Safety Regulation Group

Civil Aviation Authority

CAP 704

ACCESS

Aircraft Call Sign Confusion Evaluation Safety Study

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List of Effective Pages

Page		Date	Page	Date
iii		April 2000		
iv		April 2000		
v		April 2000		
vi		April 2000		
vii		April 2000		
viii		April 2000		
1		April 2000		
2		April 2000		
3		April 2000		
4		April 2000		
5		April 2000		
6		April 2000		
7		April 2000		
8		April 2000		
9		April 2000		
10		April 2000		
11		April 2000		
12		April 2000		
13		April 2000		
14		April 2000		
15		April 2000		
16		April 2000		
Appendix A	1	April 2000		
Appendix A	2	April 2000		
Appendix A	3	April 2000		
Appendix A	4	April 2000		
Appendix B1	1	April 2000		
Appendix B2	1	April 2000		
Appendix C	1	April 2000		
Appendix C	2	April 2000		
Appendix C	3	April 2000		
Appendix C	4	April 2000		
Appendix D	1	April 2000		
Appendix E	1	April 2000		
Appendix E	2	April 2000		
Appendix E	3	April 2000		
Appendix F	1	April 2000		
Appendix F	2	April 2000		
Appendix F	3	April 2000		
Appendix F	4	April 2000		
Appendix G1	1	April 2000		
Appendix G1	2	April 2000		
Appendix G2	1	April 2000		
Appendix G2	2	April 2000		
Appendix G3	1	April 2000		

Contents

Executive Summary

The aim of the ACCESS group was to conduct a study of call sign confusion reports in UK airspace during 1997, in order to improve existing safety levels whilst simultaneously raising operator awareness and educating the aviation industry. The objectives were to collect reliable data over one year, to ascertain the magnitude of the problem, and confirm that those categories identified in previous reports as causing most confusion were still relevant.

Airlines and controllers were requested to submit reports to the CAA on call sign confusion incidents which met Mandatory Occurrence Report (MOR) criteria as detailed in CAP 382. In addition, airlines and controllers were invited to submit all other reports relating to call sign confusion on a tailor-made report form designed by the ACCESS group.

The 482 reports in 1997 were collated by the CAA and entered onto a dedicated call sign confusion database, which was subsequently used to analyse the data.

From the 482 call sign confusion occurrences, the main results of the study were as follows:

- 45% involved actual confusion.
- 73% involved an increase in ATC workload.
- Most occurrences took place between 0600 and 1759hrs.
- The majority of occurrences took place in Terminal control area (TMA) or Upper ATS Routes (UARs.)
- Nearly 50% involved UK airlines only.
- 66% involved 2 or more call signs of the same airline.
- 84% involved only numeric call signs.
- 27% involved 2 or more identical call sign suffixes.
- 43% involved call signs ending with the same two characters.
- Of the 72 occurrences where prescribed ATC separation was lost or there was some deviation from operating procedures, 92% involved only numeric call signs.
- 89% of actual confusion reports occurred in either the climb, descent or cruise phases of flight

The ACCESS group concluded that call sign confusion is a safety problem which can affect safe and expeditious operations in UK airspace. However, it was felt that a revised AIC should be published incorporating some of the additional lessons learned from the study. Additionally, it was felt that the ACCESS final report could form the basis of a CAP and be distributed to industry to act as a permanent guide for RTF call sign matters.

It was also concluded that as it is practically impossible for individual airlines to allocate their own call signs in isolation, a dedicated call sign confusion cell should be established by the NATS, as major ATC service provider, to assist with this matter and to act as a monitor and mediator into airline RTF call sign problems in UK airspace.

In order to identify, rectify and provide permanent guidance on call sign related problems, the ACCESS group made 3 recommendations which have been responded to.

Access Group Members

During the course of the study, the ACCESS group was comprised of the following people:

Chris Gomez (Chairman)	Group Supervisor – LATCC Terminal Control
Mark Cristofoli	Flight Operations – Civil Aviation Authority
Sarah Doherty	Safety Analyst – Civil Aviation Authority
Jimmie Galbraith	Flight Safety Department – British Regional Airlines
Andrea Goldsmith	ATCO, Directorate of Safety and Operations – National Air Traffic Services
Ian Hardy	Air Traffic Services – British Airways
Steve James	ATCO, Watch Supervisor Heathrow – National Air Traffic Services
Ed Pooley	Flight Safety Manager – British Regional Airlines
Justin Robertson	University of Hertfordshire undergraduate placement – Civil Aviation Authority
Jim Snee	Operations Manager – British Midland Airways
Graeme Stagg	Flight Safety Analyst – Civil Aviation Authority
Martin Weir	Operations Support – British Midland Airways
Debbie Westley	ATCO, Directorate of Safety and Operations – National Air Traffic Services
Paul Wiggins	Air Traffic Services – British Airways

Glossary

The following terms and acronyms have been used in this report:

Call sign	composed of a 3 letter prefix (i.e. the airline identifier) and a suffix which can contain up to 4 characters
Numeric	consists of numbers only
Alphanumeric	consists of number(s) followed by one or more letters
Severity grading	**A** prescribed ATC separation was lost
	B no loss of prescribed ATC separation but there was some deviation from operating procedures by the flight crew(s) or controller
	C no deviation from operating procedures

ACCESS	Aircraft Call sign Confusion Evaluation Safety Study
AIC	Aeronautical Information Circular
AIRPROX	Aircraft Proximity Hazard
ATC	Air Traffic Control
ATSU	Air Traffic Services Unit
CAA	Civil Aviation Authority
CTA	Control Area
CTR	Control Zone
FPS	Flight Progress Strip
LATCC	London Area and Terminal Control Centre
MOR	Mandatory Occurrence Report
NATS	National Air Traffic Services Ltd.
OACC	Oceanic Area Control Centre (Shanwick)
OCA	Oceanic Control Area
RTF	Radio Telephone Frequency
SCACC	Scottish Area Control Centre
TMA	Terminal Control Area
UAR	Upper Air traffic services Route
VOR	VHF Omni-Range (beacon)

Aircraft Call Sign Confusion Evaluation Safety Study (ACCESS) 1997

1 Introduction

1.1 Why study call sign confusion?

The Civil Aviation Authority (CAA), National Air Traffic Services Ltd. (NATS) and several airlines have become increasingly concerned about the problems that result from the similarity of airline Radio Telephone Frequency (RTF) call signs. Furthermore, a safety recommendation from the Joint AIRPROX Assessment Panel (JAAP) in 1991 suggested that there should be a central system for the control and allocation of airline RTF call signs to help avoid ambiguity and confusion.

Airline call signs are composed of a 3 letter prefix (i.e. the airline designator) and a suffix which can contain up to 4 characters. Historically, airlines have used the numeric flight or trip number as the RTF call sign. An example of this would be if Continental Airlines flight COA29 used the call sign suffix of '29' to match the flight number. The rules of RTF call sign construction are detailed in ICAO Annex 10 Chapter 5 – a copy of which can be found in Appendix A.

Call sign confusion can be either aural or visual, or both. Aural confusion can occur between flight crews and controller – and sometimes between different flight crews – when using the RTF. Visual confusion is primarily an ATC problem. It relates to flight progress strips (FPS) and radar displays, where call signs are the primary means of identifying the aircraft. Examples of these types of visual confusion are shown in Appendices B1 and B2.

Call sign confusion problems often give rise to both potential and actual flight safety incidents. Previously, it had been difficult to quantify the extent to which confusion caused by similar RTF call signs had contributed to incidents or, if left undetected, may have caused an incident. Based on the success of the Level Violations study of 1994 – which was an issue similar in size to that of call sign confusion – a dedicated group was established to conduct a study on call sign confusion known as ACCESS (**A**ircraft **C**all sign **C**onfusion **E**valuation **S**afety **S**tudy).

1.2 Aeronautical Information Circular (AIC)

The CAA and NATS issued an AIC (ref.1 and see Appendix C) in 1996 on the subject of call sign confusion. The AIC gave detailed guidelines for airlines to use when allocating their own call signs and guidance for flight crew and controllers to avoid call sign confusion. The details of the proposed ACCESS study were also mentioned in the AIC with contact addresses for further information, in order to prepare the UK industry for the study.

The AIC was sent out to all UK airlines and air traffic services units. Subsequently, its contents have been reviewed against the ACCESS study data with a view to re-issuing the AIC as standing guidance to airlines and air traffic service providers about problems associated with aircraft call sign confusion.

1.3 ACCESS study

The ACCESS group comprised representatives from CAA, NATS, British Regional Airlines, British Airways and British Midland Airways. The composition of the group enabled participation of the regulatory authority, the main air traffic service provider and a cross-section of UK airlines. Additionally, the group benefited from a wide range of expertise in air traffic control, flight operations, safety regulation, data collection and analysis.

The aim of the group was to conduct a study of aircraft call sign confusion reports in UK airspace during 1997, in order to improve existing safety levels whilst simultaneously raising operator awareness and giving guidance to the aviation industry as a whole.

The objectives were to collect reliable data over one year, to ascertain the magnitude of the problem, and confirm that those categories identified in previous reports as causing most confusion were still relevant. It was anticipated that the results of the study would also enable airlines, flight crew and controllers to focus attention on structure, format and use of RTF call signs in order to reduce the incidence of confusion.

Airlines and ATC service providers were requested to submit reports to the CAA on call sign confusion incidents which met Mandatory Occurrence Report (MOR) criteria as detailed in CAP 382 (ref.2):

> 'The following should be reported as indicated:
> .....Incorrect transmission, receipt or interpretation of significant messages'

In addition, controllers were invited to submit all other reports relating to call sign confusion on a tailor-made report form designed by the ACCESS group (hereafter referred to as an ACCESS report – see Appendix D). Airlines were invited to submit such reports on standard safety report forms. All reports involving actual confusion were recorded as MORs, regardless of whether they were originally submitted as an MOR or an ACCESS report.

The 482 reports in 1997 were collated by the CAA's Safety Regulation Group (SRG) and entered onto a dedicated call sign confusion database, which was subsequently used to analyse the data. During input each report was assigned an ACCESS severity grading, which indicated if prescribed separation was lost during the incident and whether, or not, there was some deviation from operating procedures by the flight crew(s) or controller.

Preliminary analysis of the data was performed early in 1998 and the results were published in DataPlus 98/DP1, which is shown in Appendix E.

2 Assumptions and Limitations

2.1 Data and results

It was assumed that information received on call sign reports was correct unless mistakes were evident. On several occasions, the stated flight level did not correspond with the airspace type. The CAA Safety Data staff would verify this information before entering it onto the database. In addition, the reports often lacked information such as the flight phase or whether the workload of the controller was increased. In these cases an objective judgement was made of these criteria from the other data on the report.

2.2 Reporting

The call sign confusion database, and therefore the results in this report, only reflect those incidents which have been reported to the CAA by airlines and ATC providers. It is known that not all UK airlines and controllers report events consistently, and thus the overall numbers are likely to be higher than the results imply. This is reflected in the fact that only 1% of call sign confusion incidents on the database were reported by both the ATC and airline.

Repetitive incidents of call sign confusion are known to have occurred on a regular basis, involving the same combination of call signs. These were sometimes reported on more than one occasion, but were mostly reported only once on the assumption that further reports were unnecessary.

In order to compare airlines, it was necessary to determine a measure of the time spent in UK airspace and the potential exposure to call sign confusion during periods of high crew and controller workload. A direct measure of these criteria was not readily available, so stage flights have been used when comparing airlines in this paper.

A stage flight is defined as follows (ref. 6) and will be referred to as a 'flight' from this point onwards:

> 'Stage flight is operated from when an aircraft takes off to when it next lands (including technical stops).'

For analysis purposes the RTF call sign was used to identify the airline which issued it, or on whose behalf the flight was being made.

2.3 Purpose

It is not the intention to apportion blame or liability to any airline or controller involved in a call sign confusion occurrence. Involvement in occurrences included in this report does not confer blame on any party. The sole purpose of the report is to enhance aviation safety by the prevention of call sign confusion occurrences.

3 Results of the Analysis

3.1 General information

This section deals with the analysis of all 482 reports received during 1997. The analysis has been kept general to provide background information for the study.

3.1.1 Breakdown of reports received

In 1997, there were 482 call sign confusion reports of which:

175 (36%) were MOR reports, and

307 (64%) were ACCESS reports.

3.1.2 Severity grading

The 482 reports were graded in terms of severity as follows:

Severity	Number of reports	Percentage of reports
A	3	0.6%
B	69	14.3%
C	410	85.1%

Where:

A = prescribed ATC separation was lost.

B = there was no loss of prescribed ATC separation but there was some deviation from operating procedures by the flight crew(s) or controller.

C = there was no deviation from operating procedures.

3.1.3 Reporters

Of the 482 reports received:

435 (90%) were reported by controller,

44 (9%) were reported by flight crew,

3 (1%) were reported by flight crew and controller.

3.1.4 Actual confusion

Of the 482 reports received, there were 217 (45%) where actual confusion took place. Of the 217 reports involving actual confusion of any party:

80 (36.8%) involved actual confusion of one flight crew only,

57 (26.3%) involved actual confusion of controller(s) only,

42 (19.4%) involved actual confusion of controller(s) and one flight crew,

38 (17.5%) involved actual confusion of more than one flight crew, but not controller(s).

3.1.5 Actual confusion of flight crew by phase of flight

An occurrence may involve actual confusion of one or more parties, which may include actual confusion of one or more flight crews. Of the 482 occurrences, there were 232 flight crews who were **actually confused**. The phases of flight during which the relevant flight crew(s) were **actually confused** are shown below:

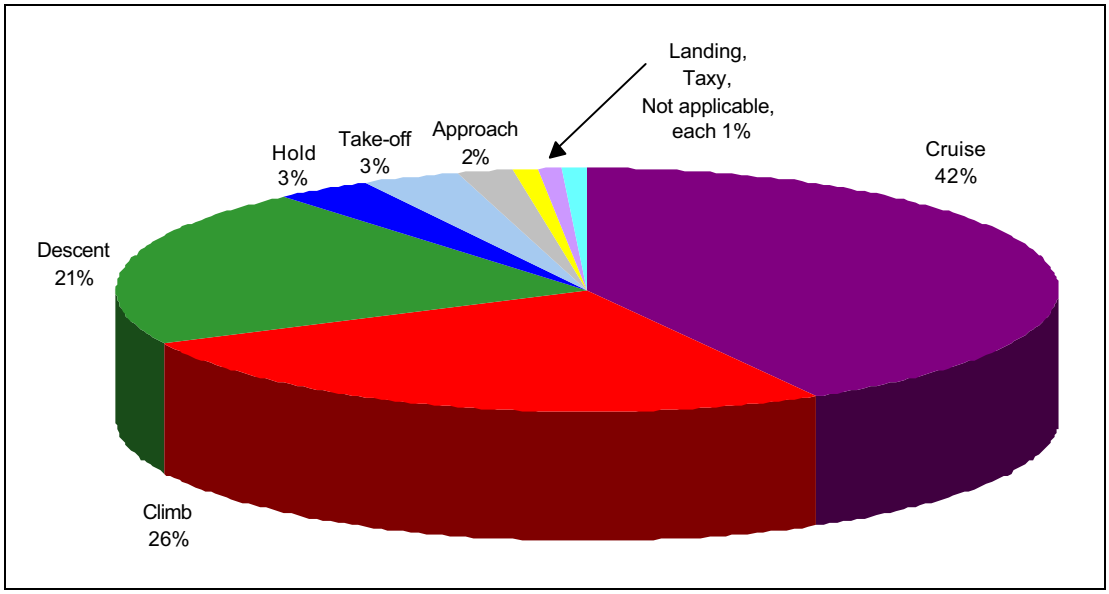


Figure 1 Percentage of actual confusion of flight crew(s) by phase of flight

'Cruise' was the phase of flight which involved the largest percentage (42%) of actual confusion of flight crew(s). However, when 'climb' and 'descent' phases are combined, reflecting the part of flight potentially involving the majority of flight level changes, it is evident that 47% of actual confusion of flight crew(s) occurred during these 2 phases. Indeed, the majority (89%) of actual confusion of flight crew(s) occurred during the climb, cruise and descent phases. It should also be noted that climbing and descending manoeuvres are generally performed in busy TMA airspace (see section 3.1.9).

3.1.6 Increased workload

Of the 482 call sign confusion occurrences, 353 (73%) involved increased workload for controllers and flight crew where thinking time was reduced and RTF usage time increased.

3.1.7 Reports by month

The largest number of reports received was 61, in April and May. The largest number of total aircraft movements reported was 263,347 in July 1997 (ref.3):

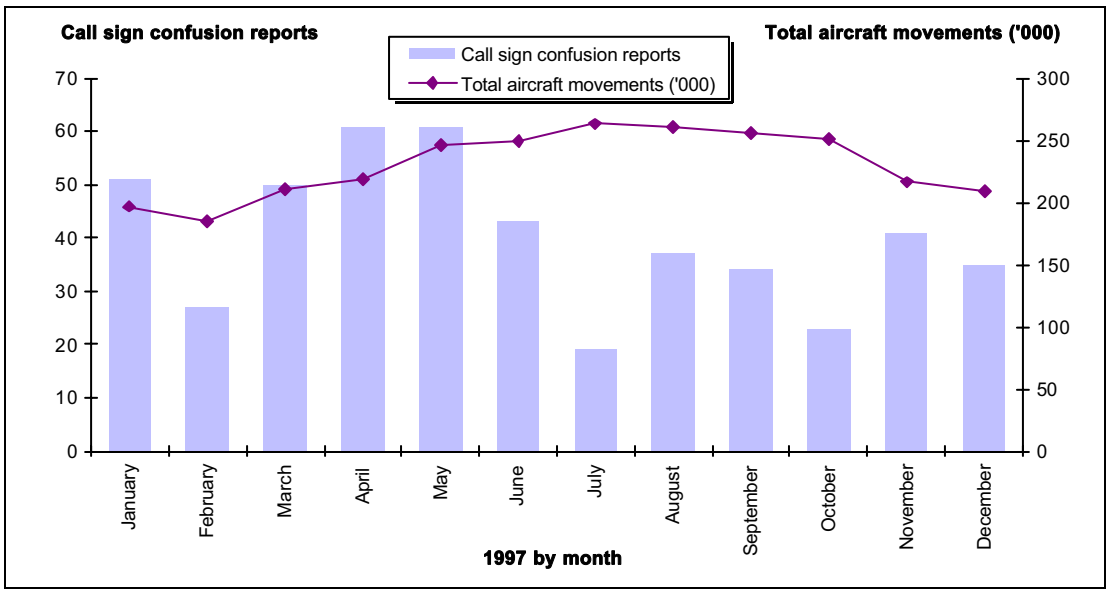


Figure 2 Call sign confusion reports by month

3.1.8 Reports by time of day

Call sign confusion occurrences took place most often between 0600 and 1759hrs. The highest number of occurrences in any 3 hour period was 135, which occurred between 0900 and 1159hrs. The peak number of UK movements occurred during the 3 hour period between 0600 and 0859hrs (ref.3). The peak call sign confusion report rate per 100 total aircraft movements occurred during the 3 hour period 0900 to 1159hrs.

Of the 482 reports received, 29 (6%) did not report the time of occurrence. These reports have therefore not been included in the following chart:

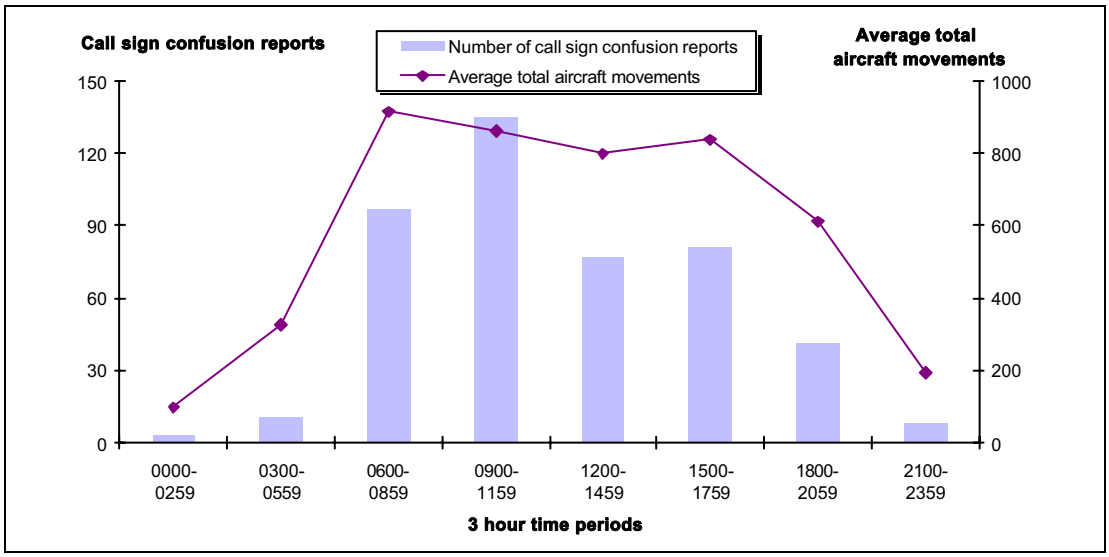


Figure 3 Call sign confusion reports by time of day

3.1.9 Reports by airspace type

The 482 reports involved call sign confusion in the following airspace types:

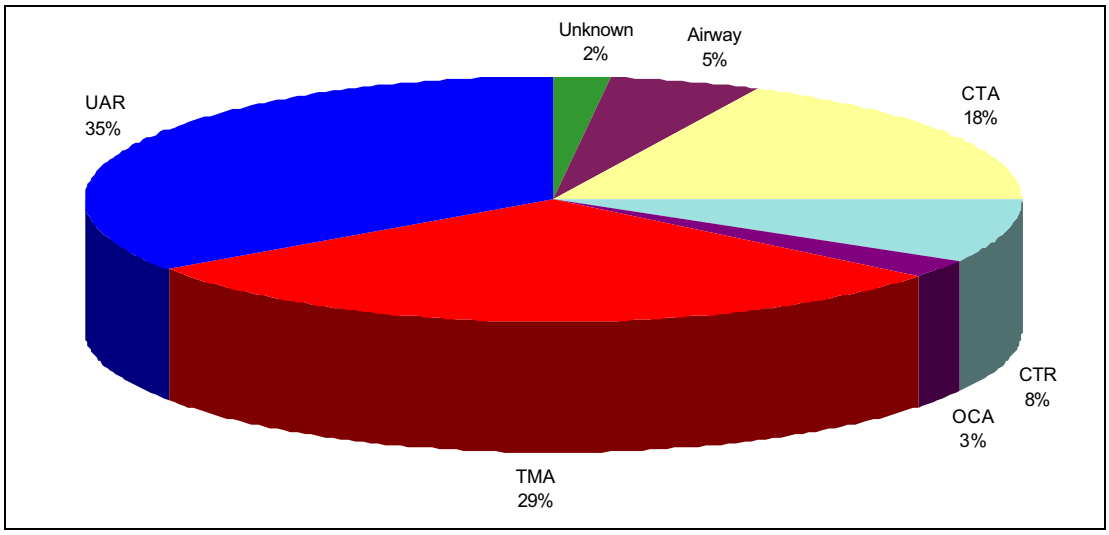


Figure 4 Percentage of reports by airspace type

3.1.10 AIRPROX reports

Of the 482 reports, 1 (0.2%) involved an Aircraft Proximity (AIRPROX) report. This report was allocated an ACCESS severity grading of **A** as it involved a loss of prescribed ATC separation. An extract from the AIRPROX report can be found in Appendix F.

3.1.11 Level busts

Of the 482 reports, 7 (1.5%) involved a level bust by one of the aircraft involved. Six of these reports were allocated a severity grading of **B** as they involved a deviation from operating procedures. One report involved a loss of prescribed ATC separation and was therefore allocated severity grading **A**, although it did not result in an AIRPROX.

3.1.12 Air Traffic Services Units (ATSUs)

The ATSUs responsible for flights at the time of the report are shown below. Of the 482 reports received, 379 (79%) were from the LATCC area:

LATCC	379	Manchester	20
Other	33	Shanwick OACC	13
SCACC	28	Newcastle	9

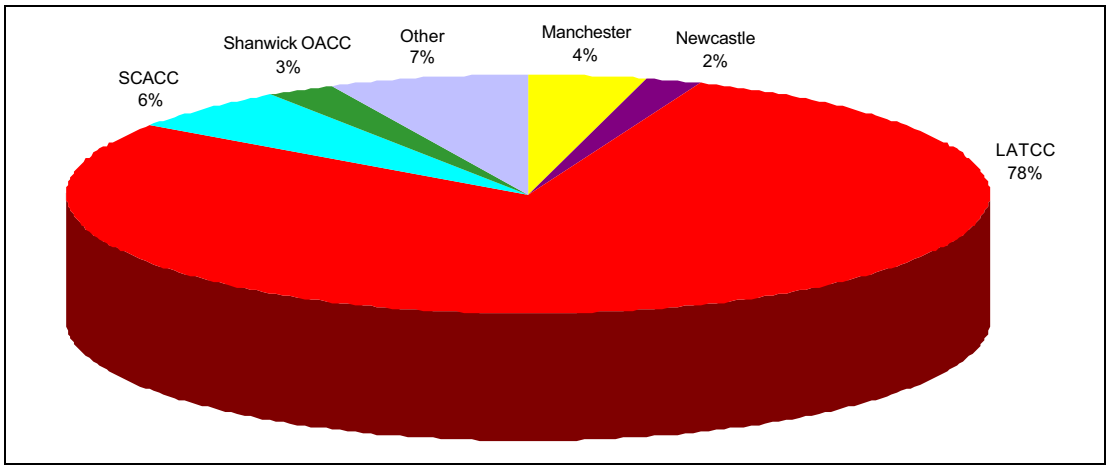


Figure 5 Percentage of reports shown by ATSUs

3.1.13 Reports by location

The locations of the call sign confusion occurrences are shown below, for all locations which had been reported 5 or more times. It should be noted that due to inconsistent reporting of locations, the list below contains a mixture of sectors, VORs, geographical locations and ATC reporting points.

Daventry	37
Clacton	30
North Sea	24
Dover	23
Manchester	20
Gatwick	15
Hurn	15
Biggin	13
London Upper Sector	13
Heathrow	12
Lakes	12
Lydd	12
Seaford	12
Newcastle	11
North Atlantic	11
Lamborne	10
Ockham	10
Dean Cross	8
Berryhead	6
Aberdeen	5
Bovingdon	5
Bristol	5
Cowly	5
Glasgow	5
Luton	5
MARGO	5
Stansted	5

NOTE: These locations account for 334 (69%) of the 482 reported locations.

3.2 Airline analysis

3.2.1 Same airlines

Of the 482 occurrences, 319 (66%) involved confusion (actual or potential) which occurred between call signs of the same airline. The most frequently identified airlines with confusion between their own company call signs (on 5 or more occasions) are listed as follows:

BRITISH AIRWAYS	79
EASY JET	21
BRITISH REGIONAL	18
SABENA	17

KLM	10
AIR CANADA	8
AIR FRANCE	8
AIRTOURS	8
BRITANNIA	8
CROSSAIR	8
RYANAIR	8
UNITED AIRLINES	8
IBERIA	7
SAS	7
AIR UK	6
AMERICAN AIRLINES	6
JERSEY EUROPEAN	6
CITYFLYER	5

3.2.2 UK, Irish and foreign airlines

The airlines involved in the call sign confusion were recorded as being UK, Irish or foreign. Irish airlines were treated separately from foreign airlines because the country is situated within the British Isles and the majority of their flights involve a take off, landing or overflight within UK airspace.

Of the 482 call sign confusion occurrences:

224	(46.5%)	involved **UK** airlines only
164	(34.0%)	involved **foreign** airlines only
29	(6.0%)	involved **Irish** airlines only
49	(10.2%)	involved a combination of **UK** and **foreign** airlines
8	(1.7%)	involved a combination of **UK** and **Irish** airlines
1	(0.2%)	involved a combination of **Irish** and **foreign** airlines
7	(1.4%)	did not contain sufficient information to compare airlines.

When combining UK and Irish airlines, more than half of the occurrences (54.2%) involved airlines from the British Isles only.

3.2.3 Follow-up action

Of the 482 occurrences, 39 (8%) resulted in known or recorded follow-up action by the airlines and 5 (13%) of these occurrences were allocated severity grades of **A** or **B**.

Of the 482 occurrences, 32 were reported to be regular problems. Only one of these occurrences has resulted in known or recorded action by the airline, although it is recognised that there is no routine method of reporting follow-up action.

3.2.4 Comparison of airlines

In any call sign confusion occurrence, an airline may have featured only once or several times. It is possible that the confusion existed between two or more aircraft of the same airline, and many airlines featured regularly in the 482 occurrences. The airlines have been compared in the Appendices, by determining the average number of flights between call sign confusion occurrences. This comparative measure was calculated by relating the number of times each airline was involved in a call sign confusion occurrence, with the annual number of flights by that airline which operated in UK airspace.

The airlines which featured repeatedly in the 482 call sign confusion occurrences are listed in Appendix G1. The airlines which featured regularly in the 175 MORs involving call sign confusion are listed in Appendix G2. Of the 72 occurrences involving a severity grade of **A** or **B**, several airlines were involved on frequent occasions – these are listed in Appendix G3.

3.3 Call sign analysis

A call sign is composed of a 3 letter prefix (i.e. the airline designator) and a suffix which can contain up to 4 characters.

3.3.1 Numeric v. alphanumeric

A numeric call sign is one where the suffix consists of numbers only. An alphanumeric call sign is one where the suffix consists of number(s) followed by one or more letters. Of the 482 call sign confusion occurrences:

405 (84%) involved **numeric** only call signs.

51 (10%) involved **alphanumeric** only call signs.

17 (4%) involved a combination of **alphanumeric** and **numeric** call signs.

9 (2%) of occurrences did not contain sufficient information to compare call signs.

Of the 72 occurrences which were allocated severity grades of A or B, the distribution changed as follows:

66 (92%) involved **numeric** only call signs.

6 (8%) involved **alphanumeric** only call signs.

0 (0%) involved a combination of **alphanumeric** and **numeric** call signs.

3.3.2 Similar and identical call signs

Of the 482 occurrences, there were 128 (27%) involving call signs with the same characters, in exactly the same order were as follows (for example 371 and 371):

NOTE: these airlines include UK, Irish and foreign airlines

Same airline = 10 (2%)

Different airlines = 118 (24%)

The most common identical call sign suffixes were all numerical as follows:

101 202 333 37 837 762 924

Of the 482 occurrences:

198 (41%) involved call signs ending with the same **2 numerical characters**

11 (2%) involved call signs ending with the same **2 alphanumeric characters** (these could be two letters such as AB or a number and a letter such as 3C)

110 (23%) involved call signs ending with the same **single number**

23 (5%) involved call signs ending with the same **single letter**

Of the 482 occurrences, those involving call signs with the same characters, but in a different order were as follows (for example 371 and 317):

Same airline = 51 (11%) Different airlines = 8 (2%)

Of the 1011 **call signs** involved in the 482 occurrences

41 (4%) call signs ended in '0' 61 (6%) call signs ended in '5'

98 (10%) of the 1011 **call signs** ended in a single letter as follows:

A	32	G	5	P	3
B	10	H	5	R	3
C	9	J	3	T	3
D	5	K	6	X	4
E	5	N	3	Z	1
F	1				

3.3.4 Multiple characters

Several call sign suffixes involved consecutive double and triple characters (i.e. 533, 444 or 2884):

Multiple character	Number of call signs
111	5
333	14
444	2
555	7
00	12
11	31
22	30
33	24
44	17
55	15
66	10
77	11
88	32
99	6

3.3.5 Airline allocation of call signs

In order to compare the composition of call signs involved in occurrences, the proportions of call signs allocated by the majority of UK airlines are shown below, split into numeric and alphanumeric:

AIRLINE	NUMERIC CALL SIGN	ALPHANUMERIC CALL SIGN
AIRTOURS	YES	NO
AIR 2000	YES	NO
AIR UK	YES	NO*
AIRWORLD	YES	NO
AURIGNY	YES	NO
BOND HEL	NO	YES
BRISTOW HEL	NO	YES
BRITANNIA	NO	YES
BRITISH AIRWAYS	YES (60%)	YES (40%)
BRITISH MEDITERRANEAN	YES	NO
BRITISH MIDLAND	YES (45%)	YES (55%)
BRITISH WORLD	YES	NO
BRITISH REGIONAL	YES (95%)	YES (5%)
BRYMON	NO	YES
BUSINESS AIR	YES (85%)	YES (15%)
CALEDONIAN	YES	NO
CHANNEL EXPRESS	YES	NO
CITYFLYER	NO	YES
DEBONAIR	YES	NO
EUROPEAN AIR CHARTER	YES	NO
EASY JET	YES	NO
EMERALD	YES	NO
FLIGHTLINE	YES	NO
FLYING COLOURS	YES	NO
GB AIRWAYS	NO	YES
GILLAIR	YES	NO
GO	YES	NO
HEAVYLIFT	YES	NO
JERSEY EUROPEAN	YES	NO
LEISURE INTERNATIONAL	YES	NO
LOGANAIR	YES	NO
MAERSK	YES	NO
MANX	YES	NO

MONARCH	YES	NO
SABRE	YES	NO
TITAN	YES	NO
TNT	NO	YES
VIRGIN ATLANTIC	YES	NO

EIRE

AER LINGUS	YES (89%)	YES (11%)
RYANAIR	YES (90%)	YES (10%)

NOTE: During the study period the majority of UK airlines were still using numeric only call sign suffixes, although several airlines had begun to adopt alphanumeric call sign suffixes.

3.4 **Comparison with AIC 112/1996**

The results of the study have been compared with the guidelines in AIC 112/1996 in order to highlight the problem areas. Several of the guidelines on call sign allocation in the AIC were substantially supported by data from this study:

'Avoid use of similar numerical call signs within own company'

- 66% of occurrences involved confusion which occurred between call signs of the same airline

'Try to minimise use of call signs involving four digits and wherever possible use no more than three digits'

- 30% of call sign suffixes had 4 or more characters

'Avoid multiple use of the same digit'

- 21% of call sign suffixes had consecutive double or triple characters (i.e. 533, 2884, 111)

'Consider a balance of alphanumeric and numeric call signs'

- 84% of occurrences involved only numeric call sign suffixes, whilst a further 10% involved only alphanumeric call sign suffixes

'Avoid use of similar / reversed digits / letters in alphanumeric call signs...'

- 26% of occurrences involved confusion between identical call sign suffixes (i.e. 371 and 371)
- 13% of occurrences involved confusion between call sign suffixes with the same characters but in a different order (i.e. 371 ands 317)

Many of the other AIC guidelines were supported by data from this study, although some issues raised in the data were not reflected in the AIC.

The study also recognised that it is practically impossible for individual airlines to cross-check with other airlines to co-ordinate call sign use, resolve any similarities and appreciate the impact of their call signs on other users and ATC service providers. This situation lends credence to the need for a central ATC agency or cell dedicated to this task.

4 Summary of Results

The ACCESS call sign confusion study of call sign confusion reports, submitted to the CAA in 1997, has enabled a focused and detailed analysis of this unresolved safety issue. It has also, for the first time, enabled an attempt at measuring the scale of the problem in UK airspace.

4.1 General analysis

Following the initial analysis of the 1997 safety study, published in a DataPlus article (ref.5 and Appendix E), the detailed analysis has been completed and presented in this paper.

- Of the 482 occurrences analysed, 45% involved actual confusion.
- 89% of actual confusion reports occurred in either the climb, descent or cruise phases of flight.
- 3 occurrences involved loss of prescribed ATC separation, and a further 69 occurrences involved some deviation from operating procedures.
- 73% of occurrences involved an increase in ATC workload.
- Most occurrences took place between 0600 and 1759hrs.
- The majority of occurrences took place in TMA or UARs.
- One occurrence involved an AIRPROX report.
- 7 occurrences involved a level bust by one of the aircraft involved.
- Nearly 80% of occurrences took place in LATCC airspace.
- 66% of occurrences involved 2 or more call signs of the same airline.
- Nearly half of the occurrences involved UK airlines only, and a third involved foreign airlines only.
- When combining UK and Irish airlines, more than half of the occurrences (54.2%) involved airlines from the British Isles only.

4.2 Call sign analysis

- 84% of the occurrences involved only numeric call signs, and 10% involved only alphanumeric call signs.
- 27% involved 2 or more identical call sign suffixes.
- 41% involved call signs ending with the same 2 numerical characters, whilst only 2% involved call signs ending in the same 2 alphanumeric characters (these could be two letters such as AB, or a number and a letter such as 3C).
- 23% involved call signs ending with the same single number, whilst 5% involved call signs ending in the same single letter.
- Of the 72 occurrences with severity grades A or B, 92% involved only numeric call signs.
- Whilst the majority of UK airlines are still using only numeric call sign suffixes, several airlines have adopted alphanumeric call sign suffixes.

4.3 Conclusions

The ACCESS group concluded that call sign confusion is a safety problem which can affect safe and expeditious operations in UK airspace. Many of the issues raised in the previously issued AIC were supported by data from this study, although the AIC

did not cover all of the issues found during the study. However, it was felt that a revised AIC should be published incorporating some of the additional lessons learned from the study. Additionally, it was felt that the ACCESS final report could form the basis of a CAP and be distributed to industry to act as a permanent guide for RTF call sign matters.

It was also concluded that as it is practically impossible for individual airlines to allocate their own call signs in isolation, a call sign confusion cell should be established by the NATS, as major ATC service provider, to assist with this matter and to act as a monitor and mediator into airline RTF call sign problems in UK airspace.

5 Recommendations

In order to identify, rectify and provide permanent guidance on call sign related problems, the ACCESS group made three recommendations as follows:

i) CAA should issue a revised Call Sign Confusion AIC (to replace AIC 112/1996) based on the results of the ACCESS study analysis.

CAA Response. The CAA accepted this recommendation. A revised Call Sign Confusion AIC based upon the results of the published ACCESS Study will be issued in mid 2000.

ii) NATS should form a dedicated cell to identify and rectify call sign related problems on a day to day basis.

NATS Response. 'NATS accepts this recommendation in part. NATS is actively exploring ways to use technology to meet the objectives of the recommendation. However, in the short to medium term, with the support of the Regulator, NATS will continue to emphasise the use of good RTF discipline.'

iii) CAA publish the ACCESS report and distribute it to all airlines operating regularly in UK airspace to act as a permanent hand book guide for RTF call sign matters.

CAA Response. The CAA accepted this recommendation. The ACCESS report will be published and distributed to all airlines operating regularly in UK airspace.

References

1 Civil Aviation Authority (1996) 'Call Sign Confusion'*, Aeronautical Information Circular 112/1996,* 3 December, London.

2 Civil Aviation Authority (1996) *'The Mandatory Occurrence Reporting Scheme'*, CAP 382, June 1996, London.

3 National Air Traffic Services (1998) *'Traffic Statistics – Quarterly Report on NATS Units'*, January 1998.

4 National Air Traffic Services (1998) *'UK Flight Database'*, London.

5 Civil Aviation Authority (1998*) 'Call Sign Confusion – Initial Analysis of the 1997 Safety Study'*, DataPlus 98/DP1, May 1998, Gatwick.

6 Civil Aviation Authority (1998*) 'UK Airlines – Annual Operating, Traffic and Financial Statistics 1997'* CAP 687, London.

Appendices

A Call sign construction (Extract from ICAO Annex 10, Chapter 5)

B1 Visual Confusion - Flight Progress Strips (FPS)

B2 Visual Confusion - Radar displays

C Aeronautical Information Circular 112/1996

D ACCESS report form

E DataPlus 98/DP1

F Extract from AIRPROX(C) report 8/97

G1 Airline comparison for all 482 occurrences

G2 Airline comparison for 175 MOR occurrences

G3 Airline comparison for 72 occurrences with severity grade A or B

Note for Appendices G1, G2 and G3:

1 The data reflects the number of times the airline has been involved in call sign confusion occurrences - an airline may feature more than once in any occurrence. For example, if an occurrence involved confusion between three call signs, two of which were British Airways and the third was a Crossair call sign, then British Airways would be counted twice and Crossair would be counted once.

2 The source of the stage flight statistics (as defined in para 2.2) was the UK Flight Database maintained by NATS (ref.4).

3 Caledonian includes Air Atlanta.
European Air Transport includes DHL.
City Jet includes City Ireland.
Maersk includes the British and Danish airlines.
Easy Jet includes Air Foyle.
Manx Airlines has been included as a UK airline in this study.

4 UK airlines are shown in **bold blue text**, Irish airlines are shown in ***bold italic text*** and the remainder are foreign airlines.

Appendix A Call Sign Construction

(EXTRACT FROM ICAO ANNEX 10, CHAPTER 5)

5.2.1.6 **Calling**

5.2.1.6.1 ***Radiotelephony call signs for aeronautical stations***

5.2.1.6.1.1 Aeronautical stations in the aeronautical mobile service shall be identified by:

a) the name of the location, and

b) the unit or service available.

5.2.1.6.1.2 The unit or service shall be identified in accordance with the table below except that the name of the location or the unit/service may be omitted provided satisfactory communication has been established.

Unit/service available	Call sign suffix
area control centre	CONTROL
approach control	APPROACH
approach control radar arrivals	ARRIVAL
approach control radar departures	DEPARTURE
aerodrome control	TOWER
surface movement control	GROUND
radar (in general)	RADAR
precision approach radar	PRECISION
direction-finding station	HOMER
flight information service	INFORMATION
clearance delivery	DELIVERY
apron control	APRON
company dispatch	DISPATCH
aeronautical station	RADIO

5.2.1.6.2 ***Radiotelephony call signs for aircraft***

5.2.1.6.2.1 ***Full call signs***

5.2.1.6.2.1.1 An aircraft radiotelephony call sign shall be one of the following types:

Type a) the characters corresponding to the registration marking of the aircraft; or

Type b) the telephony designator of the aircraft operating agency, followed by the last four characters of the registration marking of the aircraft;

Type c) the telephony designator of the aircraft operating agency, followed by the flight identification.

Note 1 – The name of aircraft manufacturer or name of aircraft model may' be used as a radiotelephony prefix to the Type a) call sign above (see Table 5-1).

Note 2 – The call signs referred to in a), b) and c) above comprise combinations in accordance with the JTU Radio Regulations (No.2129 and No.2130).

Note 3 – The telephony designators referred to in b) and c) above are contained in ICAO Doc 8585 - Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services.

Note 4 – Any of the foregoing call signs may be inserted infield 7 of the ICAO flight plan as the aircraft identification. Instructions on the completion of the flight plan form are contained in PANS-RA C, Doc 4444.

5.2.1.6.2.2 ***Abbreviated call signs***

5.2.1.6.2.2.1 The aircraft radiotelephony call signs shown in 5.2.1.6.2.1.1 above, with the exception of c), may be abbreviated in the circumstances prescribed in 5.2.1.6.3.3.1 below. Abbreviated call signs shall be in the following form:

Type a) the first character of the registration and at least the last two characters of the call sign;

Type b) the telephony designator of the aircraft operating agency, followed by at least the last two characters of the call sign;

Type c) no abbreviated form.

Note: Either the name of the aircraft manufacturer or the aircraft model may be used in place of the first character in Type a) above.

5.2.1.6.3 ***Radiotelephony procedures***

5.2.1.6.3.1 An aircraft shall not change the type of its radiotelephony call sign during flight, except temporarily on the instruction of an air traffic control unit in the interests of safety.

5.2.1.6.3.1.1 Except for reasons of safety no transmission shall be directed to an aircraft during take-off, during the last part of the final approach or during the landing roll.

Table 5-1 Examples of full call signs and abbreviated call signs
(see 5.2.1.6.2.1 and 5.2.1.6.2.2)

		Type a)		**Type b)**	**Type c)**
Full call sign	*N 57826*	*CESSNA*[1] FABCD	*CITATION*[1] FABCD	VARIG PVMA	*SCANDINAVIAN* 937
Abbreviated call sign	N26	CESSNA CD	CITATION CD	VARIG MA	(no abbreviated form)
		or	or	or	
	N826	CESSNA BCD	CITATION BCD	VARIG VMA	

1. Examples illustrate the application of Note 1 to 5.2.1.6.2.1.1.

5.2.1.6.3.2 ***Establishment of radiotelephony communications***

5.2.1.6.3.2.1 Full radiotelephony call signs shall always be used when establishing communication. The calling procedure of an aircraft establishing communication shall be in accordance with Table 5-2.

5.2.1.6.3.2.2 **PANS**.– *Stations having a requirement to transmit information to all stations likely to intercept should preface such transmission by the general call ALL STATIONS, followed by the identification of the calling station.*

Note: No reply is expected to such general calls unless individual stations are subsequently called to acknowledge receipt

5.2.1.6.3.2.3 The reply to the above calls shall be in accordance with Table 5-3.

5.2.1.6.3.2.4 **PANS.**– *When a station is called but is uncertain of the identification of tile calling station, it should reply by transmitting the following:*

STATION CALLING . . . (*station called*) SAY AGAIN YOUR CALL SIGN

Note: The following example illustrates the application of this procedure:

(*CAIRO station replying*)

STATION CALLING CAIRO (*pause*) SAY AGAIN YOUR CALL SIGN

5.2.1.6.3.2.5 Communications shall commence with a call and a reply when it is desired to establish contact, except that, when it is certain that the station called will receive the call, the calling station may transmit the message, without waiting for reply from the station called.

5.2.1.6.3.2.6 Interpilot air-to-air communication shall be established on the appropriate air-to-air frequency by either a directed call to a specific aircraft station or a general call, taking into account conditions pertaining to use of this channel.

Note: For conditions on use of air-to-air channels see Annex 10, Volume V.4.1.3.2.1, also Volume II, 5.2.2.l.l.4.

5.2.1.6.3.2.6.1 **PANS**.– *As the aircraft may be guarding more than one frequency, the initial call should include an indication of the air-to-air frequency and/or distinctive channel identification "INTERPILOT".*

Note: The following examples illustrate the application of these calling procedures.

CLIPPER 123 - SABENA 901 - INTERPILOT - DO YOU READ

or

ANY AIRCRAFT VICINITY OF 30 NORTH 160 EAST -JAPANAIR 401 - INTERPILOT 128.95- OVER

5.2.1.6.3.3 ***Subsequent radiotelephony communications***

5.2.1.6.3.3.1 Abbreviated radiotelephony call signs, as prescribed in 5.2.l.6.2.2 above, shall be used only after satisfactory communication has been established and provided that no confusion is likely to arise. An aircraft station shall use its abbreviated call sign only after it has been addressed in this manner by the aeronautical station.

5.2.1.6.3.3.2 After contact has been established. continuous two-way communication shall be permitted without further identification or call until termination of the contact.

5.2.1.6.3.3.3 In order to avoid any possible confusion, when issuing ATC clearances and reading back such clearances, controllers and pilots shall always add the call sign of the aircraft to which the clearance applies.

Table 5-2 Radiotelephony calling procedure[1] (see 5.2.1.6.3.2.1)

	Type a)	Type b)	Type c)
Designation of the station called	NEW YORK RADIO	NEW YORK RADIO	NEW YORK RADIO
Designation of the station calling	GABCD[2]	SPEEDBIRD ABCD[2]	AEROFLOT 321[2]

1. In certain cases where the call is initiated by the aeronautical station, the call may be effected by transmission of coded tone signals.

2. With the exception of the telephony designators and the type of aircraft, each character in the call sign shall be spoken separately. When individual letters are spelled out, the radiotelephony spelling alphabet prescribed in 5.2.1.2 shall be used. Numbers are to be spoken in accordance with 5.2.1.3.

Table 5-3 Radiotelephony reply procedure (see 5.2.1.6.3.2.3)

	Type a)	Type b)	Type c)
Designation of the station called	GABCD[1]	SPEEDBIRD ABCD[1]	AEROFLOT 321[1]
Designation of the answering station	NEW YORK RADIO	NEW YORK RADIO	NEW YORK RADIO
Invitation to proceed with transmission	GO AHEAD	GO AHEAD	GO AHEAD

1. With the exception of the telephony designators and the type of aircraft, each character in the call sign shall be spoken separately When individual letters are spelled out, the radiotelephony spelling alphabet prescribed in 5.2.1.2 shall be used. Numbers are to be spoken in accordance with 5.2.1.3.

5.2.1.6.3.4 Indication of transmitting frequency

5.2.1.6.3.4.1 **PANS**.- *As the aeronautical station operator generally guards more than one frequency the call should be followed by an indication of the frequency used, unless other suitable means of identifying the frequency are known to exist.*

5.2.1.6.3.4.2 **PANS**.– *When no confusion is likely to arise, only the first two digits of the High Frequency (in kHz) need be used to identify' the transmitting channel*

Note: The following example illustrates the application of this procedure:

(PAA 325 calling Kingston on 8 871 kHz)

KINGSTON CLIPPER THREE TWO FIVE - ON EIGHT EIGHT

5.2.1.6.3.4.3 **PANS**.– Wherever VHF communications channels are separated by 25 kHz, only the first 5 digits should be used to identify' the transmitting carrier frequency in radiotelephony communications. Not more than two significant digits after the decimal point are used. In the case of these being two zeros, a single zero is considered significant.

Note: The following examples illustrate the application of this procedure:

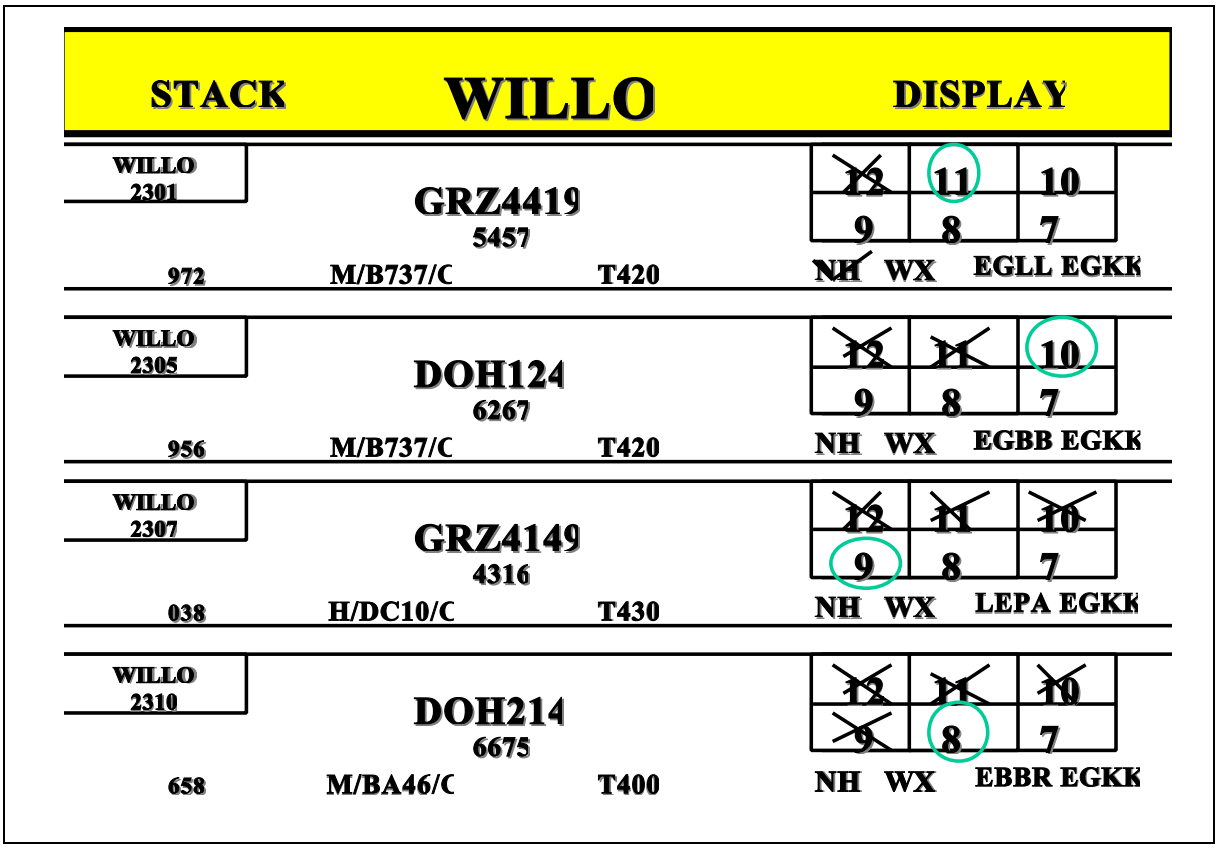
Channel Transmitted as

118.000 ONE ONE EIGHT DECIMAL ZERO
118.025 ONE ONE EIGHT DECIMAL ZERO TWO

Appendix B1 Visual Confusion- Flight Progress Strips

The figure below is a typical representation of a controller's flight progress strip (FPS) display - in this case, the WILLO Holding Stack FPS bay on the Gatwick Intermediate Director's Sector in the LATCC Terminal Control Room is displayed.

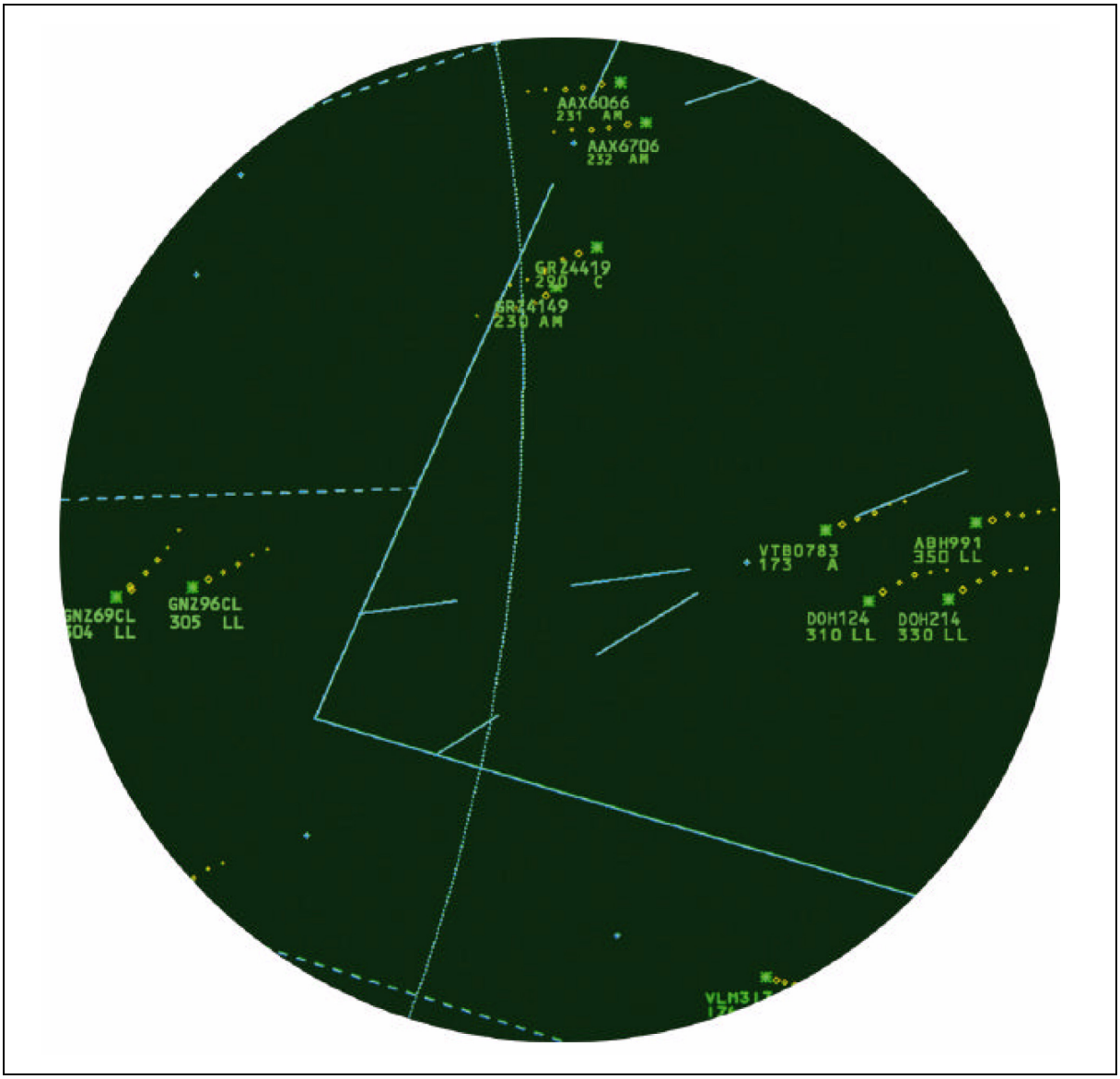
This set of hypothetical aircraft strips, with similar RTF call sign prefix letters and suffix numbers, demonstrates the visual call sign confusion aspect faced by controllers.



Appendix B2 Visual Confusion - Radar Displays

The radar picture below, is a view of a typical LATCC Sector display showing the visual call sign confusion problems faced by radar controllers. It gives a graphic example of the type of actual confusion or potential confusion that can arise. Whilst aircraft using similar designator letter groups in the call sign prefix, it is the use of the same, similar or, combinations of the same numbers/letters in the call sign suffix, that is most likely to mislead a radar controller.

NOTE: The sets of similar call signs displayed are not currently in use as airline designators.



Appendix C Aeronautical Information Circular 112/1996

Call Sign Confusion

1 Introduction

1.1 The Civil Aviation Authority, National Air Traffic Services Ltd and some Airline Operators have become increasingly concerned about the problems that result from the similarity of airline RTF call signs, which often give rise to both potential and actual flight safety incidents. Furthermore, a 1991 Joint AIRPROX Assessment Panel Safety Recommendation suggested that there should be a central system for the control and allocation of airline RTF call signs to help avoid the ambiguity and confusion.

1.2 However, it has been difficult to quantify the extent to which confusion caused by similar RTF call signs has contributed to incidents or, if left unchecked, may have caused an incident. The UK CAA Mandatory Occurrence Reporting Scheme (MORS) database contains many reports from Controllers and Flight Crew highlighting the problems associated with call sign confusion. Whilst this has established that there are definite safety implications resulting from call sign confusion, a dedicated study has not been conducted.

1.3 Based on the success of the Level Violations Study of 1994, which utilised the MOR scheme, it has been decided to conduct a similar study during 1997. Flight Crew and Controllers will be encouraged to file reports when it is considered there has been actual or potential confusion caused by similar RTF call signs. A report should only be submitted when it is thought that this confusion has, or could have, compromised aviation safety.

1.4 The terms of this Circular are only applicable to aircraft operating on a company/airline call sign within Controlled Airspace.

1.5 The trial will be known as the Aircraft Call sign Confusion Evaluation Safety Study (ACCESS). The objective of the study will be to collect reliable data that can be collated against a measured time scale, to ascertain the magnitude of the problem, and confirm that those categories identified in previous reports as causing most confusion are still relevant. It will enable Operators, Flight Crew and Controllers to focus attention and awareness on structure, format and use of the RTF call sign systems. It may also help determine whether there is a need for a central system for controlling and allocating call signs.

1.6 The results of the study may enable further action to be taken to reduce the number of safety related occurrences which can be directly attributed to aircraft call sign confusion. A report detailing the conclusions drawn and the recommended course of action will be published and made available to Airline Operators and ATS units at the termination of the trial. However, before the study commences, all those concerned should note the following points which could help to reduce the incidence of call sign confusion.

2 Airline Operators (AO)

2.1 When allocating call signs AOs are requested (in accordance with ICAO Annex 10 and Doc 8585) to:

a) Avoid use of similar numerical call signs within own company;

b) Co-ordinate advance planning, whenever possible, with other Operators (ideally prior to commencement of summer and winter season) to reduce to a minimum any similar numeric and alphanumeric elements of call signs;

c) After implementation ensure there is a tactical response system to review and amend call signs where necessary;

d) Consider starting flight number element sequences with a higher number e.g. 6 and above;

e) Try to minimise use of call signs involving four digits and wherever possible use no more than three digits;

f) Avoid multiple use of the same digit e.g. ABC555;

g) Exhaust numerical possibilities first, before using alphanumeric call sign systems. If alphanumeric call signs are inevitable, co-ordinate letter combination with existing operators, taking into account all other airspace and airport users;

h) Try to avoid using alphanumeric call signs which correspond to the last two letters of the destination's ICAO location indicator e.g. ABC 96LL for a flight inbound to London Heathrow where the ICAO indicator is EGLL;

i) Consider a balance of alphanumeric and numeric call signs;

j) Consider a more random system of RTF call sign/flight number allocation different from the allocated aircraft commercial flight schedule number e.g. Operator ticket/ flight number AB 555 RTF Call sign ABC 5LF;

k) If similar numbered call signs are inevitable, allow a significant time and/or geographical split between aircraft using similar call signs;

l) When useful capacity in the allocation of flight number and/or alphanumeric call signs has been reached, consider applying for and using a second company call sign designator e.g. 'Shuttle';

m) Ensure user airport information systems can cope with conversion of RTF call signs (for ATC use) back to commercial flight numbers for passenger and airport use;

n) Avoid, whenever practicable, flight numbers ending in a zero or five e.g. 5 may be confused visually with S and zero, when combined with two digits, i.e. 150, may be confused with a heading/level;

o) Avoid use of similar/reversed digits/letters in alphanumeric call signs e.g. ABC 87MB and ABC 78BM;

p) In alphanumeric call signs avoid phonetic letters that can be confused with another operator designator prefix e.g. D - Delta (The Airline).

3 Flight Crew

3.1 If in doubt about an ATC instruction, do not use readback for confirmation.

3.2 Positively confirm instructions with ATC if any doubt exists between flight crew members.

3.3 Avoid use of flight deck speaker especially during times of high RTF loading.

3.4 Do not clip transmissions.

3.5 Confirm unexpected instructions for any particular stage of flight.

3.6 Advise ATC if it is suspected that another aircraft has misinterpreted an instruction. ATC may be unaware of this fact.

3.7 Exercise particular caution when members of the Flight Crew are involved in other tasks, and may not be monitoring the RTF.

3.8 At critical stages of flight actively monitor ATC instructions and compliance with them.

3.9 Use full RTF call sign at all times.

3.10 Use correct RTF procedures and discipline at all times.

4 Controllers

4.1 Exercise particular caution when language difficulties may exist.

4.2 Advise adjacent sectors/airports if it is felt that potential confusion may exist between aircraft likely to enter their airspace.

4.3 The similarity of some aircraft call signs on the same frequency can cause confusion which may lead to an incident. Controllers are to warn pilots concerned and, if necessary, instruct one or both aircraft to use alternative call signs while they are on the frequency. Manual of Air Traffic Services - MATS Part 1 Appendix E Page E-6 refers.

4.4 Do not Clip transmissions.

4.5 Do not use readback time to execute other tasks.

4.6 Ensure clearances are readback correctly.

4.7 Monitor flight crew compliance with RTF call sign use.

4.8 Use correct RTF discipline at all times.

5 Data Submission for Study

5.1 Airline Operators

5.1.1 Airline Operators will continue to submit reports on call sign confusion incidents which meet MOR criteria in the normal way. In addition they are invited to submit all other reports relating to call sign confusion after the end of each calendar month.

5.2 Flight Crew

5.2.1 Flight Crew are requested to use company Air Safety or other designated report forms where applicable, or standard CA1671 MOR forms submitted to their operators in accordance with standard company procedure.

5.3 **Controllers**

5.3.1 Controllers are requested to use either the standard CA1261 report form or the dedicated NATS abbreviated call sign confusion version where available, submitted to the SDD in accordance with standard procedure.

6 Information

6.1 To ensure the success of the survey, all reports should contain the following information and be forwarded to Safety Data Unit 3, Safety Data Department, Aviation House, London Gatwick Airport, West Sussex, RH6 0YR. Fax: 01293-573972.

- Call signs of aircraft concerned;
- aircraft type;
- date and time in UTC;
- sector or geographical location;
- RTF frequency;
- phase of flight;
- was there actual confusion and for whom?
- was there a high risk of potential confusion, and why?
- where actual call sign confusion occurred, what were the safety implications? e.g. Conflict Alert (TCAS/STCA);
- loss of separation;
- increased Workload;
- did any AO/ATC remedial action result?

6.2 This Circular will become effective from 1 January 1997 and it is anticipated to be current for a period of one year.

Appendix D Access Report Form

Categories of Confusion (Fill in or circle boxes in pen as required.)

Actual Confusion (To Whom) **High Risk of Potential Confusion** (Why)

2 Occurrence Position Sector \ Geographical Location.		3 FL/Alt/Ht	4 Date		5 Time - UTC	6 Day / Night	
Operator	Callsign/Reg	Type	From	To	SSR Code	Mode C Displayed	
7	8	9	10	11	12	13 Yes No	
15	16	17	18	19	20	21 Yes No	
23	24	25	26	27	28	29 Yes No	
31 RTF Frequencies							34 Runway In Use
35 Class of Airspace			36 Type of Service			Phase of Flight	
A B C D E F G	CTR\CTA\CTZ\TMA ADR\ATZ\UIR\		Control \ Advisory \RAS\RIS\FIS				
		40 Collision / Conflict Alert / TCAS / STCA / SMF			Increased Workload Yes No		
43 Narrative							
44 Name	45 On Duty as		46 Location				
Action Taken	51 Other Agencies Advised CA 1262 Action		52 Sign/Date			53 Address / Telephone	

Appendix E Dataplus 98/DP1

May 1998

Callsign Confusion

Initial Analysis of the 1997 Safety Study

1 Introduction

The Aircraft Callsign Confusion Evaluation Safety Study (ACCESS) has finished collecting the callsign confusion data for 1997, and has also raised operator, pilot and controller awareness. The results of the detailed analysis should be available for publication in July/August 1998 for consideration and follow-on action by SRG, NATS, Eurocontrol and the airline industry. In the interim the results of the initial analysis were as follows:

In 1997, 5,625 Mandatory Occurrence Reports (MORs) were recorded on CAA's MORS database, of which 1,499 (27%) were ATC related. Of these 175 (12%) involved callsign confusion.

2 Initial analysis

The ACCESS initiative collected a total of **482** safety reports of callsign confusion in 1997. These were submitted by operators, pilots and controllers, of which:

- **175** (36%) were filed as MORs.
- **307** (64%) were ACCESS reports relating mainly to the potential safety aspects of callsign confusion which did not fit the stricter reporting criteria for MORs.
- **217** (45%) involved actual confusion of any party, including 99 where ATC were actually confused.
- **353** (73%) involved increased reported controller workload by reducing controllers' thinking time, and increasing RTF usage time.

3 Operator analysis

For analysis purposes, operators were divided into UK, Irish and Foreign groupings. Of the 482 callsign confusion reports:

- **319** (66%) involved confusion (actual or potential) which occurred between callsigns of the same operator.
- **223** (46%) involved solely UK operators, **173** (36%) involved solely foreign operators, and **22** (5%) involved solely Irish operators.
- **64** (13%) of the reports involved a combination of operator origins.

4 Callsign analysis

- **405** (84%) involved only **numeric** callsigns.
- **50** (10%) involved only **alphanumeric** callsigns.
- **17** (4%) involved a combination of alphanumeric and numeric callsigns.
- **10** (3%) of the reports did not contain sufficient information to compare callsigns.
- **134** (28%) involved two or more identical callsign suffixes, of which 3 were alpha-numeric and the remainder were numeric callsigns. The most common identical callsign suffixes were:

101 202 333 37 837 762 924

5 Scale of the Problem

In an attempt to measure the scale of the callsign confusion problem, it has been compared with another ATC related safety problem of similar importance and magnitude - level violations. There were 251 MORs involving level violations in 1997, compared with 175 MORs involving callsign confusion. In addition, the 307 ACCESS reports have been included. The report rates for both level violations and callsign confusion, measured against total aircraft movements in UK airspace, are shown in Figure 1:

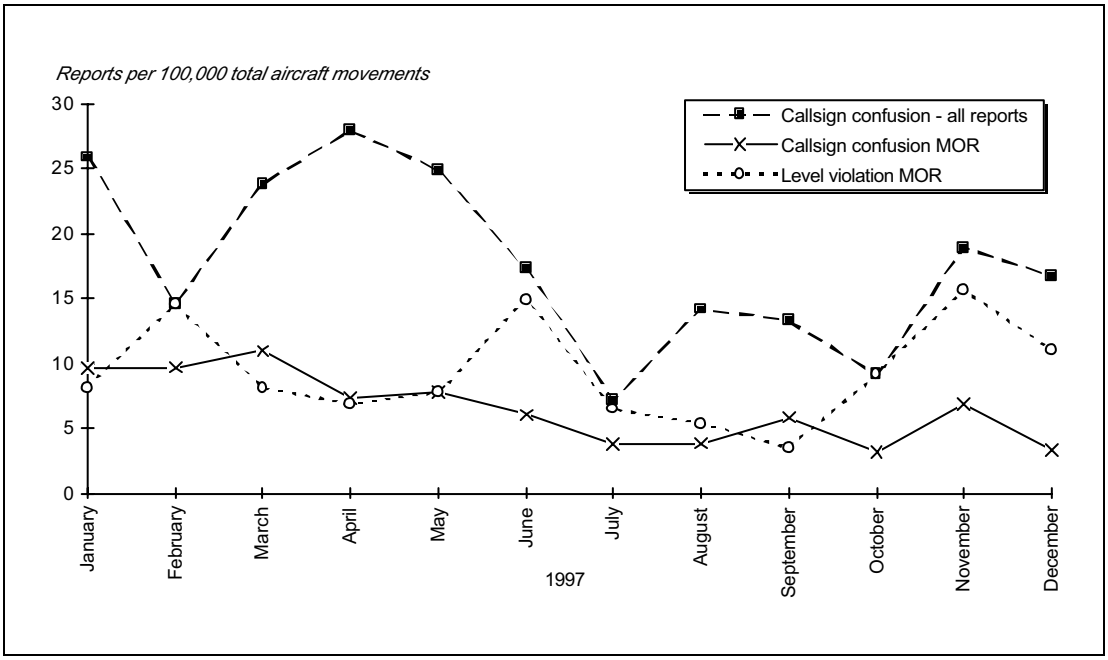


Figure 6 Comparison of Report Rates for Callsign Confusion v. Level Violations

Source of total aircraft movements: Traffic Statistics - Quarterly Report on NATS Units, NATS, January 1998.

6 Next Step

The next step is a detailed analysis of the callsign confusion reports received in 1997. In addition, it is recommended that companies continue to monitor callsign confusion reports within their internal reporting scheme and tackle any in-house issues accordingly.

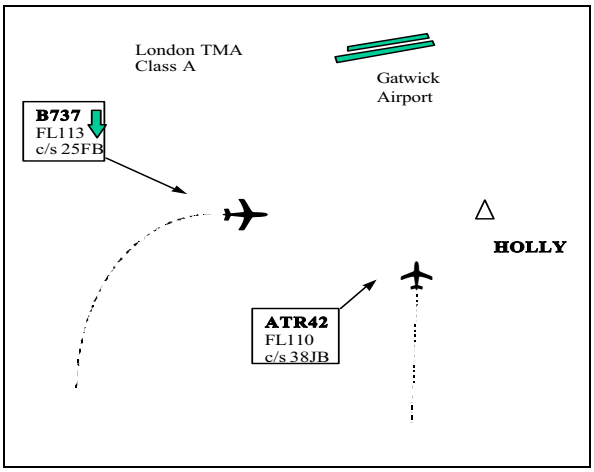
It should be noted that in cases of conflicting callsigns, crews may be requested by ATC to use their aircraft registration instead.

Subject to the findings and any recommendations from the ACCESS Group, NATS and SRG will continue to work with the industry to help address this problem.

7 ACCESS report collection

All reporters should note that the collection of reports for the ACCESS study finished on 31 December 1997. From now on, only callsign confusion reports which fit the MOR reporting criteria should be submitted to the CAA.

Appendix F Extract from Airprox (C) Report 8/97



Occ No. 97/00977

Date: 3 Mar 97

Time: 1340 UTC

Aircraft: ATR42 (callsign 38JB)/B737 (callsign 25FB)

Operators: British Airlines

Position: 4nm South West of MID

ALT/HT/FL: FL110

Airspace Type: London TMA - Class A

Reporter: LATCC - TC South, Ockham/Willo Sector Controller

Reported Separation:
1.5nm horizontal/0 feet vertical

Recorded Separation:
1.28nm horizontal/500 feet vertical

THE INCIDENT

The aircraft involved in this occurrence were all inbound to Gatwick. They were an ATR42 inbound from Jersey, a second ATR42 inbound from Guernsey and a B737 inbound from Toulouse. All three aircraft were under control of the London Terminal Control room Ockham and Willo sectors which were bandboxed together.

The two ATR42s belonged to the same operator and therefore used the same company designator in the first element of the callsign. They were all using similar alphanumeric RTF callsigns with two digits in the second element of the callsign (after the airline designator) followed by two letters. All three aircraft shared the common letter 'B' as the last character of the callsign and two of the aircraft were using the sequential numbers 24 and 25.

Work level and traffic loading were assessed as light at the time of the occurrence and the sector controller was a trainee under the supervision of a mentor.

At 1335, ATR42 pilot (callsign 38JB) established RTF contact with the Ockham/Willo sector reporting a radar heading of 035° and was instructed to descend to FL110. A minute later the B737 pilot (callsign 25FB) reported passing FL175 descending to FL130 on a heading of 030°. In his reply the trainee controller acknowledged the call, emphasised the number '2' in the callsign and a few seconds later instructed him to descend to FL110, which was read back correctly by the pilot using his full correct callsign. Shortly afterwards, the pilot of the second ATR42 (callsign 24GB) reported a heading of 040° and was cleared to resume his own navigation to Goodwood VOR. At this point, the mentor had decided to let his trainee formulate his own plan without any input. Had the mentor been operating the sector, his plan would have been to have given further descent to the B737 (25FB) in view of its high speed and rate of descent, and then to issue the pilot with a right turn once vertical separation was established from the ATR42 (38JB).

At 1338.30, the trainee controller instructed the pilot of ATR42 (38JB), *".....Three Eight Juliet Bravo route direct to HOLLY and descend to FL80"*. This call, however, was read back by "Two Four Golf Bravo" the pilot of the other ATR42 (24GB) and whilst the mentor was aware that the original instruction had been addressed to ATR42 (38JB) both he and the trainee

controller missed the readback by the pilot of the wrong ATR42 (24GB). As the pilot of ATR42 (38JB) did not realise the call was addressed to him he did not query the transmission and the flight continued on its heading maintaining FL110. Surprisingly, the pilot of ATR42 (24GB), having read back the routeing and level instructions, did not act upon them and maintained FL130. Immediately following this, the trainee controller made an error when he instructed the pilot of B737 (25FB) to resume his own navigation direct to HOLLY. Although this transmission was initially addressed to the B737 (25FB) the trainee made a further slight error and used the figure 24 in the numerical element of the callsign which he quickly corrected.

At about this time the mentor became distracted from his monitoring task because he was talking to another controller about an aircraft that his trainee may have mis-routed in the Woodley area. This probably explained why the mentor missed the HOLLY routeing instruction given to the B737 which, in the circumstances, was not safe because the trainee had not ensured that vertical separation existed from the ATR42 (38JB) before instructing the B737 (25FB) to turn towards HOLLY and thus dispense with horizontal separation. In the event the resultant turn made by the B737 (25FB) put the aircraft on a conflicting course with the ATR42 (38JB).

At 1339, the trainee controller instructed the pilot of ATR42 (24GB) to descend to FL120 and although there was a slight hesitation before the pilot read back the clearance, he did not query the cleared level even though previously he had acknowledged descent to FL80. Had the pilot queried this subsequent descent instruction, it may have alerted the two controllers to the situation.

Shortly afterwards, having dealt with the problem in the Woodley area, the mentor controller returned his attention to the subject aircraft and noticed that the B737 (25FB) was in a right turn. He scanned the aircraft's flight progress strip (fps) but from his position he could not see if any heading instruction had been annotated on it. He then asked his trainee if he had told the B737 pilot to turn but believed his trainee did not hear the question. In the event, the trainee controller realised the problem and, without prompting, instructed the pilot of ATR42 (38JB) to *"…Three Eight Juliet Bravo descend FL80 - leave FL110 now - turn right heading of er one one zero"*. What followed epitomised the confusion that had occurred earlier between the pilots of these three aircraft, all with similar sounding callsigns, when both the ATR42 (38JB) and the B737 (25FB) pilots replied to the instructions.

By this time the B737 was heading East on a crossing conflicting track to the ATR42 some four miles apart and still descending passing FL113 with the ATR42 still at FL110. The mentor controller realising that this action would not resolve the situation, took control of the frequency and instructed the B737 pilot (25FB) to, *"…two five fox bravo stop your descent now please immediately - avoiding action - stop descent"*. Once again however this instruction was replied to by the wrong aircraft, in this case the pilot of ATR42 (24GB) who replied to the transmission with, "*Who was that?*"

The mentor controller then repeated his call to the B737 (25FB) stating, *"Negative Two Five Fox Bravo stop descent immediately please - avoiding action - traffic twelve o'clock two miles same level"*. After the B737 pilot acknowledged that he was stopping his descent at FL110, the mentor controller realised that ATR42(38JB) was still maintaining FL110 so he instructed the B737(25FB) pilot, *"… Two Five Fox Bravo negative - climb now immediately - climb climb to flight level one two zero immediately"*. By now both aircraft were at FL110 and 1.7nm apart. The B737 then began climbing and without further instruction the ATR42 (38JB) began to descend and turn right. Lateral separation continued to decrease and at 1340.22 reached 1.28nm with 500 feet vertical separation. Standard vertical separation was restored very shortly afterwards.

Whilst all this was happening the other ATR42(24GB) pilot had stopped his descent at FL127 and using callsign ending in **Foxtrot Bravo** asked if he could continue his descent. This time the error was detected by the

mentor controller who replied to the pilot - using his correct callsign ending in GB. The pilot of B737 (25FB) then advised that he was at FL125 not having picked up the cleared level in the climb instruction earlier, and asked what level was required. The mentor instructed him to maintain FL120 and shortly afterwards the pilot of ATR42 (38JB) confirmed that he was passing FL85 for FL80 following which the B737 pilot was cleared to FL90. Shortly afterwards the mentor controller advised the B737 pilot that an AIRPROX had occurred with traffic just below him and that he would be taking appropriate reporting action.

In his written report the B737 pilot stated, *"Descending to FL110 speed 250 kts, ATC issued instruction which was answered by another aircraft to stop descent. Now levelled at 110 - ATC called again to climb immediately to FL120. Autopilot/auto-throttle disconnected and thrust increased immediately. Aircraft climbed to FL125 and then levelled at FL120. Nothing seen throughout due IMC."* *The pilot of the ATR42 (38JB) stated in his written report, "We were on a radar heading 035° at FL110. The first we knew that we were involved was on our descent to FL80 on heading 110°, when we were informed by ATC. I thought that we might have been the other aircraft as we were at FL110 at the time when the B737 was told to level at one one zero then climb to FL120. On getting descent to FL80 I descended at 3500 fpm just in case."* No report was received from the pilot of the second ATR42 (24GB).

SUMMARY

The principal cause of this AIRPROX was the trainee controller who did not use a fail safe separation method whilst positioning the subject aircraft towards HOLLY for their approach to Gatwick. The mentor con-troller did not detect the trainee's error in instructing the B737(25FB) to route to HOLLY which put it into conflict with the ATR42 (38JB) and was therefore not able to challenge his trainee's actions or to take appropriate measures to control the situation before a loss of separation occurred. RTF callsign confusion played a major contributory role in this occurrence which was initiated when the pilot of ATR42 (24GB) replied to the turn and descent clearance addressed to the pilot of ATR42 (38JB) and this readback was not detected by either controller. Indeed the callsign confusion caused all the pilots and the controllers to make errors throughout the incident and immediately afterwards.

Nevertheless it was assessed that although the trainee controller instigated a course of action that was not fail safe, the mentor controller should have been monitoring him closely enough to have realised the situation and been in a position to resolve the conflict. Therefore it was considered that the Ockham sector mentor controller must take full responsibility for the AIRPROX.

REVIEW BY AIRPROX PANEL

1 Discussion

In its collective memory the JAAP could not recall an AIRPROX with so many instances of callsign confusion. Naturally it listened to the RTF recording of the incident and found it just as remarkable as the written account above.

The Panel did not in fact find the three subject callsigns strikingly similar (it has seen worse) but there is no question that they did cause confusion. It was also noticed that the three aircraft had been working on the same frequency before being transferred to the Ockham/Willo sector. The pilots had not, however, become used to the similarity, such as it was, of the callsigns in use. The confusion created by the similarity of RTF callsigns does seem to be contagious in that an error by one person may lead to others also making errors, which is what happened here.

The trainee's instruction to the pilot of ATR42 (38JB) to *"Route direct to HOLLY and descend flight level eight zero"*, was clear and unambiguous but only prompted a very rapid and slightly garbled

response from the pilot of the other ATR42 (24GB) and no compliance with the instruction. Neither did it prompt a query from the pilot of ATR42 (38JB). The controller's very next instruction was to the pilot of B737 (25FB) to also route direct to HOLLY (having already cleared him to descend to FL110 some two minutes earlier). At the time the B737 was passing FL133 and was about 5nm to the North West of ATR42 (38JB). The geometry of the situation provoked a lively discussion between members as to whether the instruction to the B737 pilot would have caused an AIRPROX even if ATR42 (38JB) had turned and descended promptly as instructed. There was no unanimity but the majority view was that the trainee might just have got away with it although, again, the majority thought that the trainee's plan was inherently unsound.

In short, therefore, the JAAP agreed that the incident had been caused when the B737 was directed towards HOLLY in the anticipation that the ATR42 (38JB) was also going to turn and descend. This was not a wise course of action and, additionally, neither the mentor nor trainee detected that the readback came from the wrong aircraft or noticed that the ATR42 (38JB) had neither turned or descended. The latter point confirms that callsign confusion initiated the AIRPROX and must therefore be considered as a major contributory factor.

As a final point, the Panel believed that in the confusion which ensued, the mentor's decisive actions resolved the situation quite quickly. The JAAP Recommendation J91-1 regarding the subject of RTF callsign confusion is still open and, as yet, unresolved. Panel members were pleased to note that there is a fresh initiative underway, instigated by the CAA, to study and analyse safety reports about similar callsigns submitted by pilots and controllers in 1997 It is due to report in 1998.

2 Causal Factors

The mentor controller did not ensure that the trainee provided standard separation between the B737 and ATR42.

3 Risk Classification

C

4 Recommendations

The Panel had no recommendations to make.

Report completion date: 17.02.98

Appendix G1 Airline Comparison for all 482 Occurrences

Airline	Number of flights from/to or over UK	Number of times airline involved in occurrences	Average number of flights between occurrences
SUNWAYS AIRLINES	41	4	10
JARO INTERNATIONAL	188	4	47
EDINBURGH AIR CHARTER	**548**	**8**	**69**
AIR ATLANTA	628	4	157
DENIM AIR	357	2	179
AIR CHINA	368	2	184
GHANA AIRWAYS	386	2	193
BRITISH MEDITERRANEAN	**1,416**	**6**	**236**
AERO LLOYD	485	2	243
AIR EXEL	2,495	10	250
AIR VIA	522	2	261
EASY JET	**12,979**	**47**	**276**
POLAR AIR CARGO	666	2	333
AZZURA AIR	1,370	4	343
EUROPEAN AIRWAYS	**2,465**	**7**	**352**
BRIGHT AIR	718	2	359
CITY JET	***6,170***	***15***	***411***
CANADIAN AIRLINES	2,687	6	448
NORTHWEST AIRLINES	6,742	15	449
CSE AVIATION	**936**	**2**	**468**
TRANSAER	***2,430***	***5***	***486***
SUN-AIR OF SCANDINAVIA	1,054	2	527
MARTINAIR	4,502	8	563
CHAUFFAIR	**1,156**	**2**	**578**
FLYING COLOURS	**5,421**	**9**	**602**
AIR CANADA	10,885	18	605
CROSSAIR	9,945	16	622
SABENA	25,003	40	625
EGYPTAIR	1,255	2	628
AMERICAN AIRLINES	20,064	29	692
CALEDONIAN	**7,723**	**11**	**702**
IBERIA	12,218	17	719
BRITISH REGIONAL	**46,212**	**61**	**758**
UNITED AIRLINES	16,056	18	892
JAPANESE AIR LINES - JAL	1,986	2	993
CONTINENTAL AIRLINES	7,432	7	1,062

Airline	Number of flights from/to or over UK	Number of times airline involved in occurrences	Average number of flights between occurrences
TURKISH AIRLINES	3,208	3	1,069
AIRTOURS	**27,911**	**26**	**1,074**
AIR MALTA	4,427	4	1,107
AIR FRANCE	24,471	21	1,165
KLM	31,115	26	1,197
BRITISH AIRWAYS	**248,512**	**207**	**1,201**
AIR INDIA	2,412	2	1,206
ALITALIA	15,204	12	1,267
BRITISH WORLD	**6,376**	**5**	**1,275**
TAP - AIR PORTUGAL	3,833	3	1,278
RYANAIR	***41,425***	***32***	***1,295***
SAS	22,19616	1,387	
LAUDA AIR	3,003	2	1,502
DELTA AIRLINES	17,355	11	1,578
AIR WORLD	5,079	3	1,693
AIR EUROPA	6,954	4	1,739
LEISURE INTERNATIONAL	**7,013**	**4**	**1,753**
BAC EXPRESS	**3,813**	**2**	**1,907**
VLM	8,053	4	2,013
BRITANNIA	**35,801**	**17**	**2,106**
BUSINESS AIR	**9,298**	**4**	**2,325**
JERSEY EUROPEAN	**35,033**	**15**	**2,336**
AIR UK	**82,686**	**35**	**2,362**
CITYFLYER	**29,079**	**12**	**2,423**
MONARCH	**22,777**	**9**	**2,531**
FINNAIR	5,373	2	2,687
BRYMON	**19,483**	**7**	**2,783**
AER LINGUS	***51,195***	***16***	***3,200***
GB AIRWAYS	**7,054**	**2**	**3,527**
VIRGIN ATLANTIC	**11,021**	**3**	**3,674**
MAERSK	12,321	3	4,107
EUROPEAN AIR TRANSPORT	13,362	3	4,454
LUFTHANSA	48,819	11	4,438
GILLAIR	**15,332**	**3**	**5,111**
AIR 2000	**26,205**	**5**	**5,241**
BRITISH MIDLAND	**82,669**	**14**	**5,905**
MANX	**30,357**	**5**	**6,071**
SWISSAIR	12,561	2	6,281

NOTE: Only airlines which have been involved two or more times have been included.

Appendix G2 Airline Comparison for 175 MORs

Airline	Number of flights from/to or over UK	Number of times airline involved in MORs	Average number of flights between MORs
DENIM AIR	357	2	179
AIR CHINA	368	2	184
AERO LLOYD	485	2	243
SUN-AIR OF SCANDINAVIA	1,054	2	527
EUROPEAN AIRWAYS	**2,465**	**4**	**616**
BRITISH MEDITERRANEAN	**1,416**	**2**	**708**
CROSSAIR	9,945	14	710
LUXAIR	2,990	4	748
MARTINAIR	4,502	6	750
EASY JET	**12,996**	**17**	**764**
JAPANESE AIR LINES - JAL	1,986	2	993
TRANSAER	***2,430***	***2***	***1,215***
BRITISH WORLD	**6,376**	**5**	**1,275**
AIR EUROPA	6,954	4	1,739
UNITED AIRLINES	16,056	9	1,784
SABENA	25,003	14	1,786
AIR CANADA	10,885	6	1,814
CITY JET	***6,170***	***3***	***2,057***
AIR MALTA	4,427	2	2,214
NORTHWEST AIRLINES	6,742	3	2,247
IBERIA	12,218	5	2,444
SAS	22,196	9	2,466
AMERICAN AIRLINES	20,064	8	2,508
CALEDONIAN	**7,723**	**3**	**2,574**
FINNAIR	5,373	2	2,687
BRITISH REGIONAL	**46,212**	**15**	**3,081**
MONARCH	**22,777**	**7**	**3,254**
DELTA AIRLINES	17,355	5	3,471
JERSEY EUROPEAN	**35,033**	**10**	**3,503**
BRITISH AIRWAYS	**248,512**	**64**	**3,883**
VLM	8,053	2	4,027
CITYFLYER	**29,079**	**7**	**4,154**
KLM	31,115	7	4,445
RYANAIR	***41,425***	***9***	***4,603***
AIRTOURS	**27,911**	**6**	**4,652**
GILLAIR	**15,332**	**3**	**5,111**
AIR UK	**82,686**	**15**	**5,512**

Airline	Number of flights from/to or over UK	Number of times airline involved in MORs	Average number of flights between MORs
AER LINGUS	***51,195***	***9***	***5,688***
BRITANNIA	**35,801**	**6**	**5,967**
LUFTHANSA	48,819	8	6,102
MAERSK	12,321	2	6,161
SWISSAIR	12,561	2	6,281
BRYMON	**19,483**	**3**	**6,494**
AIR FRANCE	24,471	3	8,157
AIR 2000	**26,205**	**21**	**3,103**
BRITISH MIDLAND	**82,669**	**32**	**7,556**

NOTE: Only airlines which have been involved two or more times have been included.

Appendix G3 Airline Comparison for 72 Occurrences with Severity Grade A or B

	Number of flights from/to or over UK	Number of times airline involved in severity A or B occurrences	Average number of flights between severity A or B occurrences
SUN-AIR OF SCANDINAVIA	1,054	2	527
BRITISH MEDITERRANEAN	**1,416**	**2**	**708**
LUXAIR	2,990	2	1,495
MARTINAIR	4,502	3	1,501
EASY JET	**12,979**	**7**	**1,854**
CITY JET	***6,170***	***3***	***2,057***
SABENA	25,003	11	2,273
CROSSAIR	9,945	4	2,486
AMERICAN AIRLINES	20,064	72	866
AIR EUROPA	6,954	2	3,477
IBERIA	12,218	3	4,073
BRITISH REGIONAL	**46,212**	**11**	**4,201**
SAS	22,196	5	4,439
AIR CANADA	10,885	2	5,443
CITYFLYER	**29,079**	**5**	**5,816**
BRYMON	**19,483**	**3**	**6,494**
MONARCH	**22,777**	**3**	**7,592**
GILLAIR	**5,332**	**2**	**7,666**
LUFTHANSA	48,819	5	9,764
BRITISH AIRWAYS	**248,512**	**20**	**12,426**
AER LINGUS	***51,195***	***41***	***2,799***
AIR 2000	**26,205**	**21**	**3,103**
RYANAIR	***41,425***	***31***	***3,808***
AIRTOURS	**27,911**	**21**	**3,956**
KLM	31,115	21	5,558
JERSEY EUROPEAN	**35,033**	**21**	**7,517**
BRITANNIA	**35,801**	**21**	**7,901**
BRITISH MIDLAND	**82,669**	**2**	**41,335**

NOTE: Only airlines which have been involved two or more times have been included.