RHL** *(Rhumbline)*, **FNT** *(geoborder i.e. a line following the road , etc)*									
Identifier	Sequence	Remarks	Latitude	Longitude	Type	Arc Latitude	Arc Longitude	Arc Radius	
NZDXXD	1		440245.07S	1733141.55E	CWA	441232.56S	1732844.42E	10.02	NM
NZDXXD	2		441742.85S	1734040.81E	GRC				
NZDXXD	3		443930.36S	1731941.31E	CWA	443318.03S	1730841.74E	10.01	NM
NZDXXD	4		444246.99S	1731310.82E	GRC				
NZDXXD	5		445000.42S	1723507.01E	CWA	444011.11S	1723224.54E	10.01	NM
NZDXXD	6		444047.33S	1721824.38E	GRC				
NZDXXD	7		441125.90S	1721730.87E	GRC				
NZDXXD	8		440249.76S	1721850.25E	CWA	440427.04S	1723312.92E	10.49	NM
NZDXXD	9		435856.81S	1722049.90E	GRC				
NZDXXD	10		435528.42S	1722341.62E	GRC				
NZDXXD	11		434958.62S	1722836.74E	GRC				
NZDXXD	12		434715.46S	1723130.62E	CWA	434853.37S	1723407.42E	2.5	NM
NZDXXD	13		434623.43S	1723404.80E	GRC				
NZDXXD	14		434625.04S	1723524.99E	CWA	434854.41S	1723506.86E	2.5	NM
NZDXXD	15		434701.30S	1723722.76E	GRC				
NZDXXD	16		435557.30S	1725032.88E	GRC				

Table 4 Airspace Definition

Appendix B Scheduled Movements

Table 5 shows the usual range of timing for regularly operated scheduled flights at the time of writing[1].

The timing at LADIS for the usual range of on-time and moderately late running flights is shown in pink.

Example danger area activation times are shown in green.

During flight test campaigns, Dawn anticipates reviewing airline schedules 48 hours in advance and adjusting the danger area activation times to minimise any effect on scheduled traffic.

Route/IFP	ACID	STD	STA	ETO LADIS	Late ETO	M	T	W	T	F	S	S
NZDN->NZCH	ANZ756M	06:05	07:10	06:49	07:11	x	x	x	x	x		
	ANZ758M	08:05	09:10	08:45	09:07	x	x		x	x	x	x
	ANZ746M	10:15	11:20	11:00	11:41	x	x	x	x	x	x	x
	ANZ740M	12:05	13:10	12:43	12:57	x			x	x		
LADIS6A /	ANZ750M	13:35	14:40	14:09	14:48	x	x	x	x	x	x	x
LADIS6B /	ANZ742M	16:55	18:00	17:38	17:57	x	x	x	x	x	x	x
LADIS2F	ANZ748M	18:45	19:50	19:27	19:52	x	x	x	x	x	x	x
NZDN->NZWN	ANZ680	6:25	7:45	6:53	7:16	x	x	x	x	x	x	
Y727	ANZ686	10:45	12:00	11:12	11:39	x	x	x	x	x	x	x
	ANZ690	17:00	18:15	17:24	18:02	x			x	x	x	x

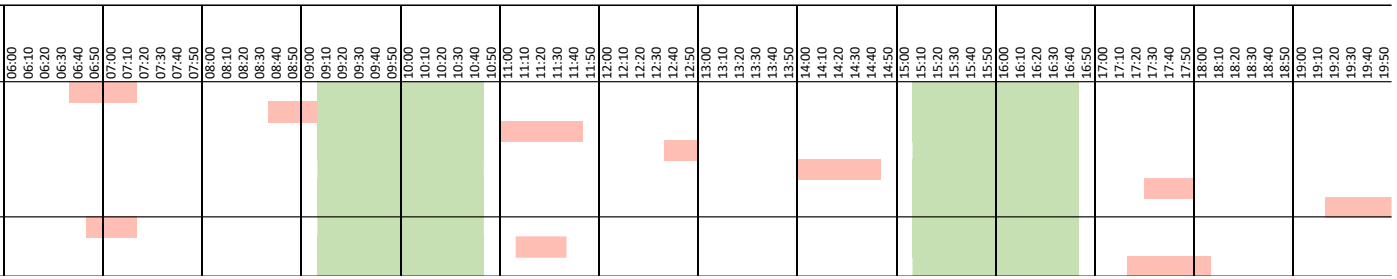


Table 5 Flight Timing for Regularly Scheduled Flights

[1] Data sourced from publicly available schedules and analysis of aircraft trajectories for 1 March 2024 through 7 May 2024 supplied under licence from FlightRadar24.

Appendix C IFR Re-routing Options

Affected IFR flights may avoid the danger area with minor re-routing.

Affected IFR Route/Procedure	Normal Route	Alternative
Y727	… LADIS Y727 WARDS …	… LADIS DCT AKAMO DCT WARDS …
Y890	… KAMDO Y890 MIPAK …	… KAMDO DCT MESIX Y676 IDARA Y814 MIPAK …
LADIS6B / LADIS2F	LADIS VEPLO….	LADIS DCT AKAMO DCT VEPLO …
PEHRR STARs	As published or vectoring under surveillance control	… HELGE DCT LADIS then use LADIS STARs
PEHRR SIDs	As published or vectoring under surveillance control	Vectoring under surveillance control to LADIS DCT HELGE

Table 6 Re-routing Options for IFR Traffic

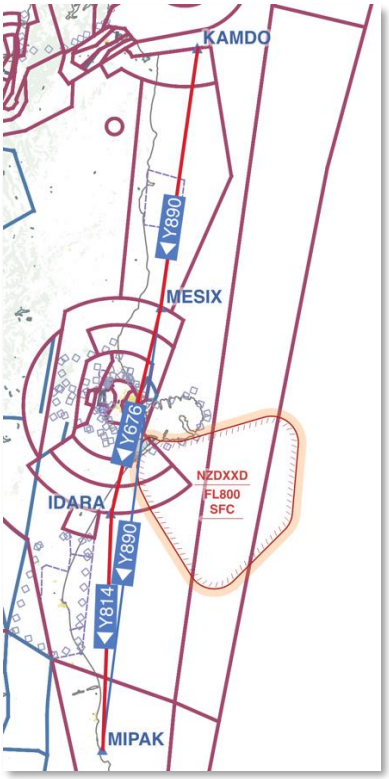


Figure 5: Y890 Re-route

Figure 6: Y727 Re-route

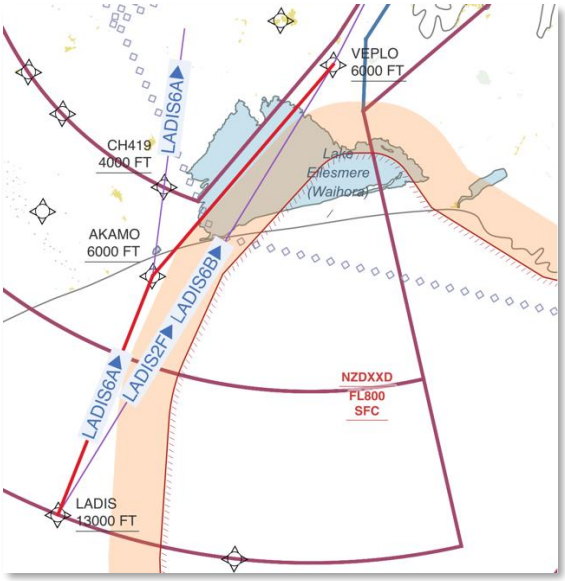


Figure 7: LADIS2F / LADIS6B Re-route

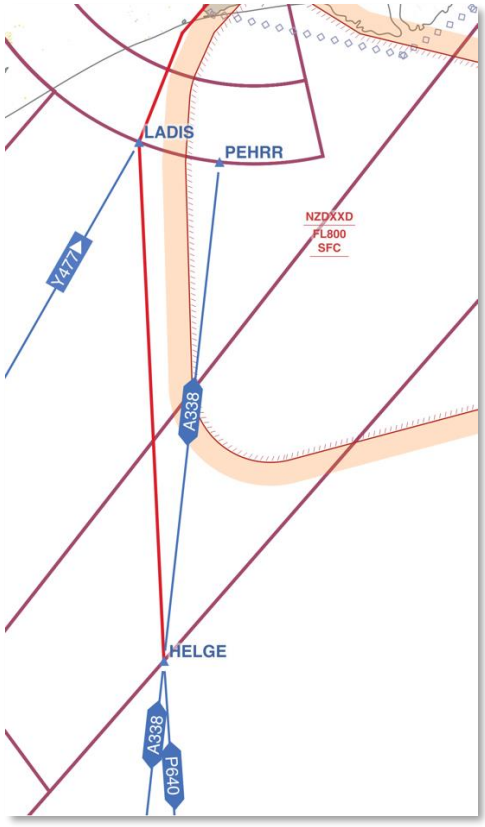


Figure 8: Antarctic Traffic Re-route