

ANNEX A

CASA risk assessment brief

A.1 Broadcast frequencies at non-controlled aerodromes

A.1.1 Introduction

On 28 September 2009, CASA published Notice of Proposed Rule Making (NPRM) 0908OS – Carriage and use of Radio and Circuit Procedures at, or in the *Vicinity of, Non-towered Aerodromes – Amendments to CARs 166 and 166A*. On 6 March 2013 CASA project OS 13/02 – *post implementation review CAAP 166* was opened. CASA identified an issue with operational broadcast procedures in the vicinity of non-controlled aerodromes. At the time, an amendment was made to one section of the Aeronautical Information Publication (AIP) detailing a change of procedures in certain circumstances – in short, to broadcast traffic information to other aircraft at non-controlled aerodromes, which do not appear on an aeronautical chart, on the Area VHF/FIA frequency, rather than the Multicom 126.7 MHz frequency that some aviation community participants were using.

Subsequent to this change, CASA undertook a post-implementation review (PIR) of the 2010 amendments to the regulations relating to non-controlled aerodrome procedures. The PIR identified the changes to the AIP procedures and incorporated them into revised Civil Aviation Advisory Publications (CAAPs) associated with the non-controlled aerodrome regulations. The changes to the CAAP were duly consulted both internally and externally and a new version published in December 2013.

At the same time, CASA identified that the initial change to the AIP created inconsistencies with other sections of the AIP document. A thorough revision of the relevant sections dealing with broadcast procedures in the AIP resulted in a number of consolidation changes to reflect the earlier change and the revised information in the CAAP.

Following publication of the clarification, there has been a small number of complaints from industry that the AIP changes were not adequately consulted and the training and awareness associated with these changes has been inadequate.

To address claims made that the guidance provided by CASA increased risk, CASA undertook to conduct a hazard identification and risk assessment review of the guidance.

A.1.2 Risk Review Team

The risk assessment team comprised CASA Standards officers, a flying operations inspector, an aviation safety advisor and representatives from Airservices Australia. A risk advisor from CASA Risk and Quality Assurance facilitated a risk assessment session on 14 January 2015. The team was comprised of the following members:

Name	Position/ Organisation
██████████	Manager, Flight Operations Standards, CASA
██████████	CASA Standards – Small Aeroplanes
██████████	CASA Standards – Small Aeroplanes
██████████	CASA AARD (now Standards)
██████████	CASA Standards – Small Aeroplanes

Name	Position/ Organisation
██████████	FOI, CASA Operations, North QLD Region
██████████	CASA Aviation Safety Adviser
██████████	CASA AARD
██████████	Safety & Regulatory Compliance Advisor, Airservices Aust.
██████████	Airservices Australia
██████████	Risk Advisor, CASA Risk & Quality Assurance

A.1.3 Discussion

Data on Airprox events at non-controlled aerodromes was analysed as part of the CAAP revision. The analysis identified a number of radio broadcast issues that were contributing to these events. Issues included monitoring and broadcasting on the wrong frequency, non-reception of actual and ostensible broadcasts, complete unawareness of other aircraft due to an absence of broadcasts and possibly intentional non-use of radio to avoid landing charges.

Whichever policy is adopted for non-controlled aerodromes, a pilot's ability to see and avoid other aircraft will not be enhanced unless an effective listening watch is maintained and an appropriate use of broadcasts are made.

To that end, this risk assessment was focussed on risk undermining the effectiveness of the control of having all aircraft broadcasting their position and intentions on the same frequency. In Bow-Tie methodology, these risks would be considered escalation factors¹.

Main issues addressed

Is an Area VHF-based aerodrome broadcast policy safer than a Multicom broadcast at non-charted aerodromes?

- What are the risks of aircraft transiting in the vicinity of uncharted, non-controlled aerodromes conflicting with local traffic, where pilots use Area VHF to communicate for traffic alerting purposes:
 - At what altitudes is conflict likely to occur?
 - What is the typical and maximum level of activity at uncharted aerodromes?
 - Where aircraft are likely to be transiting at a low level, e.g.:
 - o Due to pressure of weather
 - o Operating a helicopter?
 - o Conducting low-level operations

¹ Refer to the CAA UK webpage for a description of the Bowtie methodology:
<http://www.caa.co.uk/default.aspx?catid=2786&pagetype=90>

- If two CTAFs/aerodromes within 10nm of one another ‘overlap’, which frequency to use?
- If an unmarked aerodrome is ‘within’ a CTAF, which frequency to use? (e.g. Frogs Hollow)
- Is there additional risk where an aerodrome is in close proximity to an Area VHF boundary?
- What are the implications of computer programs such as Oz Runways overlaying ERSA aerodrome data on to maps and charts (particularly for the non-charted policy)?
- Frequency congestion affecting other Area VHF users
- Effect of congestion on the Multicom frequency?
- What are the risks of aircraft transiting in the vicinity of uncharted, non-controlled aerodromes conflicting with local traffic, where pilots use Multicom to communicate for traffic alerting purposes:
 - At what altitudes is conflict likely to occur?
 - What is the typical and maximum level of activity at uncharted aerodromes?
 - Where aircraft are likely to be transiting at a low level, e.g.:
 - o Due to pressure of weather
 - o Operating a helicopter?
 - o Conducting low-level operations (e.g. Ag. But then probably more likely to be aware of unmarked aerodromes? Also, noting that VFR pilots must be navigating by visual reference when at or below 2000 ft AGL (therefore better look-out required or more map checking/head in cockpit?)).
 - Aircraft without radio are operating in the vicinity, regardless of the broadcast frequency being used?
 - Aircraft are operating on a different discrete frequency (e.g., glider ops)?
 - Transmissions by these aircraft not being monitored by ATC. These aircraft not monitoring a frequency on which ATC can provide an on-request FIS, an ATC initiated FIS (IAW AIP GEN 3.3 Sect 2.5) or a Surveillance Information Service (SIS) or Safety Alerts (where available).
- Is a Multicom below 3000 ft AGL broadcast policy, except at assigned CTAF aerodromes and Broadcast Areas, safer than these other policies?

Other related issues

- Do all policies provide a generally equivalent level of safety – therefore choice depends on other factors?
 - Is objectively safer the main issue? Is there a case for ease of use/understanding?
- What strategies are relevant to improving overall NCA radio use?
- What are the resource implications for CASA in terms of maintaining the recommended policy, reverting to the prior policy or changing to a Multicom-based policy?
- Traffic conflict at aerodromes using Area VHF or discrete CTAF at around 10 nm due to unalerted situation and missed broadcasts where pilots are monitoring Multicom?

Context

- Strategic Objective:

- Identify safety-related trends and risk factors nationally and internationally and promote the development and improvement of the civil aviation safety system.
- Encourage a greater acceptance by the aviation industry of its obligations to maintain high standards of aviation safety.
- Assessment Objectives:
 - Standards wishes to establish whether the adopted policy provides a safer set of procedures than those in place prior to the update and review of the AIP and the CAAP.
- Scope:
 - Radio broadcast procedures for non-controlled aerodromes only, that are not registered, certified or military and are not marked on charts.
 - Radio broadcasts for collision avoidance reasons only.
- Key stakeholders:
 - CASA Standards
 - CASA Operations
 - CASA FTTO
 - CASA SEP
 - CASA AARD
 - Airservices Australia ATS
 - Aviation community using non-controlled aerodromes
 - Flight training organisations
 - RAPACs
 - High profile individuals
 - AOPA
 - Sports and recreational aviation community
 - Defence
 - Aerial Agricultural Association of Australia
 - Other aviation industry associations
- Stakeholder objectives/expectations:
 - CASA to maintain the risks of collisions at non-controlled aerodromes to ALARP (see below).
 - Improve radio broadcast procedures generally.
 - Airservices to maintain an efficient system of services to facilitate safe operations of all aircraft, including those flying at higher altitudes.
 - Industry to maintain efficient and safe operations via effective communication procedures.
 - Industry expect to be consulted, and to be heard.
 - Also expect education when changes made.
 - Changes will maintain or improve safety risk.
- Timeframe/s:
 - As soon as possible to address risks/assessment
 - Longer period of time to see whether there's any issues arising, say 12 months for review?
- Resources:
 - AIP

- ERSA
- CAR 166A-E
- CAR 243
- CAAP 166-1
- CASA Staff
- Assumptions:
 - Pilots willing to follow policy
 - At aerodromes without discrete frequency
 - Aircraft with single VHF radio only
- Out of scope:
 - Operations at NCA with discrete CTAFs
 - Operations at NCA marked on an aeronautical chart
 - Controlled aerodrome operations
 - Certified, registered, military aerodromes
 - Designated Broadcast areas
- Evaluation:

The likelihood and consequence ratings will be based on the risk assessment matrix contained in the CASA's risk management framework. The evaluation criteria used in this assessment are to be detailed in the matrix at Annex A.

A key point to be noted with this risk assessment is the control of having all aircraft on the same frequency is the accepted mitigation to avoiding an airprox event. This risk assessment identifies risks to undermine the effectiveness of that control.

A.2 Risk assessment

A.2.1 The ALARP principle

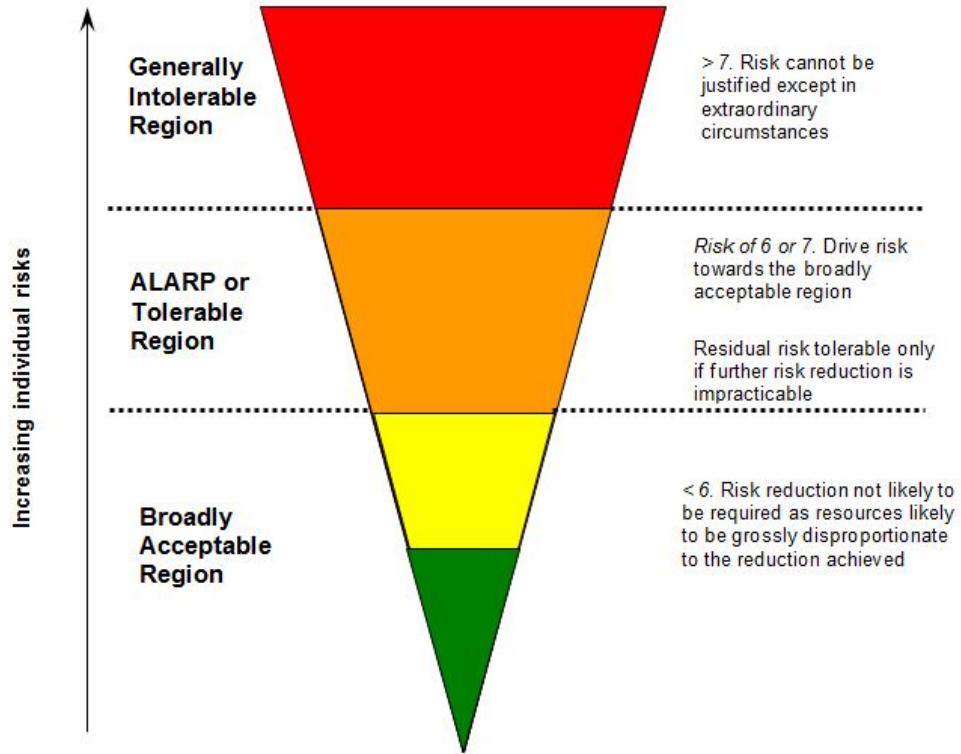
The concept of 'As Low as Reasonably Practicable' or ALARP is commonly referred to for risks with significant safety or environmental consequences and is shown in the diagram below. The concept is also applicable for other risks.

The approach is to divide risks into three bands, which align with the risk ratings from the risk matrix at Annex A, as follows:

- a. An upper band (risk rating > 7) where adverse risks are intolerable whatever the benefits the activity may bring and the risk reduction measures are essential whatever the cost.
- b. A middle band (risk rating of 6 or 7) where costs and benefits are taken into account and opportunities balanced against potential adverse consequences.
- c. A lower band (risk rating < 6) where positive or negative risks are negligible, or so small that no further risk treatment measures are needed.

Where risk is close to the intolerable level it is expected that the risk will be reduced unless the cost of reducing the risk is grossly disproportionate to the benefits gained.

Where risks are close to the negligible level then action should only be taken to reduce the risk where benefits exceed the costs of reduction.



A.3 Risk Assessment Matrix – Level of Risk

A.3.1 Consequence descriptors

	Consequences					
	Insignificant 0	Minor 1	Moderate 2	Major 3	Severe 4	Catastrophic 5
People	Injuries or ailments not requiring medical treatment.	Minor injury or first aid treatment case.	Serious injury causing hospitalisation or multiple medical treatment cases.	Life threatening injury or multiple serious injuries causing hospitalisation	Multiple life threatening injuries. Aircraft occupant fatality.	Multiple fatalities. Including third party fatalities.
Operational impact on aviation activities	Operational disruption within normal operating parameters.	Operational disruption within normal operating parameters.	Notable but manageable disruption to operations or service delivery with impact to multiple and diverse areas of the business.	Significant degradation of operations or service delivery with impact to multiple and diverse areas of the business.	Severe degradation of operations or service delivery with impact to multiple and diverse areas.	Complete cessation of operations.
Regulatory breach						
Reputation/Public confidence	Minor incident but no media exposure.	Several articles in the local media.	Extended negative coverage in local/state media.	Short term nationwide negative media coverage.	Extended nationwide negative media coverage.	Extended international negative media coverage and material change in public perception of company.
Effect on safety of aircraft operations	Nuisance.	Operational limitation imposed. Emergency procedures used.	Significant reduction in safety margins. Reduced capability of aircraft/crew to cope with conditions. High workload/stress on crew. Critical incident stress on crew. Injury to some occupants requiring medical treatment.	Large reduction in safety margins. Crew workload increased to point of performance decrement. Serious injury to small number of occupants causing hospitalisation. Intense critical incident stress.	Severe reduction in safety margins. Significant performance decrement for crew. Serious or fatal injury to small number of occupants. Intense critical incident stress. Large margin of chance preventing catastrophe.	Conditions preventing continued safe flight and landing. Multiple deaths with loss of aircraft.

>7: Extreme risk
 – detailed treatment plan required

6,7: High risk
 – needs senior management attention and treatment plan as appropriate

4,5: Medium risk
 – manager level attention and monitoring as appropriate

<4: Low risk

					Insignificant	Minor	Moderate	Major	Severe	Catastrophic
		Numerical	Historical		0	1	2	3	4	5
Probability ↑	>1 in 10	Is expected to occur in most circumstances	Almost Certain (5)	5	6	7	8	9	10	
	1 in 10 – 100	Will probably occur	Likely (4)	4	5	6	7	8	9	
	1 in 100 – 1000	Might occur at some time in the future	Possible (3)	3	4	5	6	7	8	
	1 in 1000 – 10000	Could occur but considered unlikely or doubtful	Unlikely (2)	2	3	4	5	6	7	
	1 in 10000 - 100000	May occur in exceptional circumstances	Rare (1)	1	2	3	4	5	6	
	< 1 in 100000	Could only occur under specific conditions and extraordinary circumstances	Extremely Rare (0)	0	1	2	3	4	5	

A.4 Identifying and analysing risk worksheet

A.4.1 A key point to be noted with this risk assessment is the control is that all aircraft is on the same frequency is the accepted mitigation to avoiding an airprox event. This risk assessment identifies risks to undermine the effectiveness of that control.

Risks that apply to either area frequency or MULTICOM

Risk No.	The Risk What can happen and How it can happen	The Consequence of an event happening	Description and Adequacy of Existing Controls	Likelihood Rating (a)	Consequence Rating (b)	Overall Risk Level (a+b)	Risk Priority	Description and Adequacy of Additional Controls	New Likelihood Rating (a)	New Consequence Rating (b)	Residual Risk Level (a+b)
1	An accident due to confusion about published procedures: fatalities and hull losses.	Death, damage and economic loss. Significant public and government criticism of CASA. Reputation damaged.	Significant communication strategy including a number of information products and related approaches.	2	4	6	H	Comprehensive, extensive safety promotion and education campaign Targeted advice to flying schools re: procedures Only permit RPT services to chartered aerodromes	1	4	5
2	An accident in which a pilot has not followed published procedures: fatalities and hull losses.	Death, damage and economic loss. Significant public and government criticism of CASA. Reputation damaged.	Significant communication strategy including a number of information products and related approaches.	2	4	6	H	Further education to pilots/aviation community re: procedures Targeted advice to flying schools re: procedures Only permit RPT services to chartered aerodromes	1	4	5
3	An accident despite conforming to published	Death, damage and economic loss. Extreme public	Significant communication strategy including a number of	1	4	5	M	Further education to pilots/aviation community re: procedures	1	4	5

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	procedures: fatalities and hull losses.	and government criticism of CASA. Reputation badly damaged.	information products and related approaches.					Targeted advice to flying schools re: procedures Only permit RPT services to chartered aerodromes			
4	Using FIA: Frequency congestion leading to large aircraft missing vital call	Operational impact on aviation activities. Need to reissue call.	AsA split Areas when they get busy. AsA can remove the retransmit function. TCAS. Standard procedures in AA exist to deal with this. Issues raised through RAPAC to implement new CTAFs, BAs etc Anyone can request aerodrome owner to have aerodrome chartered.	1	1	2	L	Not required as risk is acceptable.			
5	Using FIA: Low level a/c in the vicinity of aerodrome	Delayed opportunity to recognise conflict,	AsA can remove the retransmit function. Standard procedures in AsA	3	3	6	H	Further education to pilots/aviation community re: radio	2	3	5

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Risk No.	The Risk What can happen and How it can happen	The Consequence of an event happening	Description and Adequacy of Existing Controls	Likelihood Rating (a)	Consequence Rating (b)	Overall Risk Level (a+b)	Risk Priority	Description and Adequacy of Additional Controls	New Likelihood Rating (a)	New Consequence Rating (b)	Residual Risk Level (a+b)
	conflict because unable to get calls in due to congestion.	Airprox, mid-air collision.	<p>exist to deal with this.</p> <p>Issues raised through RAPAC to implement new CTAFs, BAs etc</p> <p>Anyone can request aerodrome owner to have aerodrome charted.</p> <p>Pilot training and competence. See and avoid is primary collision avoidance for VFR.</p>					<p>discipline</p> <p>Targeted advice to flying schools re: radio procedures</p>			
6	Using FIA: A/c on different frequencies due to use of different charts	<p>Unidentified conflict.</p> <p>Delayed opportunity to recognise conflict, Airprox, mid-air collision.</p>	<p>Education strategies and products.</p> <p>Pilot training and competence. See and avoid is primary collision avoidance for VFR.</p>	3	3	6	H	<p>Further education to pilots/aviation community re: radio discipline</p> <p>Targeted advice to flying schools re: radio procedures/flight planning</p> <p>Return to previous policy (with relevant education)</p>	2	3	5
7	Using FIA: An aerodrome within 10 miles of FIA	Unidentified conflict.	Pilot training and competence. See and avoid is	1	3	4	M	Further education to pilots/aviation community re:	0	3	3

CASA RISK ASSESSMENT BRIEF

Risk No.	The Risk What can happen and How it can happen	The Consequence of an event happening	Description and Adequacy of Existing Controls	Likelihood Rating (a)	Consequence Rating (b)	Overall Risk Level (a+b)	Risk Priority	Description and Adequacy of Additional Controls	New Likelihood Rating (a)	New Consequence Rating (b)	Residual Risk Level (a+b)
	boundary resulting in a risk that a/c are on different frequencies.	Delayed opportunity to recognise conflict, Airprox, mid-air collision.	primary collision avoidance for VFR. Information available on charts to highlight potential issues.					airmanship when near a FIA boundary Process for getting marked on charts.			
8	Using FIA: Uncharted aerodrome within CTAF 'area' resulting in aircraft on different frequencies.	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air collision.	Pilot training and competence. See and avoid is primary collision avoidance for VFR. Current rule set requires call on CTAF if likely to conflict.	1	3	4	M	Further education to pilots/aviation community re: use of CTAF frequency NCA owner requests to have aerodrome marked on chart. Issue can be raised through RAPAC to implement new CTAFs, BAs etc	0	3	3
9	Using FIA: No radio aircraft.	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air collision.	Current rules etc.	3	4	7	H	Further education to pilots/aviation community re: collision avoidance? Targeted advice to flying schools re: procedures/collision avoidance	2	3	5
9a	Using FIA: Some or most pilots ignore policy and continue to use Multicom.	Increased likelihood of unidentified conflict. Delayed opportunity to recognise	See and avoid. Safety promotion and education activities. Current regulations.	5	4	9	H	Comprehensive, extensive safety promotion and education campaign Targeted enforcement action	2	4	6

CASA RISK ASSESSMENT BRIEF

Risk No.	The Risk What can happen and How it can happen	The Consequence of an event happening	Description and Adequacy of Existing Controls	Likelihood Rating (a)	Consequence Rating (b)	Overall Risk Level (a+b)	Risk Priority	Description and Adequacy of Additional Controls	New Likelihood Rating (a)	New Consequence Rating (b)	Residual Risk Level (a+b)
		conflict, Airprox, mid-air collision.									
10	Using Multicom: Some pilots would not know of the existence of the aerodrome and therefore be on a different frequency	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air collision.	See and avoid (unalerted).	4	4	8	H	Further education to pilots/aviation community re: collision avoidance/awareness Process for getting marked on charts.	2	4	6
11	Using Multicom: No- radio aircraft.	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air collision.	See and avoid (unalerted).	3	4	7	H	Further education to pilots/aviation community re: collision avoidance Targeted advice to flying schools re: procedures/collision avoidance	3	4	7
12	Using Multicom: Creates a congestion issue for nearby CAR 166 aerodromes using 126.7 as CTAF.	Delayed opportunity to recognise conflict, Airprox, mid-air collision.		3	3	6	H	Further education to pilots/aviation community re: radio discipline	2	3	5
13	Using Multicom: Uncharted aerodrome within CTAF 'area' other than 126.7.	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air	Pilots must use the discrete CTAF rather than 126.7.	1	4	5	M	Further education to pilots/aviation community re: use of CTAF frequency Process for getting marked on charts.	0	3	3

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Risk No.	The Risk What can happen and How it can happen	The Consequence of an event happening	Description and Adequacy of Existing Controls	Likelihood Rating (a)	Consequence Rating (b)	Overall Risk Level (a+b)	Risk Priority	Description and Adequacy of Additional Controls	New Likelihood Rating (a)	New Consequence Rating (b)	Residual Risk Level (a+b)
		collision.									
14	Using Multicom: Won't get general hazard broadcasts from ATS. E.g., MLJ, Sigmet.	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air collision. Putting their own aircraft at risk.	Some alerts may be passed on by two-radio equipped aircraft	5	3	8	H	Further education to pilots/aviation community re: benefits of being on FIA frequency.	5	3	8
15	Using Multicom: Inability to easily make an emergency call to a monitored freq.	Putting their own aircraft at risk, due to slower or nil reaction to emergency, inadvertent IMC etc.	Some emergency calls may be relayed by two-radio equipped aircraft	4	4	8	H	Further education to pilots/aviation community re: benefits of being on FIA frequency.	4	4	8
16	Using Multicom: General congestion issue for low-level a/c.	Unidentified conflict. Delayed opportunity to recognise conflict, Airprox, mid-air collision.		4	3	7	H	Further education to pilots/aviation community re: radio discipline	4	3	7
17	Using Multicom: Unfounded belief in the extent of Multicom area.	Unidentified conflict. Delayed	See and avoid (unalerted)	3	3	6	H	Further education to pilots/aviation community re: correct	2	3	5

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Risk No.	The Risk What can happen and How it can happen	The Consequence of an event happening	Description and Adequacy of Existing Controls	Likelihood Rating (a)	Consequence Rating (b)	Overall Risk Level (a+b)	Risk Priority	Description and Adequacy of Additional Controls	New Likelihood Rating (a)	New Consequence Rating (b)	Residual Risk Level (a+b)
	Remaining on Multicom and not transferring to Area.	opportunity to recognise conflict, Airprox, mid-air collision. And no hazard, etc alerts from ATS.						procedures. Targeted advice to flying schools re: procedures.			

A.5 Risk treatment and action plan worksheet

Risk Ref.	Treatment/Controls to be implemented	Related risk numbers	Person responsible for implementing treatment/controls	Timeframe	Date Completed	Risk and treatment/controls monitored/reviewed	Date completed
1	Comprehensive, extensive safety promotion and education campaign	1, 9a	CASA :EM SEP	Medium term (6-12 months)			
2	Further education to pilots/aviation community (various) Process for getting NCA marked on charts.	2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	CASA: EM SEP Aerodrome operator	Ongoing			
3	Targeted advice to flying schools (various)	1, 2, 3, 5, 6, 9, 11, 17	CASA: EM SEP	Medium term			
4	Only permit RPT services to chartered aerodromes	1, 2, 3	CASA: EM Operations	Long term (>12 months)			
5	Targeted enforcement action	9a	CASA: EM Operations	Ongoing			
6	NCA owner requests to have aerodrome marked on chart. Issue can be raised through RAPAC to implement new CTAFs, BAs etc.	8	Aerodrome operator	Medium term			