

Violations of Controlled Airspace project

CASA Aviation Safety Promotion

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Risks posed by the General Aviation Sector

While there is a consensus that CASA should primarily concern itself with the safety of the passenger carrying operations, there has been only limited attention paid to the risks posed by the general aviation sector to fare paying passengers. Violations of controlled airspace, which predominantly involve recreational or instructional flights, are one instance of this issue. Examples of other collision threats to passenger aircraft come from a failure of a GA aircraft to notify other aircraft of its presence in MBZs, or the failure of a GA aircraft to comply with ATC instructions within controlled airspace.

In addition, any crash involving a GA aircraft may pose a risk to those on the ground.

Thus, while this paper, will concentrate on the issue of violations of controlled airspace, it should be seen as an instance of a more general concern about the risks posed by the GA sector.

Current Situation

- . At present there is no systematic, CASA wide program in place to deal with this issue.
- . In addition, anecdotal reports from district FOIs suggest that because of other demands on their resources, there has been a reduction in the amount of time devoted to following up and counselling pilots responsible for violations of controlled airspace.

Problem Definition

There appear to be two major aspects of the current VCA issue:

- . the objective threat to the safety of fare paying passengers and
- . the degree to which the public would approve of CASA's response to this problem.

Safety Risk

Size of the problem

The increase in recorded VCAs during the early part of the nineties was not necessarily entirely, or even primarily, due to a real increase in these events since the rise coincided with several changes to reporting procedures and detection rates¹.

¹ For example, it is likely that detection has increased with the increased carriage of secondary radar with mode C capability.

Nevertheless, regardless of whether there has been any *change* in the number of VCAs, it is known that they are occurring on a frequent basis, especially since the recorded VCAs almost certainly underestimate events which occur outside primary radar cover.

Associated risk

It is not clear what percentage of violations of controlled airspace result in a breakdown of separation (BOS)². BASI records (perhaps because of coding inaccuracies) show no overlap in VCA and BOS events. On the other hand, ASRB records estimate that about 5% of VCAs result in a breakdown of separation, and that about 17% of BOS events result from a VCA.

Since, no breakdown of separation (from whatever cause) has ever resulted in a mid-air collision involving an RPT aircraft in Australia, it could be argued that this is proof of the fact that the risk of this type of collision is low, and the risk of such a collision as a result of a VCA even more so.

Nevertheless, a VCA related mid-air collision involving an RPT aircraft would be likely to have catastrophic effects. Such events have occurred **overseas**³ and there is no reason to assume that they could not occur in Australia.

With such a potentially disastrous consequence, only an extremely low level of risk could be considered acceptable. There is some evidence that the level of a risk of a mid air collision resulting from a breakdown of separation (as a whole) may indeed be unacceptably high. For example, BASI statistics estimate that of the approximately 140 to 200 BOS events which occur each year, about 8% (≈ 14 per year) are classified as 'critical' - defined as one aircraft passing within 150 metres horizontally and 100 feet vertically of another.

If it is assumed that VCA related BOS events are as likely as other BOS events to be critical, then the risk appears to be far from insignificant.

Appropriateness of CASA's handling of the VCA issue

There is a possibility that criticism could be directed at CASA's current handling of VCAs by District Offices. This follows from the fact that most pilots involved in VCA events are not interviewed (mainly due to FOI workload pressures), and there is no formal written policy governing when such an interview would be required. Therefore those who are subject to actions from CASA could argue that they have been unfairly singled out for attention.

² This paper has concentrated on the risks related to mid air collisions and has not considered scenarios in which the risks are borne primarily by the aircraft responsible for the VCA e.g. when flying across active military areas.

³ On August 8, 1986 82 lives were lost in Cerritos, California when a Piper 28 violated controlled airspace and was involved in a mid air collision with a DC9 passenger jet.

A much more important consideration is how CASA would be judged in the aftermath of a VCA related mid air collision or a well publicised critical breakdown in separation. It could be argued that CASA (and its predecessors) had for many years been aware of the risks associated with VCAs but had not taken the necessary steps to significantly reduce the risk. This is partly due to the complex nature of the causal factors of VCAs.

Criticism might be particularly severe if the pilot responsible for the above event had been involved in a previous VCA but CASA had taken no action at that time to reduce the risks of a recurrence.

Conclusions

- . While there is probably only a small risk that a VCA will lead to a mid air collision in the foreseeable future, given the catastrophic nature of this consequence, it could be argued that this issue is not receiving an adequate level of attention from CASA, Airservices and BASI.

Recommendations

It is recommended that action be taken both in regard to defining an appropriate response to VCAs, and in initiating proactive preventative measures. These actions, while targeted at the VCA issue, should also be viewed from the perspective of dealing more generally with the risks posed to passenger carrying operations by those in the GA sector.

Response to VCAs

A formal policy should be promulgated which provides guidelines for dealing with reported airspace incidents. The policy should clarify:

- . who in CASA has responsibility for responding to any particular incident
- . which incidents require what level and type of response

In the case of VCAs, one point of uncertainty is whether responsibility resides exclusively with the District Office in the area in which the VCA occurred, or with the office in the area where the involved pilot is based.

With regard to determining which particular events should receive attention, anecdotal evidences suggests that this is currently based on the perceived seriousness of the outcome. It might be more appropriate to direct resources to events with high risk potential. Consideration should also be given to contacting all pilots known to have been involved in a previous VCA. For this to be possible, the policy should specify that in all cases the name of the VCA involved pilot be determined, and that these names be kept on a central registrar.

While the response to almost all VCAs should be educative in nature, the policy should also specify the conditions under which punitive action would be appropriate.

Preventative measures

Description of short term intervention

It is proposed to implement a locally focussed program, designed around flying schools and clubs, which would directly decrease the risk of **VCAs** in that area. This approach is suggested from data from the BASI study and **ASRB's** database which suggest that most pilots involved in **VCAs** are engaged in either private or instructional flights and flying in hired aircraft. In addition, in most cases, the **VCA** occurs during a flight within a reasonably limited area from the point of departure.

The proposal is to pilot test this approach at Archerfield. As Table 1 below indicates, there are a disproportionate number of **VCAs** reported from the Brisbane region.

Table 1

Number of ESIR reported **VCAs; Australia, June 1996 to October 1997**

Reporting Location	Number of VCAs	Percentage of Total VCAs
Brisbane	199	30.8
Melbourne	130	20.1
All other centres	109	16.8
Sydney	108	16.7
Perth	64	9.9
Adelaide	37	5.7

Investigation of individual reports of **VCAs** from within the Brisbane region show Archerfield as the most frequent point of departure. In addition, **CASA** inspectors at the Archerfield and Brisbane District Offices have independently expressed their concern about the high number of **VCAs**, and would be willing to actively cooperate in any local program to address this problem.

The program would have a number of components:

1. Formation of a working group of flying training operators, Airport Chamber of Commerce, Airservices Australia, and local District Office staff to develop the program details. This would be designed to encourage the local aviation community to 'own' and help address the problem.
2. General communication to all pilots in the area on the program (direct mailout).
3. Development of a package of simple pre-flight information and support material which local 'hire and fly' operations would give to pilots who hire aircraft and would perhaps also give a short briefing using the material.
4. Development and presentation of skill training packages. For example, a video or CD ROM training package may be developed which demonstrates map reading skills using materials appropriate to the local environment.

5. Collection of data, in the form of a very brief questionnaire completed by pilots at the time of aircraft hire (results - see ATTACHMENT 1).
6. Local District Office follow up with all VCAs involved pilots for a specified time period to obtain information, reinforce education, assess whether the information noted above had been received and if so, why it had not been effective. This follow up would have to be consistent with the policy on responding to VCAs and other airspace incidents outlined earlier.
7. Follow up telephone survey as part of a research project (undergraduate or Masters students) with one of the Universities delivering aviation degree programs. The telephone survey would include a random sample from the point-of-hire survey, and also VCA involved pilots (see ATTACHMENT 2)

Future directions

The proposed project will eventually need to be expanded to other locations if it is to have an influence on the total number of VCAs occurring nationally. Although the nature of the problem would probably not justify setting up programs in all locations where there are CASA District Offices, it may be appropriate to eventually establish about six local interventions where VCAs are disproportionately frequent and where the risks to passenger carrying operations is thought to be highest.

In addition to the data collected during this project, a strong case will be made for the consideration of actions that lie outside the educational sphere. For example, it is likely that there are several significant issues that need to be examined in regard to policy on training, licensing, and **recency** requirements for GA pilots that affect the general level of risk associated with this sector. There are also other systemic issues which may need to be considered.

What has happened so far:

ESIRs are now being collated centrally within CASA - Aviation Safety Promotion

Local Education Intervention Programs

Archerfield Project

- 42 page Archerfield Pilot Guide
- Point-of-Hire Survey
- University Research initiated but not fully implemented

Sydney Project

- 76 page Sydney Basin Pilot Guide being introduced by 17 June. Two drafts which went out to Industry for comment
- New Lane-of-Entry routes activated on 17 June
- Education regarding Transponder usage - reminder at the holding point and a poster to be distributed (in progress)

Melbourne

- Melbourne Basin Pilot Guide under development (4 weeks into a 12 week development cycle)
- Education regarding Transponder usage - reminder at the holding point and a poster to be distributed (in progress)

Other developments

Airservices have initiated a working group comprising Airservices, BASI and the Civil Aviation Safety Authority. Data is being collected at the moment.

ATTACHMENT 1

Analysis of Archerfield Aircraft Hire Survey

Summary:

Pilot characteristics

- About two - thirds of the pilots surveyed are aged 40 years and below.
- Virtually all the respondents (93 per cent) live in Brisbane or within 100 kilometres of Brisbane.
- About seventy percent had obtained their first licences in the last 10 years.
- About half (55 per cent) has less than 200 total hours flown.
- Majority (80 per cent) fly at least twice a month.

Characteristics of flights

- Sixty per cent of the flights were undertaken for the purpose of training or for recency requirements.
- The most popular times for the flights is between 8 am and 12 noon.
- About 67 per cent of the flights had 2 persons on board while 17 per cent had 3 or more persons on board.
- The pilots intended to use GPS on about 15 per cent of the flights and enter CTA on 34 per cent of the flights.
- A larger proportion of the flights intended to enter CTA (50 per cent) took 30 minutes or more to plan compared with 24 per cent for flights not intended to enter CTA.

1. Background Characteristics of Pilots

1.1. Introduction

This analysis deals with 91 pilots who hired aircraft from selected aviation organisations in Archer-field between January and December, 1998 and who filled in questionnaires handed out to them at the time of hiring the aircraft. In all 135 questionnaires were analysed. The report also deals with some characteristics of the flights made by these pilots.

1.2. Age and highest licence

From Tables 1, majority of the pilots (66 per cent) are 40 years and below. Of this number, half are under 25 years of age. Among respondents with private licences or less, 62 per cent are 40 or below while 74 per cent of those who hold ATPL or CPL are 40 years or less. PPL licences are the most commonly held among the respondents.

Table 1: Age of pilot by highest licence

	Highest Licence				Total
	Student	PPL	CPL	ATPL	
under 25	6	16	10	0	32
25 - 40	4	11	10	3	28
41 - 55	3	15	5	2	25
Over 55	1	4	1	0	6
Total	14	46	26	5	91

7.3. Year since first licence

The majority (70 per cent) of respondents obtained their first licences within the last ten years (see Table 2).

Table 2: Years since first licence

	Frequency	Percent
up to 5 years	52	57.1
6 - 10 years	11	12.1
11 + years	25	27.5
Missing	3	3.3
Total	91	100

1.4. Pilot's Place of residence

Almost all (93.4 per cent) of the pilots surveyed live in or within 100 km of Brisbane (see Table 3 below).

Table 3 : Place of residence

	Frequency	Percent
Brisbane	76	83.5
within 100km of Brisbane	9	9.9
Qld, NSW, ACT	4	4.4
Overseas	1	1.1
No answer	1	1.1
Total	91	100

1.5. Flying frequency and flying hours

Most of the pilots are fairly active in flying. From Table 4, about 55 per cent fly four times or more per month on average while some 80 per cent fly 2 or more times in a month.

Table 4: Frequency of flying

	Frequency	Per cent
less than once a month	8	8.8
once a month	10	11.0
2 - 3 times a month	23	25.3
4 - 5 times a month	13	14.3
> 5 times a month	37	40.6
Total	91	100

At all levels of licence groups, the majority of pilots fly at least 2 times per month (see Table 5). The proportions involved range from 100 among ATPL to 72 per cent among pilots with PPL.

Table 5 : Highest licence by frequency of flying

	Highest Licence				Total
	Student	PPL	CPL	ATPL	
< once / month	1	6	1	0	8
once / month	0	7	3	0	10
2 - 3 times / month	4	15	4	0	23
4 - 5 times / month	4	9	0	0	13
> 5 times / month	5	9	18	5	37
Total	14	46	26	5	91

Also, from Table 6 about 75 per cent of those with less than 200 hours flown claim they fly 2 or more times a month on average compared with 88 per cent for those between 201 - 500 hours and 83 per cent for those having 500 or more hours. In all, about 80 per cent of all the pilots surveyed fly 2 or more times a month.

Table 6: Frequency of flying by total hours flown

	Total hours flown			Total
	less than 200	201 - 500	above 500	
< once a month	8	0	0	8
once / month	4	2	4	10
2 - 3 times / month	11	6	6	23
4 - 5 times / month	11	0	2	13
> 5 times / month	15	9	11	35
Total	49	17	23	89

1.4. Source of current documentation

As regards the source of current documentation relating to flying activities, about 93 per cent of respondents said they obtain them from either Airservices or buy them locally. About a third of the respondents claim to buy the documents locally.

Table 7: Current source of documentation

	Frequency	Per cent
Air services	55	60.4
buy locally	30	33.0
other	6	6.6
Total	91	100

2. Analysis of flight details

2.1. Purpose of flights

The data in Table 8 indicates that the predominant purpose for the flights in this survey is 'training'. Training flights together with flights undertaken for recency requirements constitute about 60 per cent of the flights reported in the survey.

Other important reasons for the flights are recreational and work. Flights other than those for training and acquiring more flying hours constitute 40 percent.

Table 8: Purpose of flights

	Frequency	Percent
work related	15	11.1
recreational/visit/ scenic flights	38	28.1
recency requirements	8	5.9
training	73	54.1
missing	1	0.8
total	135	100

2.2. Time of Flights

The data in Table 13 indicates the morning hours are more favoured for the flights in the study.

Table 9 Time of flights

	Frequency	Percent
8-12 noon	73	54.1
1-5 p m	35	25.9
after 5 pm	3	2.2
No answer	24	17.8
Total	135	100

2.3. Aircraft type used and number of persons on board

The two most popular aircraft types hired for the flights are Cessna 172 and 152 . These have been hired for 40 per cent of the flights covered by the study.

Table 10: Type of aircraft

	Frequency	Percent
Cessna 172	37	27.4
Cessna 152	17	12.6
Other Aircraft	80	59.3
No answer	1	0.7
Total	135	

The data in Table 11 indicates that about 84 per cent of the flights carried 2 or more persons while 17 per cent had 3 or more persons on board.

Table 11: Number of persons on board

	Frequency	Percent
One	19	14.1
Two	90	66.7
Three	19	14.1
Four	4	2.9
No Answer	3	2.2
Total	135	100

2.4. Time used in planning for flight

Most of the flights were planned under one hour. Of this number 79 per cent were planned in 30 minutes or less (see Table 12).

2.5. Use of GPS

For about 82 per cent of the flights the pilots indicated that they did not plan to use GPS. The proportion of flights planned in 30 minutes or less is roughly similar irrespective of intended use or non use of GPS (i.e. .65 for intended use and .62 for no intension to use).

Table 12 Use of GPS by Time taken to plan flight

Time taken to plan flight.	Using GPS ?			Total
	Yes	No	No answer	
< 16 minutes	8	44	0	52
16 - 30 mins	5	25	0	30
31 - 60 mins	1	20	1	22
over 60 mins	6	21	2	29
no answer	0	1	1	2
total	20	111	4	135

2.6. Plan to enter CTA

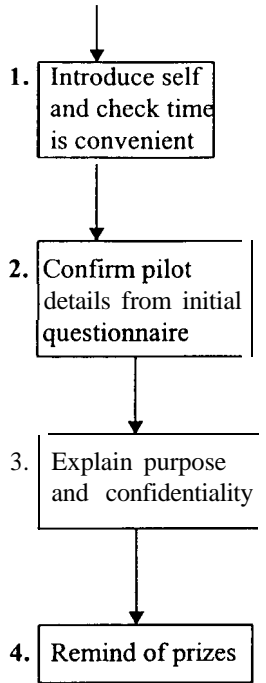
The pilots on more than half of the flights did not plan to enter CTA. Also, 50 per cent of the flights for which the pilot intended to enter CTA, took more than 30 minutes to plan, compared with 24 per cent of flights not intended to enter CTA.

Table 13: Plan to enter CTA by time taken to plan flight

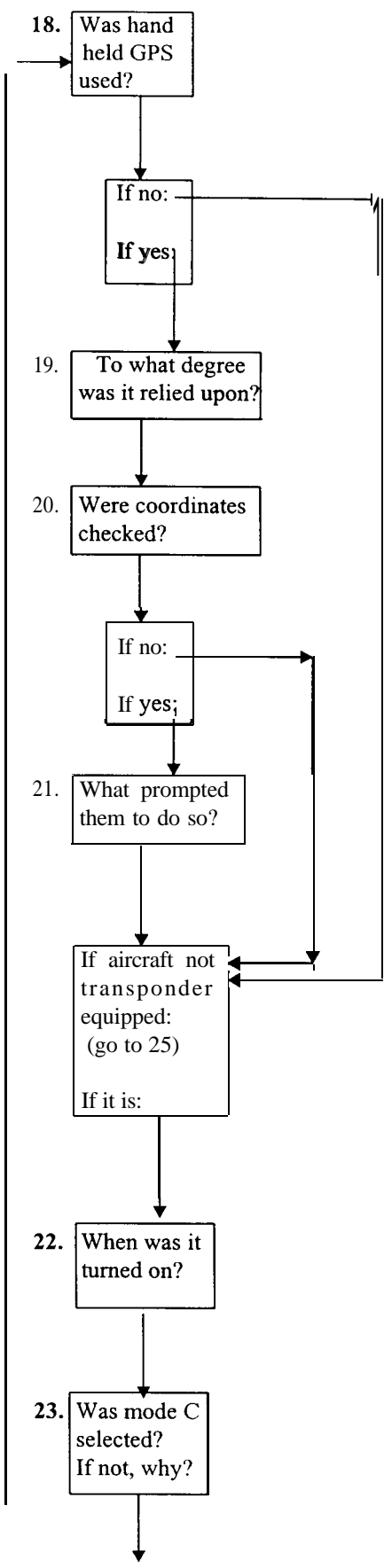
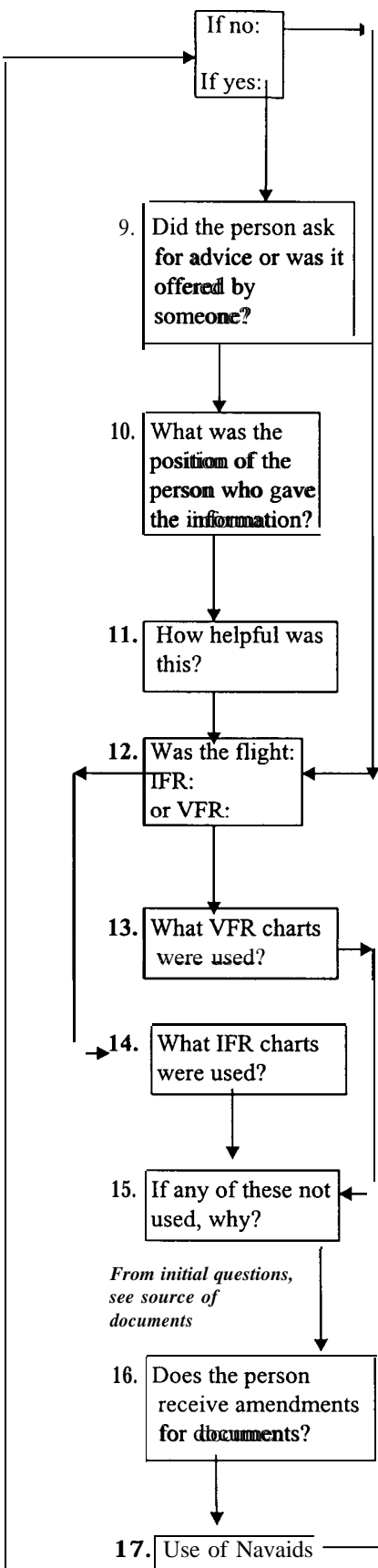
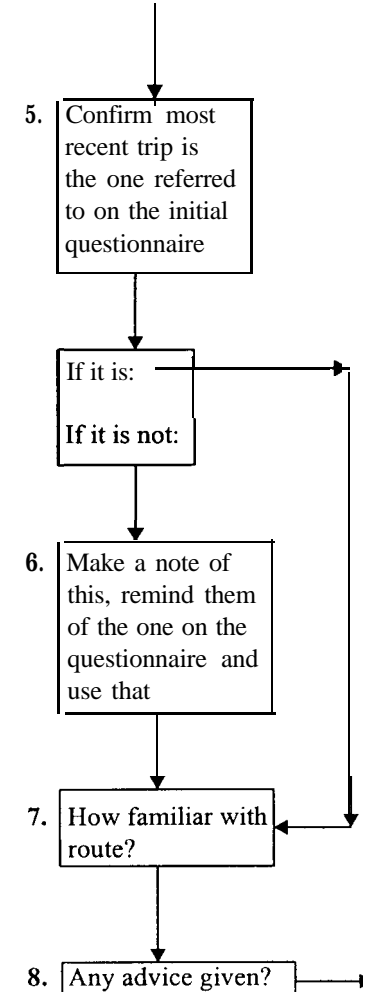
Time taken to plan flight	Plan to enter CTA			Total
	Yes	No	No answer	
< 16 minutes	10	40	2	52
16 - 30 mins	13	17	0	30
31 - 60 mins	10	8	4	22
over 60 mins	13	10	6	29
no answer	0	1	1	2
total	46	76	13	135

Attachment 2: Private Hire Follow-Up Survey - Flow Chart

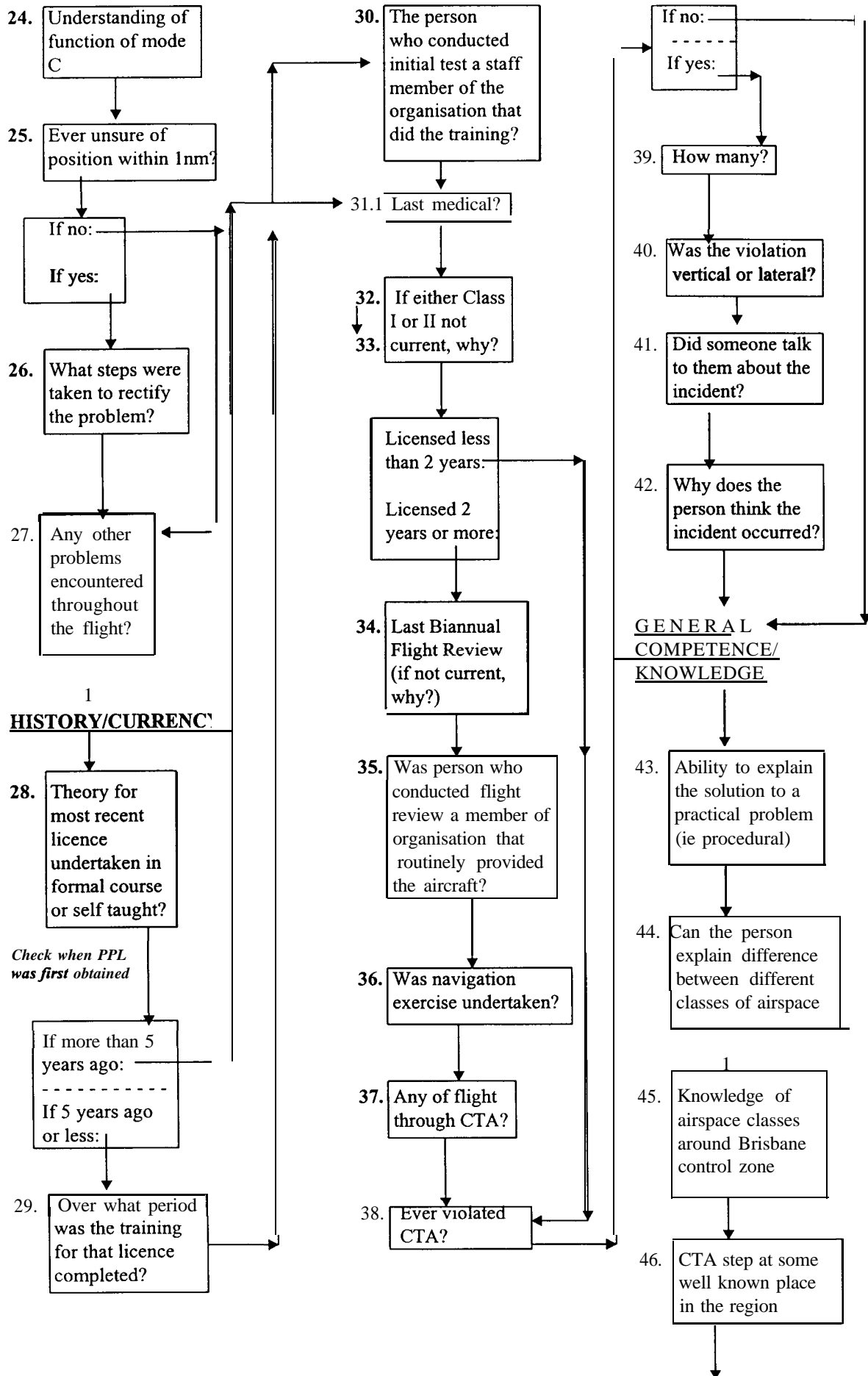
PREAMBLE



LAST TRIP INFORMATION



Attachment 2: Private Hire Follow-Up Survey - Flow Chart



Attachment 2: Private Hire Follow-Up Survey - Flow Chart

OTHER DATA

