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Introduction

1 Executive Summary

1.1 Findings

- 1.1.1 The Taupo Aerodrome Aeronautical Study Team finds that the following combination of issues, inter alia, requires enhancements to ensure the system safety at Taupo is commensurate with the target level of safety:
- a) parachuting operations;
 - b) the volume of air traffic during peak periods;
 - c) varying types of aircraft operation;
 - d) the complexity of flight paths;
 - e) the complexity of runway operations; and
 - f) significant variation in aircraft speeds.
- 1.1.2 The main finding of this report is that Taupo Aerodrome requires a minimum of aerodrome flight information service (AFIS). An AFIS is a certificated service under Rule Part 172. This rule imposes requirements that allow the provision of air traffic services (ATS) such as traffic information. An aerodrome with an AFIS service remains uncontrolled, so that pilots retain responsibility for maintaining situational awareness and avoiding collision, based on the information provided to them.
- 1.1.3 It should be noted that the establishment of AFIS alone is not sufficient to achieve an acceptable system safety. Therefore, there are several recommendations that must be implemented in conjunction with AFIS.
- 1.1.4 A finding of the quantitative collision risk analysis was that risk levels for various aircraft categories at Taupo are almost all either within the range that requires mitigating actions or within the range that requires mitigating action if it is economically appropriate to do so.
- 1.1.5 The risk modelling took into account the effect of safety systems such as the local Memorandum of Understanding (MOU) and Traffic Collision Avoidance System (TCAS). Risk modelling assumptions, such as aircraft conflict rates, were conservatively based, assuming that aircraft will be equally spaced. The conflict rate that was used is less than half that actually observed at Taupo, producing a much lower economic benefit than could be expected in reality.
- 1.1.6 The qualitative assessment found several safety issues that required mitigation. These form the bulk of the recommendations contained therein.
- 1.1.7 The economic analysis found that the benefits of an AFIS at Taupo exceed the establishment and annual operating costs and therefore the establishment of an AFIS is justified on economic grounds. The economic effect of an AFIS on individual aircraft operators was not calculated, as this was outside the scope of the economic analysis of costs and benefits to the nation.

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- 1.1.8 The current UNICOM ground service is authorised by Civil Aviation Rule Part 139.353. UNICOM is essentially a base radio without the requirement to observe aircraft movements, so it therefore does not have the privilege of providing traffic information. This study found that UNICOM does not have a major benefit in terms of collision avoidance.
- 1.1.9 The result of this study found that the NZ criterion of 40,000 aircraft movements or more for the establishment of AFIS at an aerodrome in Taupo's category is appropriate. However, the study indicated that the proportion of instrument flight rules (IFR) aircraft made a significant difference to the economic analysis results, so a single criterion was not practical. Therefore, further assessment is required at other aerodromes to establish criteria based on total numbers and a varying proportion of IFR flights.
- 1.1.10 The Taupo Aeronautical Study Team acknowledges the seminal risk modelling work provided by the Australian Civil Aviation Safety Authority (CASA) and the assistance provided by CASA during this study. CASA reviewed the Taupo collision risk modelling as part of the on-going development of State Safety Management Systems required under the provisions of the International Civil Aviation Organization's (ICAO) Annex 11.
- 1.1.11 In this report, the term Director means the Director of Civil Aviation. A list of abbreviations used in the report are contained in Appendix 1.



Len Wicks
Taupo Aeronautical study Team Leader

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- 1.2 Recommendations**
- 1.2.1 **Recommendation 1** (paragraphs 1.1.2, 6.5.14, 8.5.13, 9.2.4, 9.3.2, 10.2.8, 11.4.6, 12.4.10, 12.5.2, 14.1.2, 14.2.5, 18.4.5 refer): the Director should, as soon as practicable, but not later than **17 March 2005**, require the Taupo Airport Authority to establish an AFIS at Taupo Aerodrome.
- 1.2.2 **Recommendation 2** (paragraph 1.1.2): the Taupo Airport Authority (TAA) should ensure that the AFIS cab has adequate visibility to monitor parachuting by using windows in the ceiling or cameras, so the flight service operator does not have to leave the operational position (*Civil Aviation Rule Part 172.57*).
- 1.2.3 **Recommendation 3** (paragraph 8.1.5): the Director should, by **1 September 2005**, develop and publish a Good Aviation Practice (GAP) for Taupo Aerodrome, to familiarise pilots with Taupo procedures.
- 1.2.4 **Recommendation 4** (paragraph 8.1.5): the Director should, as soon as practicable, advise helicopter pilots that helicopters should not operate within the runway strip when other aircraft are using the runway by means of the GAP and the Aeronautical Information Publication (AIP).
- 1.2.5 **Recommendation 5** (paragraph 8.1.5): upon application by airspace users, the Director should, by **25 November 2004**, establish a low flying zone east of the aerodrome.
- 1.2.6 **Recommendation 6** (paragraph 8.2.4): the Director should, as soon as practicable, amend Rule Part 93, requiring a maximum speed of 180 knots for aircraft within the Taupo mandatory broadcast zone (MBZ) below 3,000 feet above mean sea level (AMSL).
- 1.2.7 **Recommendation 7** (paragraph 8.2.4): Eagle Airways should, as soon as practicable, advise staff that radio transmissions related to IFR aircraft airline operations be as brief as possible or on a company frequency.
- 1.2.8 **Recommendation 8** (paragraph 8.2.4): Eagle Airways should, as soon as practicable, advise IFR pilots on approach in uncontrolled airspace to make radio reports that indicate the direction from which they are approaching.
- 1.2.9 **Recommendation 9** (paragraph 8.3.3): the TAA and the Taupo Harbourmaster should, as soon as practicable, confine parasail operations over Lake Taupo within specified lanes clear of both Taupo Aerodrome and Taupo Water Aerodrome approaches (*Rule Part 101.253 (a)(1)(ii)*, requires the parasail to be not above 400 ft above the surface).
- 1.2.10 **Recommendation 10** (paragraph 8.5.8): parachute organizations at Taupo should, as soon as practicable, consider restricting solo parachute ('sport') operations by amendment to the MOU to ensure such activity is managed on a uniform basis by all parties.
- 1.2.11 **Recommendation 11** (paragraph 8.6.2): the Director should, as soon as practicable, take such action as is necessary to ensure the manned balloon operator at Taupo does not present a safety issue in future.
- 1.2.12 **Recommendation 12** (paragraph 11.1.2): the Director should, by **24 November 2005**, review the controlled airspace and mandatory broadcast zone dimensions south of Taupo to improve IFR flight profile containment.

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- 1.2.13 **Recommendation 13** (paragraph 12.1.5): the Director should, as soon as practicable, amend Rule Part 93 to authorize departures from runway 11 during AFIS hours of service.
- 1.2.14 **Recommendation 14** (paragraph 12.1.5): the TAA should, by **25 November 2004**, review the position of the three parachute landing areas with the objective of consolidating the landing areas clear of runway 11/29 operations.
- 1.2.15 **Recommendation 15** (paragraph 12.1.5): the TAA should establish a sealed taxiway for runway 11/29 as soon as practicable.
- 1.2.16 **Recommendation 16** (paragraph 12.2.4): the Director should, by **24 November 2005**, review the NDB/DME Bravo approach with the objective of either withdrawing or revising the approach to improve the disposition of the final approach track with respect to Centennial Park traffic.
- 1.2.17 **Recommendation 17** (paragraph 12.3.6): the Director should, by **25 November 2004**, establish a non-mandatory Special Procedures Area (SPA) at Centennial Park, frequency 134.45 MHz, to enhance awareness of the aerodrome and the aerodrome frequency.
- 1.2.18 **Recommendation 18** (paragraph 12.3.6): the Director should, as soon as practicable, remind pilots of their responsibilities to operate aircraft lights when operating within the Taupo MBZ to enhance flight visibility, in accordance with Rule Part 91 and encourage appropriate reporting of non-compliances.
- 1.2.19 **Recommendation 19**: (paragraph 12.3.6): the Director should, by **25 November 2004**, establish the Taupo mandatory broadcast zone between 3,000 ft and 6,500 ft AMSL as transponder mandatory (TM) to ensure the effectiveness of Aircraft Collision Avoidance Systems.
- 1.2.20 **Recommendation 20** (paragraph 12.4.10): the Director should, as soon as practicable, amend Rule Part 93 to require pilots to confirm there is no parachuting in progress during AFIS hours of service, prior to conducting an overhead rejoin procedure at Taupo.
- 1.2.21 **Recommendation 21** (paragraph 12.4.10): the Director should, as soon as practicable, amend Rule Part 93 to require aircraft to be 3,000 feet AMSL or below when entering the Taupo aerodrome traffic circuit.
- 1.2.22 **Recommendation 22** (paragraph 12.4.10): the Director should, as soon as practicable, amend Part 93 to authorize parachute aircraft to operate in circuits east of the aerodrome.
- 1.2.23 **Recommendation 23** (paragraph 12.4.10): the Director should, by **17 March 2005**, illustrate the helicopter circuit on the eastern side and standard helicopter procedures in the AIP.
- 1.2.24 **Recommendation 24** (Paragraph 12.6.2): the TAA should, as soon as practicable, review the fencing and gates along the eastern side of the aerodrome to prevent cattle from entering the manoeuvring area.
- 1.2.25 **Recommendation 25** (Paragraph 13.3.4): the Director should, by **24 November 2005**, depict Kinloch, and Huka Falls Heliport on visual navigation charts after consultation with the aerodrome operators that this is appropriate.

C-36161-01 (DW1085497-0)

22 December 2004

[REDACTED]

Dear Sir

Taupo Aerodrome Aeronautical Study: Required Actions

The Aeronautical Services section of the CAA recently completed and reported on the subject study. A copy of the report is enclosed for your information and action as appropriate. I have carefully considered the report and the recommendations made therein and, with the exception of some recommendations, I endorse the report for implementation. My decision regarding each recommendation made in the report is as follows:

- * Recommendation 1: At present, I am not convinced that an Aerodrome Flight Information Service is required at Taupo aerodrome at this time and, therefore, do not intend to exercise my power under NZCAR 139.113 to require it or to require an Aerodrome Control Service.

In light of this decision I also do not propose to implement recommendations 2, 13, and 20.

- * Recommendations 3-12: I support all of these recommendations.
- * Recommendations 14- 19: I support all of these recommendations.
- * Recommendations 21-25: I support all of these recommendations.

My decision is based on the fact that you, as the Aerodrome Certificate holder at Taupo, have the responsibility to maintain the overall safety of operations at that aerodrome. Consequently I would encourage you to take the initiative to work constructively with all stakeholders to achieve that aim. To that end, and in light of my decisions recorded above, it may be beneficial if all interested parties met with a view to developing an action plan that suits the aerodrome operator and users while satisfying the public interest.

I encourage you to proceed with such a meeting and I would be willing to attend and contribute to discussions. In the interim, I will begin the process of implementing those recommendations involving an action by the CAA.

Yours faithfully



John Jones

Director of Civil Aviation

Enclosure:

CAA Aeronautical Study: Taupo Aerodrome

15/12/04.

D-NZAP-01 (DW1085174-0)

To: Graeme Harris, General Manager Personnel Licensing and Aviation Services

Taupo Aeronautical Study

Graeme

I refer to your memorandum of 2 December 2004, and the attached copy of the memorandum to the DCA, dated 2 December 2004.

The Taupo Aeronautical Study Team has considered your memorandum carefully. We have sufficient concerns about the content to bring them to your attention and to the attention of the Director. Failure to endorse the major safety recommendation of the Study Team would expose the Director to a level of risk that would be difficult to defend in the event of any incident at Taupo that might have been mitigated by an AFIS. We believe your recommendation would place the travelling public and aviation participants at risk and would be indefensible in a Coroner's Court.

Your memorandum does not identify any specific reasons why our AFIS recommendation is invalid. The Aeronautical Study Team is surprised by the lack of reasoning behind your position. This may be viewed by some people outside the CAA as evidence that your review of the Taupo report was not independent and not without political bias.

We note that you consider the Study to be 'comprehensive' and that the 'major risks have been identified'. Notwithstanding this and the reviews conducted by independent organisations such as the NZIER and CASA, you advise that you have a 'degree of unease' sufficient to set aside the most important safety recommendations. When dealing with safety matters as a regulator we always put safety first. Where there was any uncertainty, it was correct to err on the side of safety. Your recommendation suggests a different attitude.

We are concerned that your reasons for dismissing the AFIS recommendation may be seen by some as lacking an objective, independent basis. If we consider the issues raised in your memorandum you may understand our deep concern at your position.

Consultation

You note that the consultation method could be improved with a workshop involving relevant stakeholders. We agree, though in the highly polarised and politicised Taupo environment a workshop may in fact have produced a poor result, compared to the frank and confidential feedback we received using a one-to-one interview technique. You acknowledge that we have identified the major risks.

TAAM modelling

TAAM modelling would allow a more detailed analysis of flight paths. This should lead to improvements in the collision risk modelling. It would also take into account clumping, which is the normal grouping of aircraft caused by the disposition of the runway and aerodrome traffic circuit, terrain, weather and destinations. Clumping would almost certainly increase the conflict rate, a fact noted in the Taupo report's Executive Summary. Increasing the conflict rate to that which was actually observed during the CAA Study (4.51% for aircraft to aircraft and 2.26% for aircraft to parachutes) would produce a benefit cost ratio of 1.73, with a value of 1.26 just for safety benefits. Clearly this issue is not a reason to have any unease as to the report's recommendations.

Policy criteria

Taupo is a busier aerodrome than many regional aerodromes with ATS (see the table below) and has a degree of complexity in terms of its type of operations that is unmatched by most in New Zealand. One might well ask just how busy an aerodrome has to be to justify an ATS unit. We cannot now justify using a benchmark of 40,000 total movements as Australia does to require an ATS enhancement. Your recommendation effectively overrides years of work on ATS policy criteria and brings the CAA back to the position we were in some years ago, when we made subjective decisions regarding which aerodromes required an ATS unit.

Aerodrome	2003
Christchurch	156,215
Auckland	151,921
Wellington	125,529
Tauranga	75,327
Nelson	62,690
Hamilton	57,427
Queenstown	51,403
Ohakea	49,434
Palmerston North	48,452
Taupo	43,676
Invercargill	34,805
New Plymouth	31,063
Dunedin	29,338
Rotorua	24,714
Napier	24,154
Gisborne	23,033
Woodbourne	20,469
Milford Sound	17,828
Whenuapai	17,190

Taupo is the only aerodrome in the table above not currently served by an ATS unit. Ardmore is the busiest aerodrome in New Zealand but does not have an AFIS. This is because it is not certificated, the Director cannot require an ATS, despite AFIS being the CAA's recommended minimum level of service at this aerodrome.

Summary

In summary, the Taupo Aeronautical Study Team urges you to reconsider your position in light of the clarification of the issues raised, to ensure that the Director and the travelling public are not exposed to undue risk. This decision has major implications for any further work on aeronautical studies and ATS policy work. There is little point in continuing work in these fields from a technical perspective if the results or criteria **can be overturned without good reason.**

There is certainly no enthusiasm to do any further work on the Aeronautical Study methodology. The Taupo Aeronautical Study Team feel there has been a lack of support for their extensive and in some cases ground-breaking work and therefore they do not consider there is any benefit to further work. Unless there is a major fault in our methodology (and this has not been demonstrated), we believe that you should be supporting your technical staff. We feel that we have been let down by your advice to the Director and safety has not been given proper emphasis.

Len Wicks
Aeronautical Services Officer (ATS)

15-December-2004

Cc: Mark Hingston; John Jones