# THE CASE FOR A NATIONAL NETWORK OF COMMON FREQUENCY ZONES (CFZ) IN CLASS G AIRSPACE

## BACKGROUND

The Aviation Industry Safety Update, issued by the Civil Aviation Authority for the period 1 January to 30 June 2011, shows thatAviation activity in New Zealand, both commercial and recreational, has remained in somewhat of a state of stasis over the last five years, with aircraft movements at certificated aerodromes increasing by just 0.6%. However over the the ten-year period from 1 July 2001 to 30 June 2011, annual hours flown has increased by 2.5% to nearly 1 million hours. The number of aircraft on the Register has increased by an average of 47 per year from 2008/4 to 4,495 by the third quarter of 2011, with GA aircraft representing 95% of the national fleet (CAANZ 2011).

In contrast to this, an independent review of flight training in NZ carried out by Australian-based Aerosafe Risk Management and released in August 2011, shows a 68%increase in flight training activity between 2000 and 2010.This increase, coupled with the increase in many training schools encouraging international students to train in NZ, has resulted in certain regions within the NZ Flight Information Region (NZ FIR)experiencing a significant increase in theintensity of air traffic movements, including an increase in the number of solo low-time students, many of whom do not have English as their first language, and/or are unfamiliar with New Zealand's geography. This is particularlynoticeable within a twenty (20)nautical mile radius from both attended and unattended aerodromes, although it ismost common in the vicinity of larger regional aerodromes such as Palmerston North, New Plymouth, Masterton, etc. With the predicted growth in aviation world-wide, NZ can expect to see further increases in trafiic density, particularly of GA type aircraft and operations, given the focus on expanding flight training within New Zealand. And this expansion is not misplaced optimism; current forecasts indicate an increase in flight training revenue from its current $53.5m to as much as $104.8m in 2015, of which up to 50% would come from international markets (Aerosafe, 2011).

As a consequence of this increased traffic density around aerodromes, the increasing number of navigation training flights, as well as recreational, agricultural, tourism and charter flights under both VFR and IFR in Class G airspace, increasingly raises the probability of traffic coming into close proximity and the potential for collision while enroute, even though well outside the vicinity of an aerodrome. The risk can be exacerbated when aircraft are also operating clear of any apparent promulgated frequency that pilots could use to maintain a listening watch for other traffic, in addition to their visual scan. In fact, as part of the Interim Factual Report issued by the Transport Accident Investigation Commission (TAIC) following the fatal mid-air collision between two training aircraft at Feilding in 2010, the Commission noted that "The total number of near misses for the period 1990 to 1999 was 17, with 3 involving training aircraft. For the period 2000 to date, the total number increased to 131, while the number involving training aircraft increased to near 60." TAIC went on to state that "Three factors emerge, the limitations of see and avoid, the importance of local procedures/airspace design and an increase in the number of near misses reported." (Aerosafe, 2011).

It is not uncommon during a typical 1.5 hour training flight, to come into visual contact with as many asfive or more aircraft operating in uncontrolled airspace. The large majority of these contacts are inconsequential, in that they do not require conflict resolution, however, the latent problem is thatwhile these aircraft may eventually be seen, they are not necessarily heard.

An increasing number of GA aircraft now have a Traffic Advisory System that detects and interrogates other aircraft transponders (if fitted, and ON mode C – altitude data)out to a maximum range of seven nautical miles or more, depending on the system. [Photo of TAS]. This equipment has highlighted to operators that, on a number of occasions, aircraft are flying in close proximity to one another withoutever achievingvisual or radio contact. This serves to illustrate the increasing risk of flying in uncontrolled airspace, particularly in areas of high traffic density where there is no promulgated common air-to-air frequency. The alerting of the presence of an aircraft via a radio call is an important safety aspect and a signifcant part of a pilot's situational awareness, complementing the visual 'lookout'. The reason for degraded situational awareness can be ambiguous or misunderstood information about the 'best' or most appropriate aircraft to aircraft radio frequency for an area or location, which means that this important (and at times critical ) safety information about an aircraft's position and intentions is not available to other pilots. An improvement to the aircraft-to-aircraft radio instructions would enhance safety and reduce potential conflict between aircraft.

The following are a few examples where this problem has been observed and reported on:

1. Transiting from Palmerston North CTR via Ashhurst and the Manawatu Gorge or vice versa.
   Aircraft that have vacated the PM CTRto the east have four frequency options available to them:
   - Remain on 120.6MHz (PM TWR) until clear of the Gorge before changing to 119.1MHz or FISCOM
   - Change to 124.1MHz (Feilding CFZ) and then very shortly to 119.1 MHz (Dannevirke)
   - Change to FISCOM CH INFO 124.2MHz
   - Change to 119.1MHz

   Since pilots operating in the area east of PM CTR and around the Manawatu Gorge all have this same set of options (not all of which are promulgated or advised), there is a strong chance that any two aircraft could be on any one of four frequencies, reducing the chance of pilots positively identifying each other's position.

2. Operating in the vicinity of the Rangitikei River valley north of Feilding.
   There are four possible frequencies that pilots could use in this area:
   - Feilding CFZ 124.1MHz
   - FISCOM CH INFO 129.8MHz
   - 'Unattended' 119.1MHz (possibly reporting on 'Flat Hills traffic')
   - Wanganui 120.2MHz

   There have been incidents of aircraft coming into close contact in this area, but not hearing each other due to uncertainty over which frequency to use.

3. Crossing Cook Strait.
   - The only available option for pilots crossing the Strait in Class G airspace is FISCOM CH INFO 121.3MHz, unless they obtain radar monitoring from Wellington Control, although it is possible that aircraft crossing east from the Marlborough Sounds could remain on Marlborough Sounds traffic 123.0MHz until halfway across. Pilots vacating, or planning to enter WN or WB CTRs could also remain on those respective frequencies until well out into

the Strait. In any case, the likelihood of aircraft operating around Cook Strait outside controlled airspace being able to communicate with each other is virtually nil.

Cook Strait is a VFR bottleneck, in that most pilots will be aiming to take the shortest route (Ohau Point to Perano Head), and the lower limit of controlled airspace is 2500 feet. This has the two-fold result of reducing horizontal and vertical separation, and consequently reducing situational awareness with respect to other aircraft that may present a traffic conflict, particularly on poor-weather days.

4. Operating on the east coast of the North Island south of Napier.
   There are four common frequencies that pilots are most likely to monitorand broadcast on in this area:
   - FISCOM CH INFO 124.2 MHz Dannevirke and south.
   - FISCOM NR TWR 125.6 MHz Dannevirke and north
   - 119.1 MHz, using various aerodrome traffic designations, such as Waipukarau, Dannevirke, Porangahau, etc
   - Hastings CFZ 125.8 MHz

   The very large area of Class G airspace in the Wairarapa region, combined with increasing private, commercial and training trafficis resulting in confusion over position reporting. This is particularly noticeable between Dannevirke and Masterton, where some pilots are monitoring FISCOM, while others are listening out and making position reports on 119.1 MHz. The major problem is that, due to the large area, pilots wishing to make position reports using 119.1 MHz have to decide which aerodrome to base their report on (usually Dannevirke or Masterton), and some are using 'fictional' traffic designators such as "Woodville traffic" or "Castle Point traffic". Although pilots generally make excellent use of the "See & Avoid" principle, situational awareness is impaired by confusion and misunderstanding regarding position reporting in the Wairarapa region.

   Hastings CFZ is well used, however, since it is isolated (except for its boundary with the Napier CTR), there is a latent safety risk in the ambiguity regarding how far before entering, or after exiting the CFZ does a pilot change to their next nominated frequency.

The CAA's Vector magazine has documented an increase in pilots using 119.1MHz as a 'default' frequency for listening and making position reports when flying in uncontrolled airspace (*Vector September/October 2005, pp 15-16*). This in itself is not necessarily a bad thing, since it shows that pilots are taking the initiative to maintain an active listening watch. The concern is that 119.1 Mhz has never been promulgated as a common aircraft-to-aircraft frequency, and in certain areas such as Wairarapa and east of Wanganui it is possible,when conditions allow, to hear pilots making reports relative to a large number of unattended aerodromes, including South Island ones. The magazinealso summarised some of the outcomes of the 2009 airspace review process, which included an increased number of Common Frequency Zones (CFZ) "designed to improve safety by establishing a single frequency to assist collision avoidance, and reduce congestion on 119.1 MHz" (*Vector September/October 2009, pg 18*).

Arguably the most vivid and poignant example of the confusion that exists with regard to appropriate air-to-air position reporting frequencies within the NZ FIR remains the mid-air collision between two Massey University School of Aviation aircraft near Shannon on Feb 9 2006. The aircraft accident report released by the CAA identified four possible frequencies that the two aircraft could have been using, which may have resulted in reduced situational awareness if the pilots had been monitoring different frequencies (CAANZ, n.d.). The report also stated that, as a result of the accident, the CAA was "currently working with local operators to develop a Common Frequency Zone for the Palmerston North southern training area. Currently all operators in

the southern training area have agreed to monitor 119.1 MHz as a common user frequency, until a discrete frequency is issued" (CAANZ, n.d.). This was since amended with the establishment of the Manawatu Common Frequency Zone on 122.6 MHz.

## THE CURRENT ARRANGEMENT

Common Frequency Zones were first established in NZ in December 2008 and are not currently designated under CAR Part 71. According to AIP ENR 5.3 – 14, 5, they"have been established to encourage pilots to use a single VHF frequency specified for the zone. Pilots should transmit their position, altitude and intentions relevant to prominent reporting points or features at entry, or at other times for traffic safety." CFZs "are not mandatory and are advisory in nature."As such, CFZs are being developed in an ad hoc manner, either as a reaction to an incident or accident (e.g. Manawatu), or as a result of increased traffic density around specific areas (e.g. Hastings and Taranaki), most commonly due to increased flight training activity.

While Airways Corporation is continuing to develop effective traffic management systems within controlled airspace (an Airways review is currently underway), aircraft operating in Class G airspace outside existing MBZs and CFZs continue to rely primarily on published FISCOM and local aerodrome frequencies for traffic information.A continuous listening watch is required below 3000' AGL and within 10nm of unattended aerodromes in accordance with AIP ENR 1.1 – 11, 6.1.1, on the frequency listed in the COM box on the aerodrome chart, or on 119.1 MHz if there is no such chart. This arrangement helps ensure that all RTF-equipped aircraft are on a common frequency while operating in the vicinity of unattended aerodromes, which significantly increases situational awareness, thereby reducing the risk of an incident or accident. However this does not resolve the ambiguity and the resulting confusion experienced by many pilots enroute, and outside 10nm from an aerodrome. This ambiguity also exists around current CFZs and MBZs, such as Hastings, mentioned earlier, with regard to where a pilot should change frequencies when approaching these airspace boundaries.

Airspace changes implemented by CAA in 2009 resulted in the establishment or amendment of a number of CFZs (*Vector September/October 2009, pg 19*), designed to cater to increased traffic density within specific areas, in particular Auckland, Taupo, Wellington, Tasman and Canterbury. The majority of these are adjacent to MBZs around busy unattended aerodromes, and close to existing CFZs. It is interesting to note that the CFZ between Auckland City MBZ and Ardmore MBZ evolved from what was called a "collision avoidance frequency", a term upon which the entire philosophy behind the creation of CFZs rests.

## THE PROPOSED NEW CONCEPT

In consultation with various industry stake-holder groups (including Airways Corporation, RNZAF and lower North Island aerodrome users' groups), it has been suggested that, rather than continuing to establish CFZs on an ad hoc basis, according to localised requirements, the time has come to develop a national philosophy with regard to the ongoing development of CFZs, and that the entire NZ FIR be divided into CFZsusing the following guidelines:

- CFZs should be contiguous - don't leave gaps between them.
- All Class G airspace should be contained within CFZs (from the surface to the lower level of controlled airspace)
- CFZ boundaries should be obvious geographic features.

- CFZs should avoid having unattended airfields on or near the boundary - pilots entering the area from an adjacent CFZ should have at least 10nm of transit to pick up traffic info.
- Any one CFZ should encompass only one reasonably busy unattended airfield (e.g. OK to have a CFZ that encompasses Wanganui, but only Wanganui)
- CFZs do not supersede existing MBZs
- Should have a CFZ covering the Cook Strait region (monitored by ATC). Any aircraft south and west of Kapiti Island and PP MBZ should be on a Cook Strait CFZ, and everything north and east of Kapiti/ PP MBZ should be on Tararua.

A draft chart has been produced outlining the proposed CFZs (Appendix A). Each of the proposed CFZs will be assigned a discrete frequency, which will also apply to any unattended aerodromes within that CFZ, e.g. Foxpine aerodrome, which is within the Manawatu CFZ (122.6 MHz), is referred to as "Foxpine traffic" on 122.6 MHz. Any MBZs within a CFZ will remain separate (as per Paraparaumu MBZ which is inside the Tararua CFZ). The so-called "unattended frequency", 119.1 MHz would be disestablished, as there will no longer be any requirement for it under the above-mentioned arrangement.

CAR Part 172 requires Airways to establish procedures to ensure that a flight information service is provided to any aircraft operating VFR for which the pilot has submitted a VFR flight plan to an ATS unit, and any aircraft operating VFR if the pilot makes a specific request to an ATS unit for flight information. The flight information service must include the provision of available and relevant—

(1) SIGMET information; and

(2) information on weather conditions reported or forecast at departure, destination, and alternate aerodromes; and

(3) information concerning pre-eruption volcanic activity, volcanic eruptions, and volcanic ash clouds; and

(4) information concerning the release into the atmosphere of radioactive materials or toxic chemicals; and

(5) information on changes in the serviceability of navigation aids; and

(6) information on changes in the condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by snow, ice, or water; and

(7) information on unmanned free balloons; and

(8) other information likely to affect safety.

Currently this information is provided outside controlled airspace by FISCOM, which is available on different frequencies around NZ. FISCOM was originally designed so that pilots anywhere in the NZ FIR would be able to update ETAs and SAR times, as well as transmit and receive relevant meteorological and operational information enroute,however it appears that the flight following aspect of FISCOM is becoming somewhat obsolete as more organisations provide their own flight following services. It is proposed that Airways establish a national network of automated weather and flight information service broadcasts, fulfilling all the requirements listed above, which pilots could activate and listen to in the same manner as an AWIB or FISB (AIP GEN 3.4 – 12 & 13). This automated broadcast could be activated by multiple pulsing of the push-to-talk switch on the CFZ frequency, similar to the activation of PAL (pilot activated lighting), thereby allowing pilots with only one comm box to remain on the CFZ frequency, rather than having to switch periodically back to FISCOM.FISCOM could still be available for pilots to submit PIREPs (which would then be updated on the appropriate automated broadcast (as per ATIS information) and update ETAs and SAR times if required, but as

navigation and tracking technology progresses (ADS-B, etc), it is likely that the requirement for this will decrease. Obviously there would be a setup cost associated with the installation of this system, which could be spread over a number of years as the system is progressively introduced, but this cost would be offset by the reduced staffing requirements currently associated with maintaining FISCOM.

It is also suggested that Common Frequency Zones be included in CAR Part 71 Subpart D – Special Use Airspace, whereby CFZs continue to retain their current status and definition, as outlined below:

**71.1xx Common frequency zones**

(a) The Director may designate a portion of uncontrolled airspace as a common frequency zone if, due to traffic density or special circumstances, the pilots within that zone are advised to make radio broadcasts of their position and intentions.

(b) The Director must—

(1) identify each common frequency zone by the ICAO nationality letters of the applicable State followed by the letter "C" followed by a number; and

(2) assign the radio frequency to be used within the common frequency zone for the non-mandatory radio broadcasts

In the case of Transit Lanes, pilots would maintain a listening watch on the CFZ frequency adjacent to the Transit Lane they are using, changing halfway through if there is a different CFZ at the other end of the Transit Lane.

Emergency messages would be transmitted on the promulgated FISCOM, 121.5 MHz, or a tower or radar frequency, if in range.

## DRAWBACKS

Pilots flying aircraft equipped with only one comm box would need to switch from the CFZ frequency to FISCOM in order to update ETA/SAR time. This a minor disadvantage, since CFZs are non-mandatory, and the pilot would be maintaining a good lookout throughout the flight in any event.

Pilots of these aircraft experiencing an emergency or urgency would need to switch to an appropriate frequency, if they had been listening out on a CFZ frequency. It would be prudent for pilots to have the local FISCOM on standby while using the CFZ frequency.

Mention was made earlier of the ambiguity surrounding when pilots should switch frequencies in the vicinity of airspace boundaries. There is no definite answer to this question, and the solution, such as it is, must rest with the airmanship and commonsense of individuals. This lack of absolute clarity could be seen as a disadvantage. However it has to be said that actually having clearly specified boundaries, regardless of how pilots choose to manage the changeovers between them, significantly increases the safety margins over having no definite boundaries at all.

## OUTCOME: ENHANCED FLIGHT SAFETY

With the increasing number of aircraft movements in uncontrolled airspace in NZ the establishment of a national network of contiguous CFZs covering the whole country would significantly enhance flight safety. CFZs have thus far been demonstrated to effectively increase situational awareness, by augmenting the "See & Avoid" principle that all flight instructors teach their students from day one.Rather than allowing CFZs to continue to be established ad-hoc as the perceived need arises in certain areas, or as the result of a serious incident or accident, it is proposed that a national policy be developed by the CAA in consultation with the aviation industry. The aim would be to reduce the ambiguity currently experienced by pilots with respect to position reporting and maitaining a listening watch for other pilots operating in the area, especially in more remote areas outside the vicinity of an aerodrome,

Although the tried-and-true practice of "See and Avoid" will always apply, giving all pilots flying in Class G airspace the option of maintaining a listening watch on a promulgated common frequency in any given geographical area within the NZ FIRwould enhance their situational awareness and reduce the risk of collisions between aircraft. It is far easier to spot an aircraft if the pilot has been given a 'heads-up' on where to concentrate their scan by means of a clear concise position report on a promulgated common frequency.

Pilots would still receive all the benefits of the current FISCOM service through the proposed arrangement outlined above.

CFZ boundaries would be clearly marked and, wherever possible, use prominent geographical points, thus enabling pilots to seamlessly switch frequencies as they fly between CFZs, even if they are unfamiliar with the territory through with they are flying. The majority of air traffic in NZ flows roughly north south, thereforemost CFZs are likely to be longer through their north-south axis and pilots should reasonably expect to remain on any given CFZ frequency for at least fifteen to twenty minutes, depending on aircraft speed and the constraints of boundary location in a given geographic area (mountainous terrain, etc).

Due to their non-mandatory nature, there is no requirement for an aircraft to communicate on a promulgated CFZ frequency and therefore NORDO aircraft, or aircraft equipped with only one comm box can continue to freely use the airspace. The sole objective of a CFZ is to increase the safety of flight through enhanced situational awareness by using dedicated discrete VHF frequencies inside promulgated, unambiguous, region-specific zones.

This proposed system should eliminate occurrences of pilots broadcasting position reports using 'fictional' traffic designators, as mentioned earlier, thereby standardizing radio calls and reducing confusion over position reporting.

The disestablishment of 119.1 MHz will reduce the amount of radio 'clutter' currently being experienced by many pilots operating in remote locations or around unattended aerodromes. With all RTF-equipped aircraft in a given CFZ using the same frequency, only local and relevant traffic reports will be heard.

## RECOMMENDATION.

It is recommended that the CAA consider the guidelines and suggestions offered above (including the draft chart at Appendix A) and by actioning the create a nationwide network of Common Frequency Zones.

The following steps are offered:

1. Establish contiguous CFZs throughout the NZ FIR,
2. Review the existing FISCOM service and explore ways of automating and streamlining it

3. Include CFZs in CAR Part 71 Subpart D
4. Disestablish 119.1 MHz, the so-called 'unattended frequency' (which will no longer be necessary, since CFZs would be contiguous, and all unattended aerodromes within each CFZ would operate on that CFZ's discrete frequency).

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