GEN 3
Callsign Confusion

1. Introduction

1.1. The use of similar callsigns by aircraft operating in the same area and especially on the same RTF frequency often gives rise to potential and actual flight safety incidents. This hazard is usually referred to as "callsign confusion".

1.2. The danger of an aircraft taking and acting on a clearance intended for another is obvious. The following are some of the potential outcomes of such a situation:

(a) The aircraft takes up a heading or routing intended for another;

(b) The aircraft commences a climb or descent to a level to which it has not been cleared;

(c) The aircraft departs the RTF frequency of its controller;

(d) In responding to the message, the aircraft blocks a transmission from the intended recipient;

(e) The intended recipient does not receive the clearance, and fails to take up the desired heading or routing, or fails to climb or descent to the desired level;

(f) The workload of controllers and pilots is increased due to the necessity to resolve the confusion.

1.3. Any of the above situations could result in a loss of separation, a level bust, an AIRPROX, or a mid-air collision.

1.4. The purpose of this briefing note is to recommend the best courses of action for aircraft operators, pilots and air traffic controllers in order to minimise the risk of callsign confusion.

1.5. This briefing note draws heavily on the studies referred to in paragraphs 2.2, 2.3 and 2.4 below.

2. Statistical Data

2.1. The UK CAA reported[1] that of a total of 5,625 safety occurrences notified to them during 1997, 175 involved callsign confusion.

2.2. In the same year, the ACCESS[2] initiative collected a total of 482 reports of callsign similarity filed by pilots and air traffic controllers in UK. 217 of these involved actual confusion, including 99 where ATC were actually confused. 353 involved increased reported controller workload by reducing controllers' thinking time, and increasing RTF usage time.

2.3. During 2003, about 800 safety occurrences reports concerning similar callsigns were collected by air traffic management (ATM) services in France. These include 100 or so incidents having a direct impact on air traffic safety and leading to very unsafe situations (AIRPROX, STCA alerts, level busts and clearance misunderstanding).

2.4. In co-operation with the Netherlands Research Laboratory (NLR), EUROCONTROL studied 444 occurrences[3] in which there were problems with communication between the controller and the pilot. All these occurrences were classified as "incidents[4]".

2.5. The above occurrences were classified by their consequences. 70 were classified as "wrong aircraft accepted clearance" and 92 as "altitude deviation[5]". In 19 cases, where the wrong aircraft accepted a clearance an altitude deviation resulted.

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[1] CAP 701 – Aviation Safety Review 1990-1999

[2] CAP 704 – Aircraft Callsign Confusion Evaluation Safety Study. A summary of this report may be found in UK CAA Aircraft Information Circular (AIC) 107/2000.

[3] Air-Ground Communication Safety Study: An Analysis of Pilot-Controller Communications.

[4] An incident is defined in ICAO Annex 13 as an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

[5] In this study, an altitude deviation was defined as a departure from, or failure to attain, an altitude assigned by ATC.

3. Studies of Callsign Confusion

3.1. Recent European studies of callsign confusion have had broadly similar findings. The following brief summary of the ACCESS study, referred to in paragraph 2.2 above, is typical.

3.2. The following is a break-down of the main types of occurrence:

(a) 66% of occurrences involved 2 or more aircraft from the same airline;

(b) Nearly half of all occurrences involved UK airlines only, and a third involved foreign aircraft only;

(c) 89% of actual confusion reports occurred either in the climb, the descent or the cruise phase of flight;

(d) 73% of occurrences involved an increase in ATC workload;

(e) Most occurrences took place between 0600 and 1759 hrs.;

(f) The majority of occurrences took place in TMAs or UARs.

3.3. Of the callsign confusion occurrences,

(a) 84% involved numeric[6] only callsigns;

(b) 10% involved alphanumeric[6] callsigns only;

(c) 4% involved a combination of numeric and alphanumeric callsigns.

3.4. The most common identical numeric callsign suffixes were: 101, 202, 333, 37, 837, 762 and 964.

4. Aircraft Callsigns

4.1. Before proceeding with an examination of the callsign confusion problem the rules governing the use of aircraft callsigns will be reviewed. These rules are laid down in ICAO Annex 10[7]. Relevant paragraphs are summarised below.

4.2. Three different types of aircraft callsign may be encountered, as follows:

Type (a) The characters corresponding to the registration marking of the aircraft (e.g. ABCDE). The name of the aircraft manufacturer or model may be used as a prefix (e.g. AIRBUS ABCDE);

Type (b) The telephony designator[8] of the aircraft operating agency, followed by the last four characters of the registration marking of the aircraft (e.g. RUSHAIR BCDE);

Type (c) The telephony designator of the aircraft operating agency, followed by the flight identification (e.g. RUSHAIR 1234).

4.3. The full callsign must be used when establishing communications.

4.4. After satisfactory communication has been established, abbreviated callsigns may be used provided that no confusion is likely to arise; however, an aircraft must use its full callsign until after it has been addressed by the ground station using the abbreviated callsign.

4.5. Callsigns may be abbreviated only in the manner shown below. Examples of full and abbreviated callsigns are shown on Table 1 below.

Table 1 – Examples of Full Callsigns and Abbreviated Callsigns				
	Type (a)		Type (b)	Type (c)
Full Callsign	ABCDE	AIRBUS ABCDE	RUSHAIR ABCDE	RUSHAIR 1234
Abbreviated Callsign	ADE or ACDE	AIRBUS DE or AIRBUS CDE	RUSHAIR DE or RUSHAIR CDE	No abbreviated form.

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[6] A numeric callsign is one in which the suffix consists of numbers only (e.g. RUSHAIR 1234). An alphanumeric callsign is one in which the callsign consists of numbers followed by one or more letters.

[7] ICAO Annex 10, Volume II, Section 5.2.1.7.

[8] The telephony designators referred to in (b) and (c) are contained in ICAO Doc 8585 — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services.

Type (a)   The first character of the registration and at least the last two characters of the full callsign (the name of the aircraft manufacturer or model may be used in place of the first character);

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.

4.6.   Most airline callsigns belong to type (c) for which there is no abbreviation. Therefore, abbreviations such as "RUSHAIR 34" are not permissible.

4.7.   An aircraft is not permitted to change the type of its call sign during flight, except temporarily on the instruction of an air traffic control unit in the interests of safety.

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

5. Numeric v Alphanumeric Callsigns

5.7.   Many airlines continue to use their IATA commercial flight numbers as callsign suffixes. However, because they tend to be allocated in batches of sequential and very similar numbers, callsign confusion occurs.

5.8.   Several airlines have switched to alphanumeric callsigns reasonably successfully in recent years. However, if every operator adopts alphanumeric callsigns, the limited choices available within the maximum of 4 elements allowed within a callsign suffix means that callsign confusion, similar to the existing numeric system, is likely to result.

5.9.   Before changing to an effective all alphanumeric callsign system, which involves a significant amount of work, it is recommended that operators review their existing numeric callsign system to deconflict any similar numeric callsigns. Where there is no solution to those callsigns that have a potential for numeric confusion, alphanumeric callsigns can be adopted.

6. Selection of Callsigns

6.1.   The best defence against callsign confusion consists in eliminating, or reducing to an absolute minimum, the chance of having two (or more) aircraft with phonetically similar callsigns monitoring the same RTF frequency at the same time.

6.2.   To be effective, such a strategy requires action on a regional and international basis. Callsign suffixes must be allocated according to a deliberate, coordinated policy that prevents a confliction arising in the first place.

6.3.   Until such a strategy is in place, aircraft operators should attempt to assign callsigns in such a way that confliction with their own and other scheduled traffic does not arise.

6.4.   In allocating callsigns, aircraft operators should where possible observe the following recommendations:

(a) Avoid the use of similar numeric callsigns within the company. Effectively, this means, do not use commercial flight numbers as callsigns;

(b) Co-ordinate with other operators to reduce to a minimum any similar numeric and alphanumeric elements of callsigns;

(c) Start flight number element sequences with a higher number (e.g. 6);

(d) Do not use callsigns involving four digits and, wherever possible, use no more than three digits;

(e) Do not use the same digit repeated (e.g. RUSHAIR 555);

(f) If alphanumeric suffixes are to be used, co-ordinate letter combinations with other airspace and airport users;

(g) Do not use alphanumeric callsigns which correspond to the last two letters of the destination's ICAO location indicator (e.g. RUSHAIR 25LL for a flight inbound to London Heathrow);

(h) Use some numeric and some alphanumeric callsigns (rather than all numeric or all alphanumeric);

(i) If similar numbered callsigns are inevitable, allow a significant time and/or geographical split between aircraft using similar callsigns;

(j) When useful capacity in the allocation of callsigns has been reached, apply for and use a second company callsign designator;

(k) Do not use similar/reversed digits/letters in alphanumeric callsigns (e.g. RUSHAIR 87MB and RUSHAIR 78BM).

6.5.   Where commercial flight numbers are not used, operators should ensure that airport information systems can cope with the conversion of RTF callsigns (for ATC use) to commercial flight numbers (for passenger and airport use).

7. Additional Recommendations for Aircraft Operators

7.1. Aircraft operators should have a system to review and if necessary, amend callsigns.

8. Recommendations for Flight Crew

8.1. Always use headsets, especially during times of high RTF loading.

8.2. Do not clip transmissions.

8.3. Use full RTF callsign at all times.

8.4. Use correct RTF procedures and discipline at all times.

8.5. If in doubt about an ATC instruction, do not use readback for confirmation. Instead, positively confirm instructions with ATC. This procedure should also be followed if any doubt exists between flight crew members.

8.6. Question unexpected instructions for any stage of flight.

8.7. Take extra care when members of the flight crew are involved in other tasks and may not be monitoring the RTF.

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

8.9. Advise ATC if any of the following situations are observed:

(d) Two or more aircraft with similar callsigns are on the RTF frequency;

(e) It is suspected that an aircraft has taken a clearance not intended for it;

(f) It is suspected that another aircraft has misinterpreted an instruction;

(g) A blocked transmission is observed.

8.10. Although not an official procedure, many pilots hearing that two transmissions block each other call out "Blocked", after which all transmitting parties try once more to pass their messages.

8.11. After a flight where an actual or potential callsign confusion incident is observed, file a report using the national mandatory incident reporting system or voluntary incident reporting system as appropriate.

9. Recommendations for ATM

9.1. Ensure that aircraft operators are made aware of any actual or potential callsign confusion reported by air traffic controllers.

10. Recommendations for Air Traffic Controllers

10.1. Use correct RTF phraseology, procedures and discipline at all times.

10.2. Do not clip transmissions.

10.3. Ensure clearances are read back correctly. Do not use readback time to execute other tasks.

10.4. Monitor flight crew compliance with RTF callsign use.

10.5. Take extra care when language difficulties may exist.

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

10.7. Warn the pilots of aircraft on the same RTF frequency having similar callsigns that callsign confusion may occur. If necessary, instruct one or both aircraft to use alternative callsigns while they are on the frequency.

10.8. A transmission could be blocked when two or more aircraft are responding to the same clearance. Typically the controller would hear a partial or garbled readback. If a blocked transmission is suspected, ensure that both aircraft retransmit their messages and confirm that a clearance has not been taken by an aircraft for which it was not intended.

10.9. Where an actual or potential callsign confusion incident is observed, file a report using the national mandatory incident reporting system or voluntary incident reporting system as appropriate.

11. Resources

Other Level Bust Briefing Notes

11.1. The following Level Bust Toolkit Briefing Notes contain information to supplement this discussion:

GEN 2 – Pilot-Controller Communication;

OPS 1 – Standard Operating Procedures;

ATM 2 – Reducing Level Busts.

Access to Resources

11.2. Most of the resources listed may be accessed free of charge from the Internet. Exceptions are:

ICAO documents, which may be purchased direct from *ICAO*;

Certain Flight Safety Foundation (FSF) Documents, which may be purchased direct from *FSF*;

Certain documents produced by the Joint Aviation Authorities, which may be purchased from *JAA*.

Regulatory Resources

11.3. Documents produced by regulatory authorities such as ICAO, JAA and national aviation authorities are subject to amendment. Reference should be made to the current version of the document to establish the effect of any subsequent amendment.

ICAO – Annex 10 – Aeronautical Tele-communications, Volume II – Communication Procedures including those with PANS status, Chapter 5 – Aeronautical Mobile Service Voice Communications, Section 5.2.1.7.;

ICAO Doc 8585 — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services;

ICAO Doc 9432 – Manual of Radiotelephony.

Training Material and Incident Reports

EUROCONTROL Level Bust Workshops – Level Bust: Case Studies;

EUROCONTROL Level Bust Workshops – Level Bust: Causal Factors;

EUROCONTROL Safety Letter – Reducing Level Bust;

FSF ALAR Toolkit – Briefing Note 2.3 – Effective Pilot/Controller Communications.

Other Resources

FAA Report – An Analysis of Ground Controller-Pilot Voice Communications;

FSF Digest June 1993 – Research Identifies Common Errors behind Altitude Deviation;

FSF Accident Prevention Volume 47 No 6 – My Own Mouth shall Condemn Me;

RAe Human Factors Conference – Level Busts: Considerations for Pilots and Controllers;

UK CAA Aeronautical Information Circular (AIC) 107/2000 – Callsign Confusion;

UK CAA CAP 710 – "On the Level" and associated recommendations.