Queenstown Airspace Classification Review – Summary of Submissions

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Glossary of terms and abbreviations

ACAS	Airborne collision avoidance system (sometimes referred to as TCAS)
AMSL	Above mean sea level
ATC	Air traffic control
ATM	Air traffic management
CAR	Civil Aviation Rules
CTA	Control area
CTR	Control zone
EGPWS	Enhanced ground proximity warning system
FAA	The Federal Aviation Administration is the national aviation authority of the United States. An agency of the United States Department of Transportation, it has authority to regulate and oversee all aspects of American civil aviation.
GAA	General aviation area
GNSS	Global navigation satellite system
IFR	Instrument flight rules
IMC	Instrument meteorological conditions
MOU	Memorandum (Memoranda) of Understanding
PBN	Performance based navigation – area navigation based on performance requirements for aircraft operating on instrument flight paths and procedures
RNP	Required navigation performance – navigation specification for accuracy, integrity, continuity, availability and functionality needed
RNP-AR	Required navigation performance – authorisation required
VFR	Visual flight rules
VMC	Visual meteorological conditions
ZQN	The International Air Transport Association (IATA) three-letter code for Queenstown airport

Background

A formal review of the classification of the airspace at Queenstown aerodrome and the environs has been initiated by CAA and consultation with airspace users commenced in February 2014.

The review document "Queenstown Airspace Classification Review – Consultation Document, February 2014" was sent to industry and made available on the CAA website.

A consultation meeting with interested parties was held in Queenstown on 5 March with 71 attendees, including six representatives from the Part 172 air traffic service provider Airways Corporation of New Zealand Ltd (Airways), and five CAA representatives.

The main issue raised by the meeting was that more information was needed by users on how air traffic would be managed under a Class C specification in Queenstown controlled airspace to allow them to make informed submissions to the Director on the likely effect on industry operations.

Following the meeting, CAA's Aeronautical Services Unit met with Airways and it was agreed that Airways would develop a draft ATM plan for Class C airspace identifying any changes and possible impacts on VFR operations. This was done with Queenstown ATC staff input and discussions with users. CAA was to provide guidance and advice to address any issues that might be identified.

The Airways' "Queenstown Class C Airspace Application of Separation" document dated 15 April 2014 was completed and promulgated to all interested parties in mid-April.

The original cut-off date for submissions was extended from 28 March to 2 May 2014 to allow time for affected parties to assess the Airways document and prepare their submissions with consideration to this information.

Summary of submissions

Twenty one submissions were received with representation from the different types of aviation activity which takes place within Queenstown airspace.

The Part 172 Air Traffic Service provider advised that it would be able to manage Queenstown airspace and apply the required/accepted separations if the classification is changed to Class C.

The Part 121 airline operators unanimously supported the change of airspace classification to Class C based on current air traffic movement numbers and the complexity of the airspace due to the diversity of aviation activity which takes place within.

The Part 115 hang glider and paraglider operators who operate within the three GAAs opposed the change of classification if this meant that the existing method of activation and/or the dimensions of the GAAs would be changed.

The Part 115 parachute operators did not comment specifically if in favour or opposed to the proposal. Current MOU already provide separation for parachute operations within Queenstown airspace, despite this being contradictory to Class D airspace specifications.

The operators would like to see a review of the current IFR procedures to possibly mitigate or minimise the effect on VFR operations.

The Part 135 air transport operators, both fixed-wing and helicopter VFR operations, raised several concerns as to the perceived impact on their operations and oppose a change of classification.

CAA considerations regarding matters raised

It should be noted that the CAA recognises the symbiotic relationship between the airline operations, scenic flight operators and adventure aviation industries. Most of the non-airline activities are legacy operations and a significant part of the adventure tourism market of New Zealand which draws tourists and visitors to Queenstown in the first place. A significant proportion of the passengers flying in on scheduled passenger transport will most likely experience one or more of the other aviation-related activities while visiting Queenstown.

However, the responsibility for the safety of all passengers, airline and other, flying at or around Queenstown is the prime consideration for the CAA.

Should the Director determine that airspace classification be Class C, CAA will work with Airways and all operators that every practicable step is taken to ensure that it does not result in unduly adversely impact on Queenstown aviation activities.

The common themes raised by several submitters were that an adverse effect on their current VFR operations was anticipated.

The following comments are offered in response.

(a) IFR/VFR risk assessment

The consultation document stated that the review had been conducted using a risk based approach based upon the ISO 31000[1] methodology of "change of operations brings change of risk profile".

A copy of the ISO 31000 based risk assessment was requested by several operators. The consultation document was based on several internal CAA reports and reviews which used this methodology.

Operations have significantly changed at Queenstown since ATC was introduced 20 years ago, with a substantial increase in IFR operations, both domestic and international, continuing change from scheduled turbo-prop to jet services, the development of PBN procedures and the re-design of the controlled airspace which included a reduction in the size of the control zone. Passenger numbers are forecast to continue to increase.

Factors that increase the risk for IFR aircraft in particular at Queenstown are the high terrain close to the aerodrome and flight paths; challenging environmental conditions (e.g. changeable winds, turbulence, wind shear, winter effects); runway (narrow and relatively

[1] ISO 31000 is a family of standards relating to risk management codified by the International Organization for Standardization.

short by international standards with no taxiway meaning that aircraft are required to backtrack); and the large volume and variety of traffic using the aerodrome and operating within the environs.

Prior to the implementation of PBN procedures and the airspace re-design at Queenstown; the CAA Airline Flight Operations Unit undertook a risk review of air transport operations at Queenstown in November 2011. While there had been reviews of various aspects affecting air transport operations at Queenstown (e.g. RNP-AR procedures, airspace changes, aerodrome improvements), the CAA determined that a more comprehensive risk review was required to fully understand the overall risk to safety. The large increase in air transport operations at Queenstown underlined the importance of a timely and complete review of the safety risk.

The relevant outcome in regard to the provision of ATC service at Queenstown was that for both RNP-AR and non RNP-AR air transport operations the risk of a traffic conflict (loss of separation between air transport aircraft and VFR aircraft) is a risk which was identified as requiring improvement/additional mitigation. Refer to Appendix A for a copy of the risk analysis used to arrive at this conclusion.

One of the tenets of this risk review was that "*the equipage of ACAS and EGPWS were not considered as risk mitigations as on their own they will provide an alert to undesirable operational state but cannot prevent such an undesirable operational state from developing."*

Each of the submissions from the Part 121 airline operators identified the reduction in risk to air transport operations if Class C airspace is designated and separation between IFR and VFR aircraft is provided by ATC.

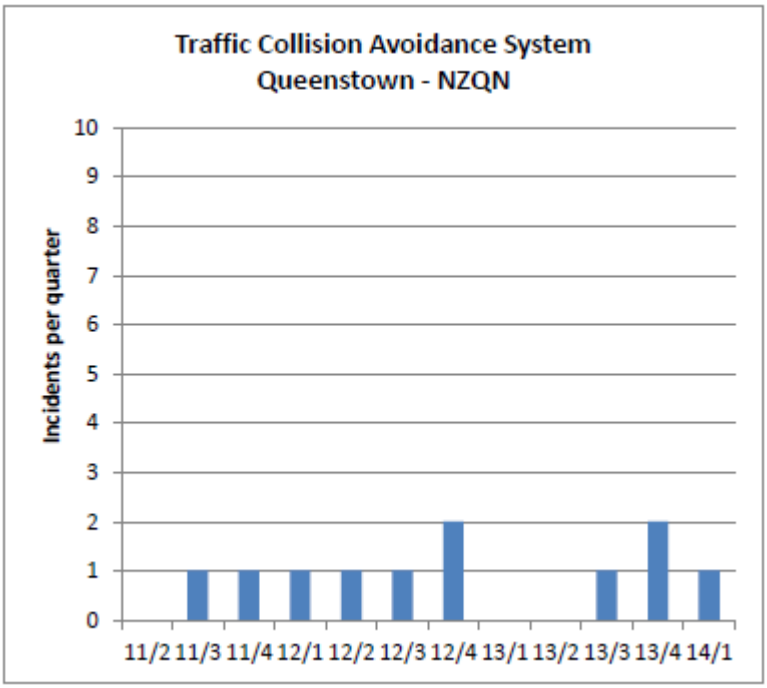
A counter-argument has been made that the IFR/VFR risk at Queenstown had decreased. This was perceived to be due to the following factors:

- "*2013 IFR/VFR occurrences had dropped 59% since their peak in 2007*"

An absence of serious reported occurrences between IFR and VFR aircraft does not indicate an absence of risk. This is a recognised harm in itself well known to regulatory organisations – "*but this hasn't happened yet*".[2]

There are still on-going ACAS resolution advisories being reported at an average of one every quarter. The total of 11 in the chart below is the second highest within New Zealand over the period. The five highest ranking aerodromes had a similar average each quarter, but the other four aerodromes have 2-3 times the number of annual movements.

[2] "The Character of Harms: Operational Challenges in Control", Professor M Sparrow, Cambridge University Press, 2008.



Reported resolution advisories for the period 1 April 2011 until 31 March 2014

- *"Only one critical occurrence involving an IFR aircraft within the last 14 years (in 2009)"*

Refer to previous answer.

The reasons for the perceived increase in safety given were:

- "*PBN approaches*"

PBN approaches permit the design of IFR paths and procedures closer to terrain than those of conventional ground-based navigation aids. This substantially reduces the "wriggle-room" that an IFR aircraft might otherwise have to manoeuvre clear of conflicting VFR traffic. PBN is not a separation tool.

Additionally, the pilots of aircraft flying RNP approaches are more "heads-down" in the cockpit monitoring flight management systems to ensure the navigation integrity and this assumes an IFR environment rather than a visual manoeuvre to avoid a VFR aircraft.

- "*TCAS*"

As stated earlier – ACAS (TCAS) is an emergency tool when the separation minima has already been breached and may involve sudden manoeuvres close to terrain to avoid a collision. The hostile nature of the terrain would make pilots of IFR aircraft flying IFR procedures unlikely to be willing to descend towards terrain should that be the resolution advisory given.

- "*Multi-lateral surveillance*"

Multi-lateration technology is just another ATS surveillance system. Presence of an ATS surveillance system does not imply ATS surveillance under Rule 172.107. Multi-lateration system like radar and ADS-B displays may be used by approach procedural controllers for situational awareness and reduction of need for some radio transmissions to confirm that separation is established. It may also be used in support of aerodrome control service.

- "*Safer IFR aircraft with better climb performance, fewer missed approaches*"

A better climb performance does not necessarily mean that risk from VFR aircraft is reduced. Refer to previous comments.

The reduced number of missed approaches is due to the minima of RNP approaches being substantially lower, with IFR aircraft remaining in IMC to lower altitudes amongst mountainous terrain. Establishing visual reference at the later stages of an instrument approach reduces any opportunity to sight potentially conflicting traffic and take appropriate actions if necessary.

- "*HG/PG ops now within designated GAA's that were extensively reviewed in 2012*"

The GAAs were reviewed in the context of Class D airspace specification where separation is not specified between IFR and VFR aircraft.

NZG756 Skyline is located within 3-4 NM from Queenstown aerodrome. This distance is within the vicinity of the aerodrome, where all aircraft receive aerodrome control service (usually under continual visual watch where terrain allows), so mitigation was needed to be applied to ensure that IFR flights on the RNP approach were adequately protected. The mitigation applied was to change the method of activation to require ATC approval.

NZG753 Crown Terrace is 4-5 NM from Queenstown aerodrome away from the aerodrome traffic circuit and where separation is not applied between IFR and VFR aircraft in Class D airspace.

NZG755 Coronet Peak is a similar distance away from Queenstown aerodrome and was therefore assessed the same as for NZG753.

The effect of a change to Class C on the current GAAs is discussed under (g) below.

- "*Consistent drop in VFR traffic since 1996: 29% from 44,0001* [sic] *to 31,323*" and "*…**7,795 less** aircraft Queenstown ATC do not have to handle compared to 17 years ago.*"

A decrease in VFR movements does not equate to a decrease in workload for ATC, although flight information service provided to VFR aircraft may have. The accompanying increase in IFR movements would be expected to increase the ATC workload because ATC is required to apply separation between all IFR aircraft in Class D airspace.

(b) Airspace design

Several submitters requested a detailed airspace design for operations under Class C airspace.

Revised controlled airspace boundaries effective from November 2012 were designed to be as small as practicable to protect instrument flight paths and procedures. The control zone is as small as currently possible to protect the paths of IFR flights departing or arriving at Queenstown in IMC and much smaller than was previously the situation.

(c) Separation standards

Several submissions requested information on the separation standards specified by ICAO and CAA for application in Class C airspace between IFR and VFR aircraft.

Airspace classification specifies the extent of the air traffic control service provided to IFR and VFR aircraft as detailed in ICAO Annex 11 Air Traffic Services and specified in CAR Part 71.

ATC separation minima used is not related to airspace classification; and is applied when separation is required between two aircraft in airspace Classes A to E.

Current separation minima prescribed by ICAO are detailed in the PANS-ATM[3] Doc 4444. These are designed to afford separation between IFR aircraft may feature utilisation of navigation aids but are also used for separation between IFR and VFR aircraft where applicable.

Separation is achieved by using one of the following methods:

- vertical
- longitudinal
- lateral
- visual
- wake turbulence
- runway

In controlled airspace where an ATS surveillance service is provided, 'radar' separation minima are also used above the minimum vectoring altitude.

Where a situation is not covered by ICAO provisions, other separation minima may be developed as necessary by the ATS authority.

The New Zealand separation standards used are promulgated in Civil Aviation Rule Part 172 "Subpart E – Separation criteria and minima".

[3] Procedures for Air Navigation Services – Air Traffic Management

At a *controlled aerodrome,* all aircraft in the vicinity of the aerodrome – the aerodrome traffic circuit – receive an air traffic control service and are issued with clearances, instructions and traffic information to prevent collisions between aircraft and between aircraft and objects on the manoeuvring area.

Where VFR aircraft are separated from IFR aircraft in *controlled airspace* (beyond the vicinity of a controlled aerodrome), separation minima used are extracted or derived from those contained in Doc 4444 and may include minima from the following examples:

(a) surveillance, by a radar controller (3-5 NM)

(b) vertical (500 ft – 2000 ft)

(c) longitudinal including:

- § distance (if direct tracking using DME separations/opposite direction separations)
- § time (as for above or '5 min outside lateral separation point' if no DME and no geographical position to validate)

(d) lateral (1 NM exists between the possible positions of two aircraft after tracking tolerance and equipment error etc.), including:

- § geographical ('sectors' or visually 1 NM either side of a coastline, railway track, prominent road, mountain range…)
- § composite (combination of IFR tolerance and VFR tracking)

(e) visual, including:

- § definite passing confirmed by both pilots
- § 'sight and follow', or 'track behind' for the pilot of the second/following aircraft

(f) separation distances calculated by Airways' Aeronautical Development and Design unit (Part 173 certificated)

(g) separations approved by the ATS authority (CAANZ)

These would take many pages to transcribe in complete detail. By practicality, they also cannot and do not describe every permutation for their application.

(d) Increased risk to VFR aircraft if held outside and inside controlled airspace

This issue was raised in relation to the Milford Sound – Queenstown traffic flow and the concern that there could potentially be several VFR aircraft holding in airspace with confined terrain.

The current traffic flow, separation requirements and agreed VFR arrival and departure procedures mean that it is very seldom that aircraft have to hold outside Queenstown CTR.

VFR aircraft can be denied a clearance to enter controlled airspace if there is conflicting traffic. However it should normally be possible to accommodate traffic even if doing so requires a temporary issue of a clearance limit. In the event that an aircraft arrives at a clearance limit and is still not clear to proceed further, the aircraft is instructed to hold at the clearance limit (normally a prominent topographical feature).

In the case of a stream (or daisy-chain) of VFR aircraft arriving, orbiting over a common point is not feasible if there are a dozen or so light aircraft in loose line-astern formation, requiring arrangement of a more organized method of holding in the event that this was necessary and before another form of separation could be applied once the lead aircraft reaches the holding point. This could, for example, involve flying a sausage-like pattern of follow-the-leader on the left or right side of a coastline or road, turning back 'inbound' once abeam the last aircraft in the stream. When the holding at the clearance limit is lifted, the next aircraft to have not yet turned outbound continues straight ahead as cleared and consecutive aircraft follow.

However VFR routes should be developed to minimise any likelihood of needing to hold or warrant a clearance to enter the control zone to be denied. It may be possible that reduced tolerances as a result of more accurate PBN navigation could result in closer track spacing where 1 NM between the possible positions of two aircraft is defined as satisfying lateral separation.

The CAA agrees that this is a significant safety issue and mitigations will be considered should the airspace be designated as Class C.

(e) Proposed VFR south arrival altitude restriction

Concern was raised about the proposed change to lower the altitude to from 3500 ft to 2200 ft or below when east of Gully. One respondent requested the CAA's risk assessment of per-passenger risk of ditching and survival rates.

The details contained in the Airways' document are initial proposals as to how separation could be achieved. There may possibly be other solutions designed which don't require the restriction to 1000 ft AGL for the 3 NM crossing over the lake.

Airways considers that helicopter operators would not find this lower limit acceptable. There was no specific feedback provided by the helicopter operators about that proposal.

This situation will be examined if the decision is made to classify the airspace as Class C and once Airways has submitted its final proposed air traffic management plan, should that arrival procedure still be deemed necessary.

(f) Movement data used

The movement data is based on aircraft movement statistical information from the Airways website which counts all take-offs, landings and missed approaches handled by Airways at Queenstown.

Some operators queried the total of VFR movements as it did not include the movements within the general aviation areas. The commercial operators estimated that there could be a further 30,000 VFR movements within the nominal boundaries of the Queenstown CTR.

The 2013 flight movement statistics provided by Part 115 hang glider and paraglider operators to the CAA as required under rule Part 12 total just over 14,000. This figure does not include non-commercial flights.

While the Airways movement data includes the parachute drop plane movements it does not include the actual number of parachute descents. At the parachute drop zones within the Queenstown controlled airspace there were nearly 20,000 tandem parachute descents from approximately 4000 flights made by the drop aircraft. There are no statistics available for other parachute descent operations.

The Queenstown movement statistics are used to indicate air traffic controller workload and the risk of collision between controlled flights. Controlled flights are defined as all aircraft requiring an ATC clearance.

By their nature, general aviation areas are Class G airspace and no ATC service is provided within. When a GAA is active, ATC will keep controlled flights clear, as for uncontrolled airspace.

One statement made was that "*This is an airport with decreasing air traffic movements but increasing passengers. It is not passengers roaming the skies that create risk, it is aircraft.*"

Passenger numbers are forecast to treble over the next 25 years. Passengers are now predominately being carried by turbojet aircraft rather than by turboprop aircraft by up to a factor of 2.5:1 (up to 180 seats vs. 68 seats). This has increased the risk of exposure of a passenger on an aircraft to an airspace safety event. Even if all of the existing airline flights are being operated at less than 100% capacity all of the time, there will still be a significant increase in IFR aircraft operating at Queenstown. Due to the terrain and runway constraints, it is unlikely that the turbo-jet aircraft being used at present could easily be replaced with larger aircraft. Risk analysis procedures require 'likelihood vs. consequence' to be assessed for determination of risk.

(g) General Aviation Areas

The general aviation areas at Queenstown are legacy airspace from the early 1990's when the Queenstown CTR was first established. Until the first RNP approaches were established, IFR traffic was generally on a visual approach or departure procedure when operating within the vicinity of these areas.

The Airways "Queenstown Class C Airspace Application of Separation" document identified the potential conflictions of the Queenstown GAAs and the IFR paths and procedures.

Aircraft using the RNAV (GNSS) and VOR/DME procedures are either clear vertically or tracking on visual departure or approach segments when in the proximity to the GAAs. Controlled airspace is not designed to contain IFR aircraft when on a visual approach or departure and containment is the pilot's responsibility.

The RNAV (RNP) procedures are not clear of the GAAs.

NZG753 Crown Terrace

The climb performance of jet aircraft on the RNAV (RNP) RWY 05 departures should ensure that these flights are vertically above NZG753 before passing laterally alongside.

All of the IFR approach paths except one are vertically above NZG753 by at least 500 ft so no further separation is required.

The southern boundary of the Crown Terrace GAA is less than 1 NM from the nominal centreline of RNAV (RNP) RWY 23 approach. At the closest point, aircraft on the approach are at 2700 ft AMSL.

Possible solutions:

- Move the southern boundary – however, the launch and landing areas are located in the south-western portion of NZG753 and moving the boundary would have a severe impact on operations within the NZG753.
- Lowering the upper limit of NZG753 would also have a severe impact on flight operations within the GAA.
- Raise the profile of the RNAV (RNP) RWY 23 approach – one airline specifically addressed this and does not support it as the current 3.2° profile is already steeper than the 3.0° profile of most approaches. It is anticipated that other airline operators would not agree to a raising of the profile either.

If the airspace classification is changed to Class C, the CAA would need to ensure that all affected operators are not unduly impacted by the change.

NZG755 Coronet Peak

NZG755 conflicts with several instrument approach procedures:

- Missed approach segment of RNAV (RNP) RWY 05
- RNAV (RNP) ANPOV 1A departure
- RNAV (RNP) IPNOR 1A departure

Commercial operators advised Airways that a reduction in the lateral boundaries of the GAA would have a severe impact on operations within, possibly preventing operations altogether. The southern boundary aligns with a prominent geographical feature – Malaghans Road – which makes it easily identifiable, reducing the risk of inadvertent intrusion into the CTR.

It is also impracticable to lower the upper limit as it is level with the summit of Coronet Peak and would have an unduly negative effect on operations within.

A possible change to the method of activation to make it active by ATC approval would be difficult to manage as there are not the same controls over access to the area that are available at NZG756 Skyline. While the commercial operators would be able to comply with a MOU with procedures of operations including conditions for activation, there is no

adequate measure to ensure that private or tourist hang glider or paraglider pilots would comply with these.

The airline operators have advised Airways that the climb performance of the aircraft types flying RNP procedures under normal operations would enable the aircraft to be vertically above prior to reaching NZG755.

An assessment would need to be undertaken to confirm the establishment of a new waypoint to provide adequate vertical separation for IFR aircraft from the existing boundary of NZG755. Subject to the result, the CAA current position is that there should be no impact on the operations within the GAA.

NZG756 Skyline

The proximity of NZG756 to the final track of the RNAV (RNP) RWY 05 approach was considered in 2012 when this procedure was designed. The southern boundary is approximately 0.5 NM from the nominal centreline of the approach and is within 3-4 NM from Queenstown aerodrome. This distance is within the vicinity of the aerodrome and all flights receive aerodrome control service, so mitigation is needed to be applied to ensure that IFR flights on the RNP approach were adequately protected. NZG753 is 4-5 NM from Queenstown aerodrome and outside the vicinity of the aerodrome.

It was decided that the most appropriate method of mitigation was to change the method of activation to require ATC approval. The commercial and club operators have a robust MOU with Airways which includes a method of deactivation if it is considered necessary.

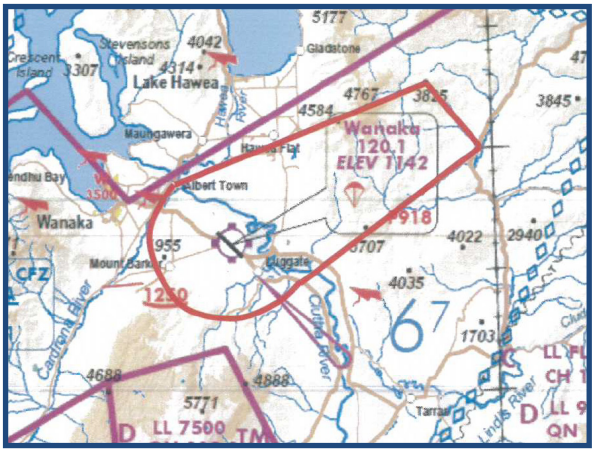
If the airspace classification is changed to Class C, at present the CAA considers that there should be no impact on NZG755.

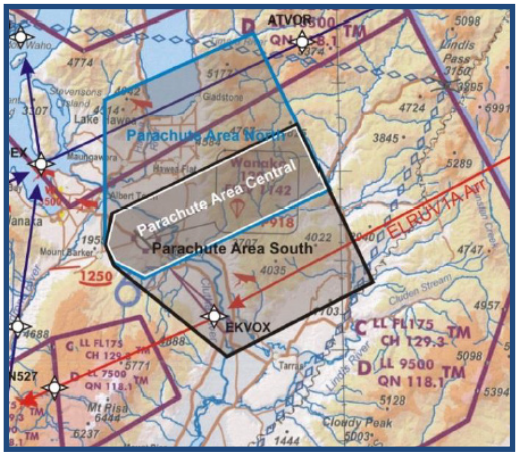
(h) Parachute operations at Wanaka

Concern was raised that the parachute operation procedures proposed over Wanaka would conflict with hang glider activity in the vicinity.

It should be noted that the purpose of the proposed Parachute Area North and Parachute Area South would be for separation from IFR traffic within controlled airspace i.e. above 9500 ft AMSL and is for the climb and descent of the parachute drop aircraft.

There is no change to the existing operation below controlled airspace. Parachutists will still be dropped within the parachute drop zone – shown as Parachute Area Central – over Wanaka aerodrome, which is a smaller area than that used at present (refer the area depicted by the red line in the diagram on the left below).





(i) Surveillance cover

Several submissions quoted the FAA Order JO 7400.2J which requires a radar approach control service to be provided within Class C airspace.

FAA requirements do not apply to New Zealand and this is not the United States environment.

There are no ICAO requirements for surveillance, either primary or other means, for the management of Class C or any other ATS airspace.

ICAO Doc 9426 Air Traffic Services Manual states that the major reason for the provision of surveillance radar at a "*...specific location is that traffic density and/or complexity has reached a point where, with the application of conventional non-radar control methods only, it is inevitable that aircraft will encounter unacceptable ATC delays*".

A radar control service could be provided down to the minimum vectoring altitude in controlled airspace over Queenstown. Due to terrain, it is likely that a minimum vectoring altitude would be approximately 10,000 ft AMSL.

There were further questions raised about the Class C airspace being designated without the application of a radar control service.

1. *How will Queenstown guarantee VFR/IFR separation without primary radar?*

   The same as it is elsewhere; by the standard methods used wherever procedural separation is applied – based on controller instructions and pilot reports – using vertical, horizontal and visual separations, as is the case at present for IFR aircraft. Class C airspace already exists where a radar approach control service without primary surveillance cover is provided within the New Zealand flight information region and many other places in the world.

2. *Will class C without radar be accepted by ICAO and international airlines?*

There is no ICAO requirement for Class C airspace to have surveillance coverage. It appears that a link has been assumed though.

Airspace management within a state is the responsibility for that individual state to determine.

3. What EFODs [filing of differences] *will need to be filed for Queenstown with ICAO?*

None. As per the answers above, the link between Class C, ICAO and surveillance is an incorrect assumption.

(j) Financial impact

The Class D airspace specification is not being applied at Queenstown at present in that the current local operating procedures in place already serve to provide a level of service consistent with Class C, but without accountability for separation applied.

In this regard, the CAA considers that most features of Class C airspace management would be indistinguishable from the existing arrangements.

If Class C is designated for the Queenstown airspace, the CAA will work to ensure that there would not be an unduly adverse financial impact on operators.

(k) Controller workload

Airways was unable to advise if a change of classification of Class C would result in an increase of controller workload.

The terrain and weather issues experienced by VFR pilots may place greater pressure on controllers if VFR aircraft are subjected to delayed clearances or restrictive routing.

However, there are effective methods of distributing workloads to acceptable levels.

Identified Stakeholders

An electronic copy of this document will be sent directly to the following organisations and those parties who made a submission but are not listed below:

- Airways NZ
- Queenstown Airport Company
- Queenstown and Milford User Group
- Air New Zealand (including Link Operators)
- Qantas Airlines
- Aviation Industry Association (AIA)
- JetStar Airlines
- NZ Airline Pilots Association (NZALPA)

- Virgin Airlines
- Board of Airline Representatives New Zealand (BARNZ)
- Queenstown based general aviation operators: Wakatipu Aero Club, helicopter and Milford operators
- Queenstown based affected airspace users: Hang gliding, paragliding, parachuting, gliding.

Notifications will be sent to CAA email notification subscribers to NOTAM areas 7 and 9.

The CAA will conduct a meeting at Queenstown on Monday 26 May to discuss the submissions made and the next steps in the review process.

This document is also available on the CAA website at the following link:

http://www.caa.govt.nz/airspace/airspace_review.htm

If you have any further questions regarding the review process, please contact Paula Moore – contact details below.

Timeframe

Airways' submission detailed its expected timelines for work that it would need to undergo to implement Class C airspace. Some of the tasks have already been undertaken with the production of the Application of Separation document. However, there will need to be formal studies made of proposed separation minima and the expectation that the accuracy of PBN procedures could reduce the lateral minima.

If the decision is made to classify existing Queenstown Class D airspace as Class C, consideration must also be given to consultation, design, development, and promulgation of new procedures, possible amendments to existing procedures, pilot and controller training requirements, before an implementation date is agreed.

The CAA review document timeframe originally planned for the possibility of implementation in November 2014.

The request for more information to assist operators and users with making a submission changed the cut-off date to 2 May 2014.

The timeframe is now changed to:

Action	**Previous Date**	**New Date**
Industry consultation initiated	February 2014	Completed
Meetings and discussions with Queenstown users and Airways	March 2014	Completed
Consultation and feedback complete	28 March 2014	2 May 2014 - completed

Action	Previous Date	New Date
Final decision on airspace classification – subject to any need for further assessment	April 2014	August 2014

If the decision is made to change the classification of Queenstown airspace to Class C then:

Implementation work started	April 2014	August 2014
ATM and airspace design completed	May 2014	January 2015
Effective date	N/A	TBA

If the decision is made to re-classify the airspace as Class C, all potential risk factors will be considered when determining an implementation date.

Further information

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Appendix A – Excerpts from CAA document "Air Transport Operations at Queenstown Risk Review – November 2011"

The overall approach that the CAA adopted for the review is the AS/NZS ISO 31000 Risk Management process. The risk assessment methodology includes an adaptation of the US 14 CFR (FAR) / EASA CS Part 2X-1309 System Safety Analysis, with reference to the ARMS methodology and UKCAA CAP 760.

The review methodology included the following steps:

- Consider existing known hazards and their potential impact on existing operations.
- Define acceptability criteria in a risk matrix format
- Analyse risks associated with the identified hazards and determine the acceptability of these risks

The risk scores are based on the decision by the risk review panel; risk scores have not been averaged.

Table 1: Derived Risk Matrix

			Likelihood						
			Probable	Occasional	Unlikely	Remote	Extremely Remote	Improbable	Extremely Improbable
			3	4	5	6	7	8	9
Severity	Catastrophic	9	100000	30000	10000	3000	1000	300	100
		8	30000	10000	3333	1000	333	100	33
	Hazardous	7	10000	3000	1000	300	100	30	10
		6	3333	1000	333	100	33	10	3
	Major	5	1000	300	100	30	10	3	1
		4	333	100	33	10	3	1	0.3
	Minor	3	100	30	10	3	1	0.3	0.1
		2	33	10	3	1	0.3	0.1	0.03
	Nil Effect	1	10	3	1	0.3	0.1	0.03	0.01

Table 2: Risk Description

Risk Score	Risk rating	Proposed new operation	Existing operation
	Unacceptable	The operation must not commence	The operation must be discontinued until acceptable risk reduction measure have been implemented
	Improve	The operation must not commence until risk reduction measures are in place and reduce risk to acceptable level	Risk reduction measures need to be identified and started within an agreed time frame

Risk Score	Risk rating	Proposed new operation	Existing operation
	Secure	Operation may commence but close monitoring and revaluation is required	Risk level needs to be monitored continuously to prevent escalation to unacceptable level; reinforcement of existing measures
	Monitor	Operation may commence provided routine monitoring measures are in place	Operation is monitored through routine measures (e.g. occurrence reports, FOQA etc.)
	Acceptable	Operation may commence	No specific action required

Risk Analysis

A semi-quantitative risk assessment was conducted. Quantitative descriptors have been used to assess likelihood, however, qualitative measures have also been used to refine scores. The risk assessment relies heavily on the subjective assessment of an experienced panel of participants, supported by hazard information data where available.

Risks were analysed to identify likelihood and severity using the descriptors found in Appendix A with explanation as follows:

Likelihood

- Likelihood = probability x exposure
- Quantitative descriptor - expressed as per flight hour
- Qualitative descriptors - used to refine likelihood based on frequency of event at Queenstown

Severity

- A number of qualitative descriptors have been used to help refine severity score.
- Except as specified, the severity is assessed based on the most probable accident outcome.

Severity and Likelihood Tables

Severity

Score	1 - No safety effect	3 - Minor	5 - Major	7 - Hazardous	9 - Catastrophic
Effect on Airplane	No effect on operational capabilities or safety	Slight reduction in functional capabilities or safety margins	Significant reduction in functional capabilities or safety margins	Large reduction in functional capabilities or safety margins	Normally with hull loss
Effect on Occupants	Inconvenience for passengers	Physical discomfort for passengers	Physical distress to passengers, possibly including injuries	Serious or fatal injury to an occupant	Multiple fatalities
Effect on Flight Crew	No effect on flight crew	Slight increase in workload or use of emergency procedures	Physical discomfort or a significant increase in workload	Physical distress or excessive workload impairs ability to perform tasks	Fatal Injury or incapacitation
1309 definition	Failure conditions that would have no affect on safety (that is, failure conditions that would not affect the operational capability of the airplane or increase crew workload).	Failure conditions that would not significantly reduce airplane safety and involve crew actions that are well within their capabilities. Minor failure conditions may include a slight reduction in safety margins or functional capabilities, a slight increase in crew workload (such as routine flight plan changes), or some physical discomfort to passengers or cabin crew.	Failure conditions that would reduce the capability of the airplane or the ability of the crew to cope with adverse operating conditions to the extent that there would be a significant reduction in safety margins or functional capabilities. In addition, the failure condition has a significant increase in crew workload or in conditions impairing crew efficiency; or a discomfort to the flight crew or physical distress to passengers or cabin crew, possibly including injuries.	Failure conditions that would reduce the capability of the airplane or the ability of the crew to cope with adverse operating conditions to the extent that there would be: (a) A large reduction in safety margins or functional capabilities; (b) Physical distress or higher workload such that the flight crew cannot be relied upon to perform their tasks accurately or completely; or (c) Serious or fatal injury to an occupant other than the flight crew.	Failure conditions that are expected to result in multiple fatalities of the occupants, or incapacitation or fatal injury to a flight crewmember normally with the loss of the airplane.

Likelihood

Score	**1** **Regular**	**2** **Frequent**	**3** **Probable**	**4** **Occasional**	**5** **Unlikely**	**6** **Remote**	**7** **Extremely Remote**	**8** **Improbable**	**9** **Extremely Improbable**
Probability (per flt hr)	<10-1	<10-2	<10-3	<10-4	<10-5	<10-6	<10-7	<10-8	<10-9
	Expected to occur in normal operation	Regularly occurs in normal service.	Expected to occur several times per year.	Expected to occur about once per year.	Once per aircraft or several times for a fleet; once in 5 years.	May be expected to occur once in 10 years for a fleet.	Not anticipated to occur in the life of the fleet	May occur a few times in the life of the fleet.	May occur a few times in the life of the type
1309 definition			Defined as a probable malfunction or failure is any single malfunction or failure that is considered probable on the basis of either past service experience or analysis with similar components in comparable airplane applications, or both.		Those failure conditions that are unlikely to occur to each airplane during its total life but that may occur several times when considering the total operational life of a number of airplanes of this type.		Those failure conditions so unlikely that they are not anticipated to occur during the entire operational life of all airplanes of one type.		Those failure conditions not anticipated to occur to each airplane during its total life but which may occur a few times when considering the total operational life of all airplanes of this type.

Operational Risk – RNP-AR and non-RNP-AR air transport

Item	Risk	Description	Cause(s)	Immediate Effect	End Effect	Likelihood	Severity	Risk Index
	Traffic Conflict							
11	Loss of separation between air transport aircraft and VFR traffic	Near miss due to loss of separation	Various	Loss of separation	Near miss	3	4	333
12	Loss of separation between air transport aircraft and VFR traffic	Collision due to loss of separation	Various	Loss of separation	Mid-air collision	7	9	1,000
13	Loss of separation between RNP AR and non RNP AR air transport aircraft	One aircraft conducting a missed approach and one conducting arrival	Conflicting flight paths	Loss of separation with ACAS alerts	Near miss	6	4	10