Risk Analysis

Airways Corporation’s proposed VFR Support Services charges

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1.0 Executive Summary

This analysis identified five risk scenarios that were perceived as “significant” by respondents to an aviation industry questionnaire. Risk control measures for each of these scenarios are discussed and recommendations made.

The five risk scenarios are:

1. **Delay in search and rescue:** As a result of either a late alert or lack of information there will be a delay in rescuing people involved in an accident.
   1. **Collision between aircraft:** Less information available on VFR aircraft movements may result in an increased risk of a mid-air collision.
   2. **Inadequate pre-flight planning:** If flight plans were not filed then people may not complete adequate pre-flight planning.
   3. **Lack of weather information:** If appropriate weather information is not obtained then the possibility of a weather-related accident increases.
   4. **Not using ATC for flight assists:** Pilots may not request in-flight assistance from ATS because they believe they will be charged. This has the potential to cause accidents.

The recommendations and risk control measures (where necessary) are:

1. Investigations show that the present alerting service saves lives and is of net benefit to the nation. The safety assessment team therefore recommends that the CAA explores methods of ensuring that utilisation of an alerting service at least continues at present levels so that lives can continue to be saved.

2. There is a lack of information on the potential level of aircraft collision risk. Even if that information was available there is no standard stating what level of risk is acceptable.

   It is recommended that the Rules and Standards Group:

   (a) Examine the feasibility of setting a standard that defines an acceptable level of risk (with respect to collision avoidance) for enroute operations in Class G airspace, and, if a standard is feasible;

   (b) Determine whether mandatory installation of Mode C TCAS II would be required to ensure Part 125 and 135 aircraft meet the standard.

   In the interim the CAA Safety Education and Publishing Unit should encourage and educate pilots to:

   (a) Make regular position reports when in Class G airspace.

   (b) Activate Mode C transponders when flying.

3. Pre-flight planning is a rule requirement. It is recommended that the CAA Safety Education and Publishing Unit provide an education programme to inform pilots of the regulatory requirements for and benefits of pre-flight planning.
4. Investigations show that the present weather information saves lives and is a net benefit to the nation. The safety assessment team therefore recommends that the CAA explores methods of ensuring that use of weather information at least continues at present levels so that lives can continue to be saved.

5. There is no change to the provision of service with regard to flight assists. There was no charge and no charge is being established. It is recommended that the CAA Safety Education and Publishing Unit provide an education programme to inform pilots of the benefits of using flight assists and to reassure them that there is no charge.
2.0 Methodology
This risk analysis was conducted in accordance with the CAA Risk Analysis Framework. The framework is based upon the following documents:

- Nav Canada Aeronautical Study Standards and Guidelines
- Canadian Standards Association (CSA) Q850: Risk Management
- CSA Q634 Risk Analysis Requirements and Guidelines

The purpose of the analysis was to determine if the risk to aviation safety would be unacceptably increased by the proposed introduction of charges for VFR services by Airways Corporation of New Zealand (ACNZ). The framework provides a method for a structured decision making process that permits the identification, analysis and evaluation of risks, and risk control measures.

The analysis is a combination of qualitative, semi-quantitative and quantitative analysis.

The framework requires the CAA to consult with all affected stakeholders and great importance is placed on stakeholder involvement in the assessment process from its onset.

3.0 Initiation

3.1 Proposed changes in the provision of air traffic services
The analysis was requested by the Assistant Director, Safety Investigation and Analysis (ADSIA). The terms of reference (see Appendix A) were to investigate the safety concerns that might arise from the proposed changes in the ACNZ charges for the provision of air traffic services.

3.2 History of charges
While historically there have not been specific charges for filing VFR flight plans or obtaining information such as weather and NOTAM, VFR pilots have paid landing charges that contribute to the costs of providing these services. The Airways Information Release, ACNZ December 1989, stated that the landing charges for aircraft under 2,000 kg gave access to all of the following services:

   (a) Aerodrome Control
   (b) Aerodrome Flight information
   (c) Flight briefing and planning
   (d) Flight information
   (e) Alerting services
(f) All VFR enroute services

(g) All IFR services

A flat charge of $100 per annum was payable by all aircraft under 2,000 kg. This entitled the aircraft to 50 landings at ACNZ serviced aerodromes. An additional landing charge was payable for all landings after the first 50.

These charges incorporated $1.20 per landing as a contribution to enroute VFR services. This replaced the previous $6.50 charge per enroute VFR flight. This change followed extensive negotiations between ACNZ, the Aviation Industry Association (representing commercial operators) and the New Zealand Aviation Federation (representing training, sporting and recreational flying). ACNZ agreed to the change in charging after the aviation industry suggested that the change would encourage all GA pilots into the airways system.

3.3 Key stakeholders

Parties affected by the proposed charges were identified as the Ministers of Transport and SOE, the DCA, the CEO of the Airways Corporation, pilots, passengers and operators of VFR and IFR aircraft, flight training organisations (FTO’s), the rescue coordination centre (RCC), and air traffic services (ATS).

The analysis concentrated on pilots and operators, FTO’s and the RCC as they were considered to be those most affected by the proposed changes.

4.0 Rule Requirements

4.1 New Zealand

A summary of the rules applicable to this analysis is included in Appendix B.

Submitting Flight plans

Rule Part 91.307 VFR flight plan, stipulates when a VFR flight plan must be submitted.

Rules Parts 121.59, 125.57 and 135.57 impose more specific requirements for when certificate holders must submit flight plans.

Rule Parts 119.73 and 119.121 ensure that a flight following service is provided if flight plans are not submitted by a Part 135-certificate holder.

Pre-flight action

Rule Part 91.217 Pre-flight action, specifies the minimum information the pilot-in-command is required to obtain before beginning the flight.

4.2 Overseas

The United States and the United Kingdom do not require flight plans for VFR aircraft. Canada requires flight plans when travelling more than 25 nautical miles from an aerodrome. Australia does not require private VFR flights to file flight plans. In Australia
flight plans are required for other operations only in certain situations (see Appendix C for more details).

5.0 Preliminary Analysis

5.1 Current services and proposed changes
ACNZ, in February, outlined their proposed charges in a consultation briefing document (see Appendix D). The proposal set out “indicative prices for the current level of service (exclusive of GST)”.

During the course of this analysis, ACNZ issued a pamphlet to industry outlining VFR Services. It was mailed on or about 19 April 1999. Inserted into this pamphlet was a schedule of ‘Proposed VFR Service Prices’. A number of these ‘proposed’ prices are significantly less than the ‘indicative’ prices set out in the February 1999 document.

Since then the CAA have received another list of prices. The charge for Fax-on-demand and Datel have been deferred.

5.2 Identification of possible risk scenarios
Possible risk scenarios were determined. They were based upon the premise that the introduction of any charges would act as a disincentive to pilots obtaining pre-flight and in-flight information, and submitting flight plans.

Risk scenarios were determined by examining in detail the various VFR support services. For example filing a flight plan means the following services are received:

(1) Pre-flight Briefing - NOTAM, weather.

(2) In-flight services - update on NOTAM, weather, alerting service, etc.

Some of these services were further broken down; for example NOTAM includes aerodrome information, volcanic information, etc.

Once the services provided were identified then the question was asked: “how could the risk change if the service was not used?” Those with risk changes were regarded as potential safety concerns and consequently a risk scenario was developed.

5.3 CAA Website
A notice was put on the ‘What’s New’ page of the CAA Website to advise the industry that the CAA was undertaking a safety assessment of ACNZ’s proposal to introduce charges for VFR support services. Submissions were sought from the aviation industry.

5.4 CAA Review
The CAA Review, Issue 3, April 1999, included the article Airways Corporation proposes flight planning charges, outlining the ACNZ proposal. Submissions from readers summarising their safety concerns were requested by 23 April.
5.5 Written submissions
A total of 114 submissions were received. The cut off date was extended by two weeks because of the large number of late submissions. The number of submissions was regarded as large and an indication of the strength of feeling in the industry.

5.6 Questionnaire
Based on the risk scenarios, questions were developed that indicated the type of risk (safety concern) that may arise. Respondents were asked to read the questions and to define their perceptions of the probability of an increased risk of accident/incident and the potential consequences.

The probability of an accident/incident and consequences were categorised using a modified form of the risk assessment matrix from the aerodrome safety assessment.

The questionnaire (copy in Appendix E) was sent to:

1. The Aviation Industry Association of NZ (Inc)
2. The Aircraft Owners and Pilots Association (NZ) Inc
3. The Royal Air New Zealand Aero Club
4. The Guild of Air Pilots and Air Navigators
5. The New Zealand Airline Pilots Association
6. Part 119 Air Operator Certificate holders
7. Part 141 Aviation Training Organisation Certificate holders
8. Reg 136 Air Service Certificate holders

The questionnaires were released to coincide with an article in the CAA Review.

Ansett New Zealand (national and regional) and Air New Zealand (National and Link) were provided with questionnaires. No responses were received from these industry participants.

The questionnaire was also distributed to 29 CAA staff members to see if there was a difference in risk perception between the industry and the CAA.

6.0 Risk Estimation
As previously noted team members identified potential safety concerns. The responses received in the submissions and questionnaires did not identify any additional potential safety concerns.
6.1 Methodologies used for estimating risk and consequences

6.1.1 Written submissions
A content analysis was completed (see Appendix F) which compiled the main issues raised along with the frequency of each issue. The methodology used in the content analysis is also described in Appendix F. The issues relating to proposed costs that are raised are most likely to be in response to the February ‘indicative’ prices. At the time of the consultation and review process these were the most widely circulated proposals.

6.1.2 Questionnaires
The responses in the questionnaires were entered into an Excel spreadsheet. Graphs in Appendix G show the responses for each question. Where the majority of the responses are to the left of the graph the majority of respondents perceived the risks as extreme, very high, high, or moderate resultant risk category. In these cases the risk was considered for this analysis as “significant” and that these safety concerns would be investigated further to decide if risk control was required.

6.1.3 Data
Data on the historical contributing factors and/or causes of accidents and incidents was obtained from the CAA’s Aviation Safety Monitoring System (ASMS) database (reflecting the New Zealand situation) and where possible from overseas reports (reflecting the situation overseas).

6.2 Acceptability of data
Data was available on the present accident/incident rates for safety concerns associated with collision between aircraft. However, there was insufficient information to quantify the potential increase in risk. For pre-flight planning there was a lack of quantitative information providing a causal link between inadequate pre-flight planning and actual accidents.

Causal or contributing data was used in the risk evaluation for all the other safety concerns.

7.0 Risk Evaluation

7.1 Analysis of written submissions
A total of 114 submissions were received. The information provided below is a summary of the content analysis in Appendix F.

**Issue: General Safety & Search and Rescue. Frequency (80):** Filing flight plans was perceived as an incentive to undertake planning and preparation for flights. A related argument was that the absence of information from filed flight plans could result in Search and Rescue activity taking longer because of an increased potential search area.

**Issue: Cost of Services. Frequency (71):** The most prominent concern was the proposed level of charge for a flight plan ($42.50).
Issue: Pilot Behaviour Change. Frequency (82): The proposed charging regime for VFR flight plan filing and associated information would result in less flight plans filed and less flight information obtained.

Issue: NOTAM. Frequency (40): These submissions were directly concerned that the proposed costs would deter pilots from obtaining NOTAM.

Issue: Weather. Frequency (45): These submissions were directly concerned that the proposed costs would deter pilots from obtaining weather information through the ACNZ National Briefing Office, or a similar approved service. The proposed charge for an in-flight update (non-hazardous MET) was of equal concern.

Issue: Aircraft protection from collision. Frequency (28): Submissions identified increased IFR/VFR collision potential. The first theme to emerge was that with the prospect of far fewer flight plans filed, controllers of airspace would not have information on actual and likely traffic at the boundaries of control zones (CTRs) and terminal areas (TMAs) and that this would increase the likelihood of traffic conflicts and even collision between controlled and uncontrolled traffic.

The second theme was, in the absence of accessible and the quite extensive use of flight planning, the practice and discipline of FISCOM contact would reduce traffic information in uncontrolled airspace and this would have the potential to increase ‘near-miss’ incidents or collisions with VFR traffic.

7.2 Analysis of Questionnaires
A total of 194 questionnaires were distributed, 165 to industry and 29 within the CAA. 103 questionnaires were completed and returned to the CAA, 83 from external clients and 20 from CAA staff.

7.3 Summary of the risks perceived as significant
The safety concerns which had risks that were perceived as ‘significant’ and that require consideration for risk control were:

1. Delay in search and rescue: As a result of either a late alert or lack of information there will be a delay in rescuing people involved in an accident.

2. Collision between aircraft: Less information available on VFR aircraft movements may result in an increased risk of a mid-air collision.

3. Inadequate pre-flight planning: If flight plans were not filed then people may not complete adequate pre-flight planning.

4. Lack of weather information: If appropriate weather information is not obtained then the possibility of a weather-related accident increases.

5. Not using ATC for flight assists: Pilots may not request in-flight assistance because they believe they will be charged. This has the potential to cause accidents.
Note: the same risks were perceived as ‘significant’ by respondents from both industry and the CAA.

7.4 Delay in search and rescue (SAR)
In the 10 year period from February 1989 to February 1999, 1,200 INCERFA (uncertainty phase) reports were filed on the CAA’s SAR database. The experience of the CAA’s SAR Mission Coordinators (SARMC) would suggest that many INCERFA are not recorded on the database because of their rapid clearance by the SARMC or by ACNZ’s air traffic service (ATS) staff. An estimate (based on the experience of the RCC team) is that 30% of INCERFA are actually entered onto the database. From this it is reasonable to estimate that while 1,200 INCERFA were entered into the database in the 10 year period, a total of approximately 4,000 such incidents would have occurred.

The vast majority of these INCERFA result from failure to terminate flight plans, but some result from aircraft accidents. In the 10 year period 35 INCERFA have resulted from aircraft accidents and there have been seven incidents when injured people have been rescued. The lives of these people may have been saved as a result of an ATS provided alerting service. That is, the rescue and consequential saving of lives in these incidents was a result of a SAR operation initiated by the ATS alerting service, and other factors such as ELT’s were not involved. Nine injured people were rescued in these seven incidents.

To summarise and put things in perspective (using the CAA’s own information and that provided by ACNZ) on average each year there are:

1. **30,000** VFR flight plans filed
2. **400** INCERFA incidents, of which
3. **120** INCERFA incidents were of sufficient significance to warrant entry onto the CAA’s SAR database. The remainder are closed quickly through ATS or SARMC action and do not justify entry.
4. **3.5** of those INCERFA incidents result from aircraft accidents, while the remainder generally result from failure to terminate flight plans.
5. **0.7** rescues involving injured people resulting from ATS provided alerting services
6. **0.9** lives may be saved as a consequence of those rescue operations.

7.4.1 Acceptability of risk
An alerting service is important because as a result of the alerting service there are on average 0.7 rescues of injured people a year. The assessment team concludes that if charges result in the alerting service being poorly utilised, there will be a risk that an aircraft involved in an accident will not be covered by an alerting service and consequently there will be a delay in rescue that may cause loss of life. The absence of an alerting service is considered by the safety assessment team to have a level of risk that requires risk control.
Risk Analysis of ACNZ’s Proposed VFR Support Services Charges

7.5 Collision between aircraft

In the 13 years since 1986 there have been 10 aircraft collisions in New Zealand. The accidents have been categorised as:

- Ground collision 1
- Formation flying 4
- Air display 1
- Tugs and gliders 2
- Class G airspace 2

For this project only the two in Class G airspace were considered relevant. The first occurred between aircraft operating in the Milford Sound scenic airspace traffic flow. The aircraft were operating VFR in VMC in Class G airspace, and had received traffic information by the use of local procedures. The second was the collision between a police helicopter and a fixed wing aircraft, both of which were engaged on traffic patrol over Auckland City in November 1993. The aircraft were VFR in VMC in Class G uncontrolled airspace. Neither aircraft was in receipt of a flight information service and the aircraft were on different radio frequencies.

This equates to an accident rate of 2 per 8,000,000 hours or 1 in 4,000,000 hours.

An analysis was made of reported near collisions in New Zealand airspace since 1992 (note that incident data has only been collected since 1992). The criteria for the “near collision” descriptor are not defined in the ASMS database. Out of 102 reported, 20 near collision pairs were considered relevant to the analysis (details in Appendix H):

Analysis showed that near collisions occurred in Class G airspace in all the following situations:

1. when both aircraft were being provided with a flight information service
2. when neither aircraft was being provided with a flight information service
3. when only one aircraft was provided with a flight information service
4. when local procedures only were being used by the near collision pair.

The number of near collisions for each situation varied between four and six. Therefore the data did not indicate that any of the situations was more risky than the others.

A related issue is that there may be a disincentive for pilots to activate Mode C transponders.

The safety benefit of properly activating a Mode C transponder is to enable air traffic services to provide known traffic information to IFR and VFR flights on request. ATS also rely on aircraft position reports and/or information from filed flight plans to provide known traffic information on request (Part 91 and the NZAIP specify procedures to be followed at uncontrolled aerodromes. The provision of a Flight Information Service is separate from these procedures).
7.5.1 Acceptability of data
Data was available on the historical risk of aircraft collision. However, there is incomplete statistical data available on the number of flights operating in New Zealand Class G airspace. Only VFR aircraft that file flight plans or contact an ATS unit are known traffic. This means it is not feasible to use the New Zealand data to forecast the effect of not filing flight plans.

The assessment team examined the Australian Airspace Risk Model (ARM) to see if it could be used to forecast the potential increase in collision risk. The ARM models the risk of collision around aerodromes. The ARM has been incorporated into Appendix 10 of ICAO Document “Manual on Airspace Planning Methodology for the Determination of Separation Minima”. The model was developed in response to concerns about the collision risk that regular public transport aircraft (RPT) may be exposed to at certain uncontrolled aerodromes. The model does not yet apply to en-route Class G airspace. The Australians have recognised that the next step is to extend the application of the model to cover the en-route phase of flight. ARM could not therefore be used to forecast the change in risk.

7.5.2 Acceptability of risk
The risk of aircraft collision is expected to increase. However, the degree of that increase cannot be reliably forecast from the data available. There is also a problem in that the question of what is an acceptable level of enroute collision risk has not been answered. There are no standards that detail the acceptable level of risk.

The assessment team can not therefore reach a conclusion on whether a ‘significant’ safety concern arises from the proposed charges. The team can only conclude that the existing risk level has been acceptable and that it is likely to increase. As a consequence, risk control may be required.

7.6 Inadequate pre-flight planning
Inadequate pre-flight planning and preparation can result in accidents (eg. from fuel starvation). CAA rules mandate the requirements for pre-flight action (planning).

The concern expressed in written submissions and by respondents to the questionnaire, is that if pilots choose not to file a VFR flight plan they may not adequately plan their flights. There is no data on the CAA database that provides evidence there is a link between filing of flight plans and adequate pre-flight preparation.

In countries where VFR flight plans are not required civil aviation rules require that adequate pre-flight planning occurs.

7.6.1 Acceptability of data
There was no information in the ASMS database to support the above concern.

7.6.2 Acceptability of risk
The filing of a VFR flight plan is only required in specific occasions as detailed in Rule Part 91.307. However, adequate pre-flight action (planning) is required for all flights.
Compliance with regulatory requirements should ensure that minimum safety standards are met.

Submissions from FTO’s made it clear that much of their training is currently based on the preparation and submission of VFR flight plans. The FTOs may have to change their training if they decide for cost reasons not to file flight plans. Any change to the training will still require compliance with CAA rule requirements for adequate pre-flight planning.

7.7 Lack of weather information
Weather is a significant factor in accidents. The Nall Report (AOPA Air Safety Foundation) states weather related accidents account for 19.5% of all fatal pilot-related accidents in the USA.

The CAA database was examined to see if weather related accidents were significant in New Zealand. There have been 800 accidents since 1991 and 100 (12.5%) of them mentioned weather as a possible contributing factor. All the accident causes since 1 January 1997 were examined; 23% had weather as a causal factor. This confirms that weather is a significant factor in accidents in New Zealand.

If appropriate weather information is not obtained, the possibility of weather related accidents increases.

7.7.1 Acceptability of risk
Lack of adequate weather information is considered by the safety assessment team to have a level of risk that requires risk control.

7.8 Not using ATC for in-flight assistance
There have been on average 30 flight assists per year recorded on the CAA database. Flight assists often occur because a pilot has either lost situational awareness or does not know a safe way to proceed. If adequate information is not provided the potential for an accident is high.

ACNZ have advised that the flight assistance will remain available to all pilots and that no charge will be made for such assistance. This needs to be made clear to pilots.

7.8.1 Acceptability of risk
Not using in-flight assistance is considered by the safety assessment team to have a level of risk that requires risk control.

8.0 Risk Control Recommendations

8.1 Alerting Service
The risk would be controlled if pilots used an alerting service such as flight plan, SARWATCH or flight following. The assessment team recommends that the CAA explore methods of ensuring that utilisation of an alerting service continues at present levels so that lives can continue to be saved.
It is also recommended that the CAA Safety Education and Publishing Unit remind pilots of the importance of using an alerting service.

A basic cost benefit analysis was completed to explain these recommendations and to examine the issue of charging for an alerting service.

**Cost Benefit Analysis**

The cost to the country of an alerting service is the cost of providing the service. Assuming the proposed $6 SARWATCH charge reflects the cost of providing the service the cost per annum is $180,000 ($6 \times 30,000 VFR flight plans). This cost is borne by ACNZ and is part of the annual charge that ACNZ obtains from aircraft owners.

The benefit of the service is the rescue of injured aircraft crash survivors. Our investigations have shown that on average 0.9 injured aircraft crash survivors are rescued per year because of the alerting service. The time it takes for injured crash survivors to be rescued and taken to hospital is a critical factor in the chance of surviving. A crash survival graph (NOAA 1996) gives a 80% survival rate for injured people after 2 hours, falling to 60% at 8 hours, 40% at 16 hours and 20% at 32 hours.

The alerting service gives a warning so that a rescue can begin earlier than otherwise. In New Zealand the alerting service has an average rescue time of 12 hours (note if the five longest times are removed the average reduces to 6 hours). This means the alerting service enables the rescue to occur when injured survivors would have between a 40% to 60% chance of survival (using the NOAA survivability figures). If there was not an alerting service the warning on average would be later and the chance of survival would decrease. It is therefore concluded that the survival chances for injured crash survivors would decrease if an alerting service was not used.

For the benefit to the nation to exceed the cost to the nation, an alerting service would need to save the life of one person in 12 years (the calculation is the statistical value of life $2,163,500 exceeds the cost of providing 12 years alerting service $2,160,000). That is the life of one of the 11 injured people (the alerting service is expected to rescue over the next 12 years, 0.9 \times 12 ) would need to be saved because of the alerting service. Given that an alerting service reduces rescue time, and the survivability figures from NOAA, the assessment team believe it is highly likely that at least one life would be saved.

The conclusion of this basic CBA is that the present alerting service, provided as part of the flight plan, is a net benefit to the nation.

**Effect of charging users**

Users being charged affects the benefit of the CBA (the costs of providing the service remains the same just who pay for it changes). The present benefit is a result of a certain level of utilisation of the alerting service. If some users do not use an alerting service, because of the charges, then the utilisation of the service will fall. This will increase the possibility that an injured person is not rescued in time and dies. The submissions indicate there will be a large decrease in utilisation of the service. However, there is no way to confirm what the actual drop in usage will be. For this reason the effect on the benefit can’t be calculated and therefore the effect on the CBA of charging users can’t be determined.
A conservative stance would be to recommend that there are no charges to the user so we can be sure of maintaining the present net benefit to the nation. However, ACNZ intend to charge because of their mandate for a commercial return. If no charges were levied on individual users then either ACNZ would have to continue to cover the costs within their present return, or the CAA would have to provide a subsidy. Pursuing either of these options may require a governmental decision.

The assessment team recommends that the CAA explore methods of ensuring that utilisation of an alerting service continues at present levels so that lives continue to be saved. The assessment team has not investigated all options but they may include:

1. Making the use of an alerting service mandatory in certain circumstances

2. Arranging for the provision of an alerting service at no or minimal charge by either negotiations with ACNZ or subsidy from the CAA.

8.2 Aircraft collision

To control the risk it is recommended that the CAA Safety Education and Publishing Unit should encourage and educate pilots to:

1. Make regular VFR position reports when in Class G airspace. Such reports will provide traffic information to other aircraft. The position reports could also provide critical information for a search and rescue operation.

2. Activate Mode C transponders when flying. This will provide information to ATS units that may allow provision of known traffic information on request, collision avoidance and easier air traffic flow. Pilots should be made aware of the benefits of properly activating Mode C transponders when flying.

It is recommended that the Rules and Standards Group

1. Set a standard that defines the level of risk that is acceptable for enroute collision in Class G airspace.

2. Determine if a rule change requiring the mandatory installation of Mode C TCAS II in all Part 125 and 135 aircraft is required to meet the standard mentioned above. An aeronautical study would be required to determine if the establishment of transponder mandatory airspace above a specified altitude throughout the New Zealand domestic flight information region was necessary.

The Australians have already mandated that from 1 January 2000 all turbine powered commercial transport aeroplanes with more than 30 passenger seats (or over 15000Kg MTOW) operating in Australian airspace will be required to be fitted with a collision avoidance system (TCAS II).
8.3 Flight planning

8.3.1 Weather information

The risk would be controlled if pilots obtained weather information both pre-flight and during the flight. The assessment team recommends that the CAA explore methods of ensuring that the use of weather information and the standard of weather information used by aviators at least continues at present levels so that lives can continue to be saved.

A basic cost benefit analysis is completed to explain these recommendations and to examine the issue of charging for weather information.

Cost Benefit Analysis

The cost to the country of weather information is the cost of providing the service. Assuming the proposed ACNZ charges (say 2 minutes of FAX on demand) reflect the cost of providing the service, the cost per annum is $60,000 ($2 \times 30,000 VFR flight plans). This cost is borne by ACNZ and part of an annual charge that ACNZ obtains from aircraft owners.

The benefit of weather information is that it may prevent an accident. Obtaining weather information gives pilots more opportunities to avoid weather related accidents.

Our investigations show since 1997 there are 154 accidents with one or more causes recorded on the CAA database. 35 of these accidents had 1 or more causes relating to weather. There were 28 fatalities in these 35 accidents. It is not clear from the CAA database whether the accidents occurred because of lack of weather information or because of incorrect actions of the pilot (e.g. pilot on VFR flight intentionally proceeding into IMC) or other reasons.

For the benefit to the nation to exceed the cost to the nation weather information would need to save the life of one person in 36 years (the calculation is the statistical value of life $2,163,500 exceeds the cost of providing 36 years weather information $2,160,000). Given the number of fatalities from weather related accidents and the benefits of weather information the assessment team believe it is high likely that at least one life will be saved in 36 years.

The conclusion of this basic CBA is that the present weather information does provide a net benefit to the nation.

Effect of charges

If users are charged the benefit will be affected (the costs of providing the service remains the same just who pay for it changes). The present benefit is as a result of a certain level of utilisation of the weather information. This level of utilisation is partly because obtaining weather information pre-flight is mandatory. If because of the charges some users do not use the ACNZ weather information they will have to obtain it from elsewhere to comply with the rule. This raises issues

1. If weather is obtained from other sources is it of a satisfactory standard

2. How to confirm compliance with the rule
If non-compliance with the rule increases or the standard of weather information obtained declines then the number of weather related accidents may increase. We don’t have sufficient information to forecast these possible effects, therefore the change to the benefit can’t be calculated and the effect on the CBA of charging users for weather information can’t be determined.

A conservative stance would be to recommend no charges to the user so that we can be sure of maintaining the present net benefit to the nation. This stance has been taken by New Zealand Maritime Safety Authority (MSA) who provides this information free of charge to users and funds it partly by a levy and partly by a contribution from government.

Although ACNZ have deferred their charges for weather information they still have a mandate to obtain a commercial return and may revisit the issue of charging in the future. A recommendation for no individual user charges would mean that either ACNZ would have to continue to cover the costs within their present return or the CAA would have to provide a subsidy. Pursuing either of these options may require a governmental decision.

The assessment team recommends that the CAA explore methods of ensuring that the use of weather information continues at present levels and the standard of weather information used by aviators is high so that lives can continue to be saved. The assessment team has not investigated all options but they could include:

1. Arranging for weather information to be at no or minimal charge by negotiating with ACNZ or subsidy from the CAA

One team member strongly believes that the best way of achieving our recommendation is to follow the MSA model of not charging for core safety information. This would require no charge to the user for weather and NOTAM information.

8.3.2 Pre-flight planning
To control the risk it is recommended that the CAA Safety Education and Publishing Unit provide an education programme to inform pilots of the regulatory requirements for and benefits of pre-flight planning.

8.3.3 Flight assists
To control the risk it is recommended that the CAA Safety Education and Publishing Unit provide an education programme to inform pilots of the availability, free-of-charge, of assistance from the air traffic services, in the event a pilot becomes lost, or uncertain of position.

8.3.4 NOTAM
In the questionnaire responses NOTAM were regarded as low to nearly zero risk. However, if current NOTAM are not obtained then changes in airspace status, facility status and hazards to navigation and safe flight will not be known with a consequential risk increase.

The team could not concur on a recommendation with regard to NOTAM. One team member believes that not obtaining NOTAM is high risk and that the recommendations for weather should also apply to NOTAM. Part of the reasoning is that weather and NOTAM are currently provided as a package.
References

1. New Zealand Standards Association (1998), Risk Management - the Australian/New Zealand Standard (As/NZS 4360)

2. Nav Canada (?), Nav Canada Aeronautical Study Standards and Guidelines

3. Canadian Standards Association (?), Risk Management (CSA Q850)

4. Canadian Standards Association (?), Risk Analysis Requirements and Guidelines (CSA Q634)

5. CAA (1998), Aerodrome Safety Assessment Risk Analysis Framework


8. CASA (draft unpublished), Acceptable Risk Criteria (especially with respect to midair collision in terminal areas)

9. CASA (draft unpublished), Overview of the Airspace Risk Model (ARM)


11. CAA database (accidents, incident and aircraft activity information)
Appendix A

Terms of Reference

To: Peter Nalder, Manager Safety Analysis

Safety Assessment - Proposed Change to the way in which Airways Corporation of New Zealand conducts it business in relation to Pre-flight Briefings, Flight Planning, NOTAMs, Flight Following and Flight Information Services for (Most) Operations under Visual Flight Rules

The Airways Corporation of New Zealand (ACNZ) has advised the Civil Aviation Authority that it intends to change the way it conducts some aspects of its business. It has indicated that some present activities are not producing a sufficient financial return to cover the cost of providing the services.

ACNZ has advised that, effective 1st July 1999, it proposes to charge for the provision of some services in the General Aviation non-commercial arena. As an alternative, it proposes to offer a significantly lesser service for some $23, approximately half that which will be charged for the full service (about $43) which is at present provided free. Other services currently free will also attract a (significant) charge. Copies of relevant documentation from the ACNZ and internal to the CAA are attached.

Your Terms of Reference are:

1. The assessment team shall consist of such members as you deem appropriate from the Safety Investigation and Analysis Group. It is suggested that Wendy Booth (Safety Investigator Air Traffic Services) lead the team and that David Eyre (Economic Analyst) be a member. Any additional members’ services should be sought from their Manager. I obtained a commitment from DDCA, ADSC, ADGI and ADRS to provide such assistance as was necessary. Composition of the team, or reluctance to provide essential resource(s), is to be advised to ADSIA by noon on 15th February 1999.

2. Consultation should be carried out with interested parties, including those likely to be adversely affected by the proposed changes.

3. Consideration should be given to any existing legal opinions as to the necessity for or use of services proposed to be changed.

4. The assessment team shall make recommendations regarding any proposed change that may not achieve an acceptable level of aviation safety, including information regarding steps or options available to the CAA to ensure safety at reasonable cost.

5. The assessment team shall also document the processes and procedures used in carrying out the assessment for use as a guide to how any similar assessment should be conducted.
6. A draft assessment report, for the Director, shall be produced to Assistant Director Safety Investigation and Analysis by 13th April 1999. A Final Report shall be completed and produced by 30th April 1999.

Please feel free to discuss the matter at any time such is considered necessary.

Michael G Hunt
Assistant Director Safety Investigation and Analysis
9-Feb-1999
Appendix B

Related rules
The following rule parts are applicable to this analysis:

Rule Part 91.307 VFR flight plan
(a) Each pilot-in-command of an aircraft shall submit a flight plan to an appropriate ATS unit prior to the start of each flight under VFR—
   (1) that proceeds more than 50 N.M. from shore; or
   (2) if the pilot-in-command requires an alerting service.

Part 121.59 Flight preparation
(e) The certificate holder shall ensure that a flight plan is submitted to an appropriate ATS prior to each air operation.

Part 125.57 Flight preparation
(c) Except as provided in paragraph (d), the holder of an air operator’s certificate shall ensure that a flight plan is submitted to an appropriate ATC prior to each air operation

Part 135.57 Flight preparation and flight planning
(b) each holder of an air operator certificate shall ensure a flight plan is prepared for each -
   (1) air transport operation; and
   (2) commercial transport operation where passengers or goods are carried from or to a remote aerodrome.

(c) Each holder of an air operator certificate shall ensure that prior to each air operation the flight plan required by paragraph (b) is submitted to an appropriate ATS unit or, if the air operation is a VFR operation outside controlled airspace -
   (1) an appropriate ATS unit; or
   (2) an alternative flight information or alerting service organisation

Part 119.73 Flight following system
(a) Each applicant for the grant of a airline air operator certificate shall establish procedures to ensure that, for each flight for which a flight following flight plan is not filed with an ATS organisation certificated under Part 172, the standard air operator certificate holder—
   (1) has at least the information required to be included in a VFR flight plan; and
(2) is provided with the location and time for the re-establishing of communications, if the flight will operate in an area where communications cannot be maintained; and

(3) makes timely notification to an organisation acceptable to the Director if the aircraft is overdue or missing.

(b) The maximum time period for which an aircraft may be planned to be without communication capability as provided for in paragraph (a)(2) is 30 minutes or such longer period that is acceptable to the Director.

**Part 119.121 Flight following system**

(a) Each applicant for the grant of a general aviation air operator certificate shall establish procedures to ensure that, for each flight for which a flight following flight plan is not filed with an organisation certificated under Part 172, the certificated holder:

(1) has at least the information required to be included in a VFR flight plan; and

(2) is provided with the location and time for the re-establishing of communications, if the flight will operate in an area where communications cannot be maintained; and

(3) makes timely notification to an organisation acceptable to the Director if the aircraft is overdue or missing.

(b) The maximum time period for which an aircraft may be planned to be without communication capability as provided for in paragraph (a)(2) is –

(1) for air transport operations, 30 minutes; or

(2) for commercial transport operations, such period established before the flight in accordance with the operator’s procedures.

**Part 91.217 Pre-flight Action**

Each pilot-in-command shall, before beginning a flight, obtain and become familiar with all information concerning that flight including the following—

(1) where practicable, the current meteorological information; and

(2) the fuel requirements; and

(3) the alternatives available if the planned flight cannot be completed; and

(4) any known or likely traffic delays that have been notified by ATS; and

(5) the status of the communication and navigation facilities intended to be used; and

(6) the current conditions of the aerodrome and runway lengths at aerodromes of intended use.
Appendix C

VFR flight planning in other countries

AUSTRALIA

Pilots of private flights are not normally required to file VFR flight plans. Pilots may file a “flight note” or obtain SARWATCH if desired.

There are certain requirements for the filing of VFR flight plans for aerial work operators such as over water flights, in designated remote areas, and at night proceeding more than 120NM from the aerodrome of departure.

There is no charge for the filing of a VFR flight plan, or flight note.

There are no en-route charges for a flight operated wholly under VFR. Workload permitting, air traffic advisory services for safety purposes will be provided at no charge for those flights.

Pilots are charged for the use of certain types of controlled airspace eg. Terminal Areas.

CANADA

VFR flight plan or itinerary required for flights more than 25NM from an aerodrome, or when crossing the Canadian border.

Canadian airspace users pay an annual fee of $60 for aircraft between 600Kgs and 2000Kgs that provides access to the entire system. When NAV Canada was established, a charging principle was imposed which meant that they cannot impose a charge per flight plan, weather briefing or radio call, as this would provide a disincentive to use the system and create a safety issue.

UNITED KINGDOM

VFR flights do not have to file a flight plan unless they wish to cross an international boundary (including European).

Flight training organisations structure training to enable pilots to plan their flights using maps and charts, weather information, calculation of track, heading and speed, minimum safe altitudes, radio frequencies, navigation facilities, aerodrome facilities, NOTAM information and any other information relevant to the flight. This information is usually recorded on a flight log, which is used by the pilot en-route.

When an overseas trip is planned, FTO’s then train their pilots in the completion of the VFR flight plan as part of the overseas trip validation.

Booking in/out of VFR flights is a requirement but no notification action will be taken by ATC at the departure aerodrome.
There is no legal charge levied by the CAA for the filing of any flight plan (either VFR or IFR, inside or outside controlled airspace), although there is nothing to prevent an aerodrome operator from making a local charge for the filing service to cover local administration and communications costs. This is very rare unless a pilot is using a commercial entity such as Jeppesen or Universal for flight following and route/weather planning.

All monies for the use of National Air Traffic Services facilities are recouped by the Eurocontrol Route Charges system applied to all IFR flights by aircraft over 2,000Kgs MAUW, inside and outside of controlled airspace. VFR flights are not charged.

UNITED STATES

No VFR flight plan is required.
Appendix D

ACNZ Consultation Document
Services for IFR Operations Under 2 tonne and VFR Operations

Introduction

Airways provide a range of services to VFR and IFR customers. These services include both air traffic control and other support services, such as pre-flight briefing and planning, NOTAM and flight information services.

We have reviewed the cost of providing these services compared to the revenue we receive, and are now beginning consultation with the industry concerning two areas of change.

We are proposing to introduce new charges for the use of VFR support services and for IFR services to aircraft under 2 tonnes.

VFR SUPPORT SERVICES

VFR support services, such as flight briefing, flight planning and area flight information, have never been separately priced and are consequently considered by many to be ‘free’. However, they are very costly to provide and existing revenue from VFR movements is insufficient to make a contribution towards supporting them. If the true cost of providing the services were taken into account, the charges for the services would have to be increased to the level shown in the attached table.

We realise that most recreational VFR pilots will not be willing or able to pay the charges at the level shown on the table, but we have shown the indicative price on the basis of the costs of providing them divided by the current demand for them.

We have critically reviewed the way we provide these services and believe that under the current CAA rules, there is no more efficient or cost effective way to provide them. They are very labour intensive and this accounts for the majority of the cost. As the services are considered to be ‘free’ it is also assumed that the demand for them is currently at its maximum level.

So from a purely commercial perspective there is not much that we can do about the unit price.

However, we also realise that the CAA rules provide pilots with options. Pilots are not required to source these services from Airways, (however we appreciate that if a pilot requires NOTAM, Airways is the only supplier in New Zealand). We propose to provide service options, thereby offering customers a choice. SARWATCH services are an example.

IFR aircraft will not be subject to explicit Support Sector charges at this time. This is because IFR charges currently contribute to the costs of providing these services to these
users. However, IFR aircraft in the under 2 tonne range will be subject to additional charges (see below).

**UNDER 2 TONNE IFR**

Aircraft under 2 tonnes operating IFR currently pay the same flat landing fee as other similar VFR aircraft.

At the time these charges were introduced there were very few IFR capable aircraft, under 2 tonnes in New Zealand and it was not considered necessary to develop and implement separate charges. This is no longer the situation and it is now appropriate that a separate charge be introduced. Accordingly we are proposing to use the same charging methodology for charges in the 2-8 tonne weight break. The only difference will be in the factor applied, which in this case will be about 0.2 and the charge will be a flat rate.

**WHERE TO NEXT**

Airways needs to introduce an appropriate level of service at a price that not only represents value to the customer, but also covers the cost of that service. These charges will be introduced with effect from 1 July 1999. We will need to give the standard 30 days notice of change on or before 1 June 1999. Consultation will continue from now until the notice of change to the Standard Terms is issued.

The CAA has been fully briefed on our proposals and understands the commercial drivers behind them. Based on this, they will be considering any safety issues that may be identified. Any safety issues that we become aware of during the consultation process we will refer to the CAA.

We invite industry comment on what level of service is considered appropriate and on the manner in which the services and charges are packaged. Any comment should be by way of written submission to the following person:
## Indicative Prices

<table>
<thead>
<tr>
<th>Service</th>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATSS Services Charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax On Demand (0900)</td>
<td>$1.50 for first minute and 50 cents per minute thereafter</td>
<td>$1.50 for first minute and 50 cents per minute thereafter</td>
</tr>
<tr>
<td>DATEL (0900)</td>
<td>$2.00 for first minute and 50 cents per minute thereafter</td>
<td>$2.00 for first minute and 50 cents per minute thereafter</td>
</tr>
<tr>
<td>National Briefing Office Operator Services (0900)</td>
<td>$3 for first minute and 50 cents per minute thereafter</td>
<td>$3 for first minute and 50 cents per minute thereafter</td>
</tr>
<tr>
<td>Acceptance and processing of VFR Flight</td>
<td>$42.50</td>
<td>$20.00</td>
</tr>
<tr>
<td>Acceptance and processing of VFR Standard</td>
<td>$25</td>
<td>$15</td>
</tr>
<tr>
<td>Acceptance and processing of SARWATCH</td>
<td>$7.5 pre-flight, $15 in-flight</td>
<td>$6.0 (flat fee)</td>
</tr>
<tr>
<td>Area Flight Information Service</td>
<td>$10 per request for non-hazardous MET information</td>
<td>Advised by ACNZ that no charge will be made.</td>
</tr>
<tr>
<td>Under 2 tonne IFR Approach</td>
<td>Charges – International aerodrome - $6.90; Domestic A aerodrome - $5.40; Domestic B aerodrome - $3.30.</td>
<td>Not included in ACNZ later consultation pamphlet assumed to be the same</td>
</tr>
<tr>
<td>Under 2 tonne IFR En-Route Domestic Charge.</td>
<td>Flat rate of $2.24 per 100nm</td>
<td>Not included in ACNZ later consultation pamphlet assumed to be the same</td>
</tr>
</tbody>
</table>
Appendix E

Questionnaire

CAA Risk Assessment – ACNZ proposed VFR Flight Plan and related charges.

As previously advised, the Airways Corporation of NZ Ltd has proposed the introduction of charges for the provision of VFR support services such as flight briefing, the acceptance and processing of flight plans, alerting and flight information services, and for SARWATCH.

The CAA is conducting an assessment of the impact of this proposal in order to determine if the introduction of the proposed new charges will significantly affect aviation safety. The assessment is based on a set of potential safety concerns that the Assessment Team has identified.

The assessment will identify, analyse and evaluate the possible risks by using a qualitative and quantitative process.

As part of the consultation process, and in order to take into account your evaluation of the identified risks, would you please complete the attached questionnaire and return it (in the attached freepost envelope) to me by 24 April 1999. The questionnaire examines the worst case scenario that the introduction of charges will result in flight plans not being used. ACNZ has advised industry that it is proposes to introduce the charges on 1 July 1999.

The assessment team would welcome and consider any additional concerns that you may wish to add to the questionnaire.

INTRODUCTION

This introduction provides some additional background information to assist completion of the questionnaire.

Rule Part 91.307 does not require a pilot to file a VFR flight plan unless the flight is to proceed more than 50nm from shore, or the pilot requires a flight information and alerting service.

The following options are available to VFR pilots with regards to VFR support services:

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>BENEFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFR Flight Plans</td>
<td>The VFR pilots obtain a Flight Information Service and Alerting Service while other parties may use the information obtained from the flight plan.</td>
</tr>
<tr>
<td>SARWATCH</td>
<td>Alerting Service</td>
</tr>
<tr>
<td>Flight following</td>
<td>Alerting Service</td>
</tr>
</tbody>
</table>
Flight Information Service and SARWATCH are air traffic services.

Flight information services: Details of the information provided as part of a Flight Information Service are listed in the AIP PM RAC 6 page 41.

Alerting services:

1. Flight following is a service provided by an organisation other than ATS that maintains a flight-watch over an aircraft and initiates emergency action in the event of a missed report or non-arrival within a specific time-frame. Note: ATS used to provide a flight following service when 30-minute position reports were mandatory.

2. SARWATCH is an air traffic service. The ATS will notify the rescue coordination centre if the flight goes beyond the SARTIME notified.
Questionnaire

Instructions

Please assess the potential safety concerns to you if a VFR flight plan is not filed and therefore the VFR pilot does not receive a Flight Information Service or an Alerting Service and other parties don’t have access to the flight plan information. Using the tables on page 7 please consider each safety concern listed below in the following manner.

1. Assess the probability (Table 1) that each specific safety concern may in your view result in an incident or an accident.

2. Again in your view, assess the consequences (Table 2) of each safety concern resulting in an accident of incident how serious will the consequence be eg minor incident or major accident.

3. Finally, use Table 3 to determine the resultant risk.

Example

<table>
<thead>
<tr>
<th>Safety concerns</th>
<th>P</th>
<th>C</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>No life jackets on aircraft</td>
<td>D</td>
<td>1</td>
<td>MODERATE</td>
</tr>
</tbody>
</table>

(This risk judgement is indicating that the Probability is RARE, but the Consequences are FATALITIES or MAJOR INJURIES. The resultant risk is MODERATE)
## Risk Analysis of ACNZ’s Proposed VFR Support Services Charges

### Safety concerns

#### VFR flight plans will not be filed

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The risk of a collision in flight will increase because traffic information will not be available to VFR pilots on request.  
2. The risk of a collision in flight will increase because VFR traffic information will not be available to IFR flights on request.  
3. The Rescue Coordination Centre may not be able to get rescue resources to a crash site soon enough to save lives because they will not have readily to hand aircraft route and other information (information that is currently available in the flight plan) to enable a reduced search area  
4. Accidents and incidents may increase because of inadequate planning of flights given that VFR flight plans are not filed.  
5. Pilots may not call ATS for assistance (when lost, unsure of position or in other difficulties) early enough because of potential charges.

#### An alerting service not being used

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Rescue Coordination Centre may not be able to get rescue resources to a crash site soon enough to save lives because in the absence of an alerting service advice of an overdue flight may be delayed. The risk of a collision in flight will increase because traffic information will not be available to VFR pilots on request.

#### Flight information service accessed by VFR pilots

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. A VFR aircraft may have a weather related accident or incident because of absence of pre-flight or in-flight information on weather conditions (forecasted or actual).  
8. Reluctance to obtain weather information along the route may have a bearing on continued safe VFR flight.  
9. Accidents and incidents may increase because information on changes in serviceability of the destination and for alternative aerodrome will not be available.  
10. Accidents and incidents may increase because information is not available on changes in the serviceability of navigational aids.  
11. Accidents and incidents may increase because information on free balloons is not available in flight  
12. Accidents and incidents may increase because information concerning volcanic activity in flight is not available
<table>
<thead>
<tr>
<th>Safety concerns</th>
<th>P</th>
<th>C</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flight information service accessed by VFR pilots</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Accidents and incidents may increase because information concerning the release into the atmosphere of toxic chemicals or radioactive materials is not available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Accidents and incidents may increase because information changes to Danger, Restricted, and Military Operational Areas is not available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Accidents and incidents may increase because air traffic services will not be able to use VFR plan information to anticipate flights and relay traffic information or other flight service information to aircraft unable to contact ATS.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Accidents and incidents may increase because VFR aircraft may not use Mode C in Class G airspace in the belief that this avoids identification and possible charging. This practice would also deny ATS of altitude information of aircraft near airspace boundaries.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note any other safety concerns which are relevant to this assessment
### Instructions

Apart from the safety concerns above there may be some cost concerns. Below are some costs concerns that may occur if flight plans are no longer used.

Please rate these concerns as major, minor or nil. Then state why you believe that these are cost concerns.

<table>
<thead>
<tr>
<th>Cost concerns</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Insurance companies, ACC and other agencies may perceive a decreased level of safety that may increase costs to the operators.</td>
<td>Comment</td>
</tr>
<tr>
<td>2. VFR flights requesting an ATC clearance to enter controlled airspace may be held or delayed outside of controlled airspace whilst ATC obtain details of the flight. This could lead to higher operating costs to the VFR flight.</td>
<td>Comment</td>
</tr>
<tr>
<td>3. Air traffic services may not be able to manage traffic flow as efficiently when confronted with unplanned VFR flights requesting an ATC clearance to enter controlled airspace. This could increase aircraft operating costs.</td>
<td>Comment</td>
</tr>
<tr>
<td>4. The Civil Aviation Authority will not be able to use flight plan information to assist safety investigations. This could increase the costs of safety investigations.</td>
<td>Comment</td>
</tr>
<tr>
<td>5. Rescue Coordination Centre will use extra resources trying to determine details and location of the flight.</td>
<td>Comment</td>
</tr>
<tr>
<td>Cost concerns</td>
<td>Costs</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>6. Flight Training Organisations will not be able to use ATS as a means of</td>
<td></td>
</tr>
<tr>
<td>obtaining operational information concerning a flight.</td>
<td></td>
</tr>
</tbody>
</table>

**Comment**

Please note any other concerns

---

**Risk Analysis of ACNZ’s Proposed VFR Support Services Charges**

21 May 1999
Table 1 Probability (P)

<table>
<thead>
<tr>
<th>Probability</th>
<th>Description</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>High:</td>
<td>accidents frequently occurring (delay has a critical effect)</td>
<td>A</td>
</tr>
<tr>
<td>Medium:</td>
<td>possibility of accidents occurring infrequently (delay has a serious effect)</td>
<td>B</td>
</tr>
<tr>
<td>Low:</td>
<td>incidents occurring frequently and maybe one accident (delay has a moderate effect)</td>
<td>C</td>
</tr>
<tr>
<td>Rare:</td>
<td>incidents (but no accidents) occurring infrequently (delay has a minor effect)</td>
<td>D</td>
</tr>
<tr>
<td>Very rare:</td>
<td>both accidents and incidents highly unlikely to occur (delay has no effect)</td>
<td>E</td>
</tr>
</tbody>
</table>

Table 2 Consequence (C)

<table>
<thead>
<tr>
<th>Consequence</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalities and major injuries</td>
<td>1</td>
</tr>
<tr>
<td>Major injuries</td>
<td>2</td>
</tr>
<tr>
<td>Minor injuries</td>
<td>3</td>
</tr>
<tr>
<td>No injuries</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 3 Resultant Risk

<table>
<thead>
<tr>
<th>Probability Consequence</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extreme</td>
<td>Very high</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
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<td>High</td>
<td>Moderate</td>
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<td>Minor</td>
</tr>
<tr>
<td>3</td>
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<td>Moderate</td>
<td>Low</td>
<td>Minor</td>
<td>Trivial</td>
</tr>
<tr>
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<td>Minor</td>
<td>Trivial</td>
<td>Nearly zero</td>
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Appendix F

Content Analysis of written submissions

Background.

In February, 1999, the Airways Corporation of New Zealand (ACNZ) circulated a document “Services for IFR Operations under 2 tonne and VFR operations” to sections of the New Zealand aviation industry. The document outlined a set of ‘indicative prices’ for various flight planning and flight information services. The document requested written submissions on the proposals be submitted to the Manager, Commercial Services, ACNZ.

Concerns expressed in terms of both the proposed costs and safety implications were raised by sections of the aviation industry with CAA. ACNZ agreed to share the submissions with CAA and CAA on its own account set up at Safety Assessment Review Team to study the safety implications of the proposed changes implied in the original ACNZ document.

As part of the CAA review process, CAA informed the aviation industry at large about the proposals from ACNZ by way of information in the April 1999 issue of CAA Review (Issue 3). The article outlined the ACNZ proposal and also asked for comments on the perceived safety impact of the proposed changes. Submissions were requested by 23 April, 1999.

This report is the result of an analysis of the 114 written submissions received.

Submission Sample Information

Twenty of the submissions could be identified as representing organisations. These covered national / regional aviation organisations and societies, commercial operators, flight trainers and aero clubs.

The remainder was from individuals, some of which did identify associations with organisations but did not claim to represent the view of an organisation. Almost all identified themselves as pilots. They covered pilots operating aircraft for major airlines, instructors, and commercial pilots operating smaller aircraft, private pilots, agricultural operators, sport and microlight class aircraft pilots, aircraft engineers and ATC staff.

Analysis Methodology

Submissions were made by letter, fax and e-mail. Each submission was attributed a code number and the collected submissions checked to eliminate duplications. The number of submissions totalled 114 at the close of submissions for this analysis.

The submissions were organised in order of receipt. A sample of 10 submissions was extracted (one in ten) and read as a basis to forming content categories reflecting the safety implications and concerns of the respondents. Twelve content categories were identified. These were:

Cost

General Safety and Search and Rescue Implications
All the submissions were then read and a frequency tally constructed to reflect the explicit identification of these issues or concerns by the respondents.

Some respondents raised a range of issues and presented quite detailed argument, others simply raised one issue of concern. In any one submission an issue or concern was counted only once, even though the same point may have been revisited from a different perspective within the submission.

The frequency tally data derived from the 114 submissions are presented below. A summary of the points, issues or concerns raised under the category heading is then given. These have been drawn from the submissions. No judgements are made as to the veracity of the argument or concern. Similarly, this analysis is not able to assess the real risk or consequences of the concern. The notes are simply an attempt to reflect the views or perceptions of the submissions.

In relation to these notes, it is important to bear in mind that persons taking the opportunity to make a written submission will have a particular point of view and almost without exception the views were, in this exercise, negative to the ACNZ proposal or aspects thereof. Notwithstanding this trend, it is important to consider the merits of the matters raised. Neither the negativity nor doubts in themselves constitute a reason to reject substance of the concerns. Other data, evidence and argument are required to determine a safe and acceptable course of action.

1. Cost: 71

Submissions objected to or raised concerns about the proposed costs for the various services. The most prominent concern was the proposed level of charge for a flight plan ($42.50). This was regarded by many as ‘outrageous’ in its level given that the infrastructure was in place and that the actual time taken to process (as perceived by the persons responding) was minimal. Cost concerns were also raised in relation to the percentage increase it would mean on both private and commercial VFR flights. A small number of submissions argued that the current service was ‘bare-bones’ in any case, ie. that ‘proper’ briefings were not actually available at filing a VFR flight plan, that weather
information was restricted in view of ACNZ commercial agreements or not accessible at the appropriate decision time and that despite filing details these were regularly requested again in the air, eg., PoB, fuel status, ETAs etc. It was implied that for any ‘massive’ increase in cost there would have to be substantial service improvement. There were also objections to the time based telecommunications charges for Fax, Datel, and Briefings when delays and the like were seen as originating from ACNZ.

2. General Safety and Search and Rescue Implications: 80

Submissions regarded the proposals for all the charging proposals (certainly at the levels proposed) as having general negative safety effects. Although filing a flight plan is not a CAR Part 91 requirement, it was argued in these submissions that the practice is common, especially for longer flights, often insisted upon by organisations hiring aircraft and that the perception that it is a good aviation practice procedure is an incentive to undertaking the planning and preparation that backs up the actual filing of a flight plan with ACNZ. A related argument was that the absence of flight planning information would impact on Search and Rescue activity because of the dramatically increased potential search area and the time taken to ascertain and cross-check possible flight path routes and intentions.

3. Aircraft protection from collision: 28

The first theme to emerge was that with the prospect of far fewer flight plans filed controllers of airspace would not have information on actual and likely traffic at the boundaries of CTRs and TMAs and that this would increase the likelihood of traffic conflicts and even collision between controlled (often IFR) and uncontrolled traffic. It was envisaged that controllers using radar would have more ‘unidentified’ targets near (and at times in controlled airspace) to deal with and provide separation from. Procedural controllers would be unaware of such traffic. Submissions did identify an IFR – VFR collision potential.

The second theme was that in the absence of accessible and quite extensive use of flight planning the practice and discipline of FISCOM contact would reduce traffic information in uncontrolled airspace and that this had the potential to increase ‘near-miss’ incidents or collisions with VFR traffic. The belief that there would be a loss of traffic information was seen as impacting of pilot situational awareness. Irrespective of type of operation, IFR, VFR, commercial or private, the steady flow of RT information (seen as encouraged by the flight plan process) was viewed as an important aspect of maintaining pilot situational awareness.

The argument was put that traffic information derived from VFR flight planning was really a protection for IFR commercial traffic operating in the ATC environment and that the costs should be borne there as it is critical to ‘fare paying passenger’ protection.

4. Pilot behaviour change: 82

A high proportion of respondents, whether speaking for themselves or their beliefs about the behaviour of fellow pilots, expressed the view that the proposed charging regime for VFR flight plan filing and allied information would result in not filing and not obtaining the potentially relevant information. Clearly the sentiments were allied to cost (and level). As in other safe or prudent practice domains, behaviour is cost or price sensitive. Indeed, respondents with a background in studying human behaviour made this point succinctly,
referring to well established behaviour maintenance and modification principles. The probable negative aspects of the perceived impediments to accessing safety orientated flight relevant information of the proposed changes came through strongly in terms of pre-flight and in-flight decision making.

The negative impacts perceived from the cost barriers to flight planning and information access was most strongly felt by the general aviation private pilot. It was conceded that recreational flying is a choice, as with other recreational pursuits, but noted that in the maritime and land transport sectors where there are large recreational communities, safety related information is available either free of charge (in the direct sense) or at a much lower cost.

Amongst the perceived negative impacts some respondents suggested changes in behaviour that reflected both increased risk to themselves and others. The behaviour changes with potentially high negative impacts were to not use the radio communications network where at all possible, to not turn on transponders and to use misleading aircraft call signs to obtain information as a last resort (so ‘billing’ not traceable). While wilful disobedience can not be sanctioned, it may occur and prove to be very costly. In these sentiments there was a strong sense of “being forced out of the system by the proposals of ACNZ”. It was connected to a sense of betrayal having gone to the expense of installing transponders to assist ACNZ. There was bitterness in some of these messages.

5. NOTAMS: 40

These submissions were directly concerned that the proposed costs would deter pilots from obtaining NOTAM. Even without filing a flight plan, this information was regarded at critical to safety as it involved such matters as the status of airfields, airports, navigation aids and airspace changes/activation’s and the like. It was noted that given the concerns with airspace incursions (allied to out-of-date documents…. also a “cost” consideration), ATC/ACNZ workload on these matters will increase further and so will the risks.

6. Weather: 45

These submissions were directly concerned that the proposed costs would deter pilots from obtaining weather information through the ACNZ National Briefing Office, or similar approved service. The proposed charge for an in-flight update (non-hazardous MET) was of equal concern. The submissions were related to the critical VFR pre-flight and in-flight decision making in relation to weather that has a direct bearing on flight safety.

7. Wrong safety message: 22

Allied to the behaviour changes, but conceptually at a different level, were the submissions that commented that the proposals in general were sending the ‘wrong safety message’ to the aviation industry. It was pointed out that CAA ‘s mission is to promote safety in aviation and that many of the educational and safety related messages in products and promotions are to do with properly planning flights and obtaining all the relevant information.

As already noted above, some submissions also felt that the ‘message’ was to force general aviation out of the airways system. Yet, it was pointed out that it is the foundation and the good aviation practice training ground. In that sense inclusion and compliance within the
airways system is important. During that time in the general aviation environment attitudes, practices and behaviours are formed that are part of a continuing safer aviation career and community.

8. ATC Workload: 9

Submissions in this domain commented directly on the prospect of increased workload at ATC centres as a consequence of handling non-flight planned flights at the confluences of airspaces, at airspace boundaries, and in handling the ‘unexpected’. It was argued that not having much of the information rendered by flight planned aircraft will not allow for anticipating events and planning orderly traffic flows. It was suggested that ‘problems’ would arise for the service provider when ‘delays’, ‘holds’, ‘orbits’ impact. If there is a dramatic rise in a fee for service, there is also a consequent change in service expectations and obligations. Submitters mentioned legal redress for cost consequences of facilitation delays or difficulties. It was also suggested that since transponder and report information from VFR uncontrolled traffic was of ‘benefit’ to ATC this should be paid for by ACNZ.

9. Own flight following: 4

Two organisations suggested as an alternative to ACNZ Flight Planning (with the implied flight following through position reporting and an alerting service) that they would consider their own flight following arrangements. Apart from two other mentions of using a cell-phone (but coverage limitations mitigate against this in many parts of NZ or leaving details to contact SAR), it would appear that the concept of alternative but essentially parallel ‘flight following’ services to ACNZ for the VFR general aviation community has not been developed.

10. New SAR costs: 5

Direct negative mention of the cost was mentioned by 4 submissions. One submission accepted as a ‘maybe’. The sentiment was allied to the ‘public good’ sentiments and the general safety implications not just for the pilot, but also passengers.

11. SAR costs passed on: 41

Submissions here believed that the ‘costs’ of changes in pilot behaviour and practice through the impediment of price for information has accident and incident implications that will be borne in higher SAR costs to the community. Reference was made to accidents where it was thought that either flight planning information or in-flight information by having aircraft operating ‘within the safety net afforded by accessible systems’ would not have been so ‘costly’ in lives, search time, search costs or social consequences (which are economic eg. health costs, loss of earnings etc – as well as emotional).

12. Public good issue: 18

Submissions argued that the provision of flight planning and the allied operational (and often safety) information to the VFR general aviation sector (principal areas affected by the proposed changes) have a public good element. Analogies were drawn with maritime, road transport and outdoor pursuits. There were sentiments that an SOE ought not to be able to contract out of public obligations for core services that are in the general public interest. The interests are just not those of the pilot and aircraft, but passengers (often
unaware of the need for information and operational constraints) and the well-being of persons and property in general who are afforded a measure of protection by the accessibility of aircraft operators to information and the encouragement to behave with a ‘safety first ethos’.

Clearly these are debates about values and ideology, and the means of affording such services.

Other information/views derived from the submissions.

1. It was suggested in some submissions that these services should be funded by some form of levy. A dedicated fuel tax was mentioned, as was an addition to the participation levy. In this context it was noted that the current ‘movement charges’ or ‘lump sum’ that some owners/operators elect to pay to ACNZ would have to be removed. The core sentiment was a ‘one-stop’ planning and information service that was affordable and easy to enter across the NZ aviation system. The recent approach by NAVCANADA was mentioned.

2. Submitters were surprised that ACNZ has not considered own filing and briefing access through the Internet. This would provide both relevant and timely information and substantially cut costs in the views of people that had accessed Australian and UK sites.

3. In the ‘anger’ expressed in a small number of submissions there were suggestions that ACNZ ought to be held legally accountable for consequences of the denial of flight safety critical information. It has to be noted that in the wake of the Cave Creek tragedy that the position of Government Departments (and possibly SOEs and Crown Entities) may change regarding the right to sue for damages.

4. Comments were directed to the ACNZ MATs manual regarding the "safe, orderly and expeditious flow of traffic". It was argued the likely changes resulting from the proposal would be in conflict with this operational statement.

5. There were strong views expressed about the manner, tone and style of ACNZ consultation in many of the submissions. It was pointed out that the services are not "free" now, that the ACNZ Consultation Briefing Paper presented a "fait accompli" and had not been dated, sourced nor widely distributed.

6. It was argued in some submissions that CAA has a responsibility to act with determination to ‘stop’ the implementation of proposals viewed as antithetical to promoting flight safety. Tangential reference was made to control tower closures advanced by ACNZ and ‘approved’ by CAA at Ardmore, Taupo, Gisborne (shortly), FIS at Paraparaumu, that had degraded flight safety (in the view of the submissions).

7. There was confusion over the issue of possible charging for contacting an ATS unit or FISCOM for information or a clearance into, out of or through a controlled airspace. The initial ACNZ document was not clear on this point. A second document, a pamphlet circulated by ACNZ in April, indicates free of charge access to airborne services to VFR traffic. This position has also been advised by ACNZ to the CAA Review Team. Safety fears expressed in terms of the possibility of airborne charges for contact with these services were lack of traffic information on the frequencies (as
passively monitored), the fact that updated airborne information would not be obtained and an unanticipated effect might be having aircraft operating in areas on invalid QNH settings.

8. The April pamphlet and ACNZ advised position that information (of a weather and NOTAM nature will be available in the air ‘free of charge’ has however raised the prospect that pilots electing not to file a flight plan or SARWATCH for reasons of cost will ask for this information airborne and place a workload on ATS staff and increase RTF traffic.

Note: The 114 submissions and the raw data tallies and notes are available. The comments reflect impartially as possible the arguments and sentiments expressed in the submission texts.

This document does not represent the views or position of the Civil Aviation Authority of New Zealand.
Appendix G
Graphs of Questionnaire responses

Question 1

Question 2

Question 3

Question 4
Question 5

Risk category:
- Nearly Zero
- Trivial
- Minor
- Low
- Moderate
- High
- Very High
- Extreme

Frequency:
- 0
- 10
- 20
- 30

Question 6

Risk category:
- Nearly Zero
- Trivial
- Minor
- Low
- Moderate
- High
- Very High
- Extreme

Frequency:
- 0
- 10
- 20
- 30

Question 7

Risk category:
- Nearly Zero
- Trivial
- Minor
- Low
- Moderate
- High
- Very High
- Extreme

Frequency:
- 0
- 10
- 20
- 30

Question 8

Risk category:
- Nearly Zero
- Trivial
- Minor
- Low
- Moderate
- High
- Very High
- Extreme

Frequency:
- 0
- 10
- 20
- 30
Risk Analysis of ACNZ’s Proposed VFR Support Services Charges

Question 13

Risk Analysis

Question 14

Risk Analysis

Question 15

Risk Analysis

Question 16

Risk Analysis
Appendix H

Analysis of near collision data

- Four occurred between VFR aircraft in VMC in Class G uncontrolled airspace when one aircraft was in receipt of a Flight Information Service.

- One occurred between IFR and VFR aircraft in VMC in Class G uncontrolled airspace when one aircraft was in receipt of a Flight Information Service.

- Six occurred in between VFR aircraft in VMC in Class G airspace when neither aircraft was in receipt of a Flight Information Service.

- Four occurred between VFR aircraft in VMC in Class G airspace where a Flight Information Service was unavailable due to radio coverage. Local procedures were in force.

- One occurred between VFR and IFR aircraft in VMC in Class G airspace where a Flight Information Service was unavailable due to radio coverage. Local procedures were in force.

- Four reports where it was not possible to determine if the aircraft were in receipt of a Flight Information Service.