

Event... (cont'd)

ration was 3-4 NM. Minimum horizontal separation was in the region of 2-2 NM; vertical, initially zero, increased as the A320 descended.

Meanwhile, the B737 continued to the west at FL 90 until the pilot transmitted "C/s with you again now we had a problem with the radio". On asking why the B737 had left the frequency the pilot replied "Yes sir it's a wrong input into the

radio until we discovered we were on the wrong frequency, we apologise for that."

A short conversation later between the captain and controller suggested there had been no errors in the A320 cockpit.

However, for some reason the A320 had simply not received any transmissions.

The A320 was out of radio contact for 4 minutes 5 seconds and the B737 was out of radio contact for 6 minutes 36 seconds.

This event features further issues being addressed by the AGC Safety Initiative:

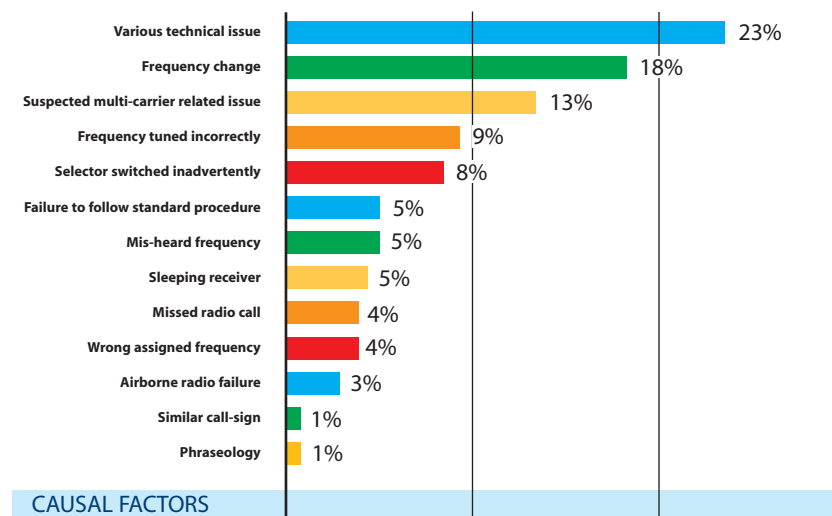
- Frequency change
- "sleeping receivers"

The consequences of the event were:

- Prolonged loss of communication (PLOC)
- Loss of separation

PROLONGED LOSS OF COMMUNICATIONS (PLOC)

Since the events of 11 September 2001, PLOC is a matter of SECURITY as well as a SAFETY issue. Over Northern Europe in 2004, there were over 120 military intercepts of aircraft not responding to air traffic control. A silent aircraft is not usually an immediate safety problem if the crews are flying in accordance with flight plan or their last clearance, but PLOC results in increased workload for controllers and additional safety concerns in the case of interception. Reports indicate a general lack of awareness of interception procedures among controllers and pilots, and failure to monitor 121.5 at all times.



JOIN THE AIR-GROUND COMMUNICATIONS SAFETY WORKSHOP

AEA,ECA,IATA,IFATCA,FSF and EUROCONTROL Safety Enhancement Business Division will host an Air-Ground Communications Safety Workshop (AGCSW) at EUROCONTROL Headquarters, Brussels, on 30 September 2005. Representatives from aircraft operators (commercial, cargo, and general aviation), pilot groups, regulators, airport operators,

Air Navigation Service Providers (ANSPs) as well as pilot and controller associations are invited to attend.

The Workshop represents an important phase within the Air-Ground Communications Safety Initiative. Recognised experts will share their knowledge and present their views on

various aspects of pilot-controller communications safety. The Workshop will then debate the issues and work to agree and validate a set of practicable safety recommendations for the industry, which will form the foundation of the next phase of the Initiative – the drafting of a European Action Plan.

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AGC Safety Letter



EDITORIAL AIR-GROUND COMMUNICATIONS SAFETY INITIATIVE

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The Air-Ground Communication (AGC) Safety Improvement Initiative was Launched by the EUROCONTROL Safety Team in 2004, and is addressing communications issues identified in the Runway Incursion and Level Bust Safety Improvement Initiatives as well as other issues of concern such as call-sign confusion, undetected simultaneous transmissions, radio interference, use of standard phraseology, and Prolonged Loss of Communication.

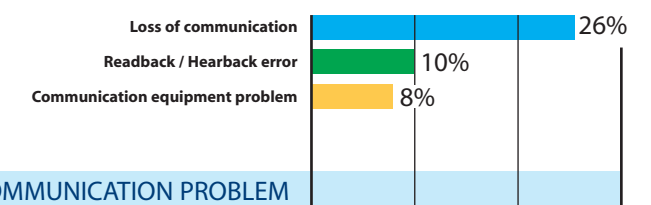
Communication between air traffic controllers and pilots remains a vital part of air traffic control operations, and communication problems can result in hazardous situations. A first step in reducing the incidence of communication problems is to understand why and how they happen. Separate studies commissioned by EUROCONTROL seek to identify the causes of these communication problems. An occurrence reporting campaign addressing European airlines and Air Navigation Service Providers was conducted in order to collect representative data on air-ground communication problems. At the

same time, a survey of airline pilots and air traffic controllers in Europe was included in the framework of this study to identify lessons learnt and recommendations in the area of communication safety. Further work is also underway studying existing practices and rules regarding similar call-signs.

These studies will contribute to our understanding of the causes of communications problems and inform the next steps in the AGC Safety Initiative, an AGC Safety Workshop, and the development of recommendations and solutions.

ASSESSING THE SCALE OF THE PROBLEM, THE CAUSES AND CONSEQUENCES

In a survey of 535 occurrences of communication problems, between air traffic controllers and pilots, loss of communication was found to be the most common type of communication problem reported.



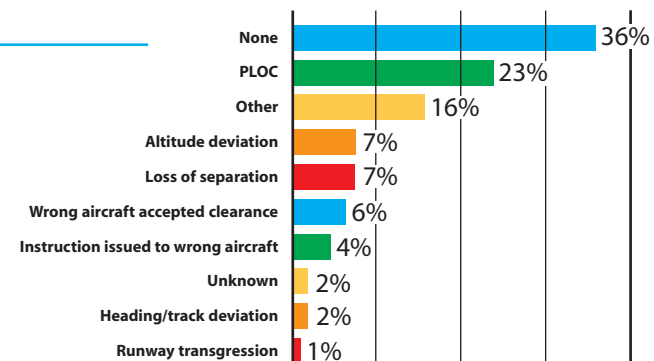
Top five Factors contributing to communication problems

| | Occurrences | Percentage |
|--|-------------|------------|
| Similar call-sign | 175 | 33% |
| Frequency change | 64 | 12% |
| Radio equipment malfunction - air | 43 | 8% |
| Radio interference | 42 | 8% |
| Content of message inaccurate/incomplete | 29 | 5% |

ASSESSING THE SCALE OF THE PROBLEM, THE CAUSES AND CONSEQUENCES (CONT'D)

Consequences of communication problems

A large portion of the communication problems have no safety consequence, but about a quarter of the reported occurrences resulted in a prolonged loss of communication (PLOC). Note that more than one consequence could be assigned to a single occurrence.



Event ... The following event occurred in 2002. The call-signs have been altered to preserve anonymity.

Air Apple 3211 departed 5 minutes ahead of **Air Banana 7411** from a busy international airport. Both aircraft were departing on the southerly SID which took them under the holding stack for arrival traffic.

The controller acknowledged **Air Banana 7411** as it joined the departure frequency after take off and confirmed the level clearance as 6000 ft. The controller then immediately cleared **Air Apple 3211**, also on the same frequency, to climb to FL150. This instruction was read back by **Air Banana 7411** but the error was not detected despite a subsequent call from

Air Apple 3211, requesting confirmation of the clearance.

Air Banana 7411 was now climbing to FL150 and into conflict with arrival traffic.

The controller transferred **Air Apple 3211** to the next sector. This instruction was simultaneously read back by both aircraft but again the error was not detected.

A loss of separation then occurred, which the controller could not prevent since none of the aircraft involved were on his frequency.

This event features many issues being addressed by the AGC Safety Initiative:

- Call-sign confusion
- Undetected simultaneous transmission
- Loss of Communications
- Read-back Hear-back errors

The consequences of the event were:

- Prolonged loss of communication (PLOC)
- Level Bust
- Loss of separation

The event also highlighted the role of TCAS as a safety net.

Note: Analysis of level bust events reported to UK NATS, occurring in the first half of 2005, shows that four out of the top five causal factors concern a breakdown in communications, including incorrect readback by the correct aircraft and Pilot readback by the incorrect aircraft.

CALL-SIGN CONFUSION

Call-sign confusion is the major cause of aircraft taking a clearance not intended for them. The danger of an aircraft taking and acting on a clearance intended for another is obvious. Call-sign confusion can lead to Runway Incursions, Level busts, Loss of Separation and CFIT. There are many factors which contribute to call-sign confusion associated with:

- **the way the message is transmitted** – accent, speech quality and rate, complexity of the instructions, use of non-standard phraseology, clipping or omitting the call-signs;

- **the quality of the communication channel** – interference, frequency congestion, blocked transmissions, audio quality;
- **the perception and cognitive processing of the message** – visual, acoustic or cognitive similarities, workload, distractions, fatigue, expectation bias;
- **inadequate mitigation** – inadequate readback hearback process, failure to seek confirmation, inadequate teamwork crosschecks.

Call-sign confusion can arise because of visual and phonetic confusion associat-

ed with the sequencing of letter and number groups in a call-sign.

3 Letter Groups:

Aircraft identification on radar screens and controllers' "strips" often use ICAO 3-letter groups plus a flight identifier number. Controllers can experience both visual and phonetic confusion with ICAO 3-letter groups relating to different airlines. For example, identical final letters (ABC & HBC), parallel letters (ABC & ADC), block letters (ABC & ABD) and anagrams (DEC & DCE) of 3-letter groups.

An analysis of the 5863 codes allocated (ICAO doc.8585) shows the following characteristics:

Within same notifying states:

- Identical final letters: 20,4% of the total allocated 3-letter groups are affected by that type of similarity. For example, GCF, JCF and ACF,
- Parallel letters: 23% (idem). For example GWI and GMI,
- Block letters: 26% (idem). For example HUV, HUK and HUF,
- Anagrams: 7,3% (idem). For example NOP and PON.

Although these figures illustrate a real risk potential of confusion between 3-letter designators, this risk is mitigated by the fact that the radiotelephony designator is in the great majority of cases well known and used properly by pilots and controllers. However, ICAO 3-letter similarities feature in more than 11% of the reports relating to call-sign confusion from French ATM services over the past 4 years.

Radiotelephony Designators:

The purpose of radiotelephony designators is to ensure a clear difference between two or more aircraft from

different airlines at the beginning of the pilot and controller communications. The use of common prefixes and especially suffixes therefore reduces their effectiveness.

The table below highlights the fact that the word "AIR" is used either as prefix or suffix in more than 1 in 5 radiotelephony designators in use worldwide. Furthermore, one of its derived translations, in the Spanish language, "AERO", represents 270 cases worldwide.

Breakdown of common radiotelephony designators part worldwide (among a total of 5465):

| Radiotelephony designators consisting of the following part: | Number of occurrences |
|--|-----------------------|
| AIR | 1043 |
| AERO | 270 |
| AVIA | 174 |
| JET | 155 |
| TRANS | 134 |
| EXPRESS | 83 |
| CARGO | 83 |
| FLIGHT | 72 |
| STAR | 59 |
| WEST | 55 |
| BIRD | 53 |
| AIRLINES | 38 |
| AVIATION | 34 |
| CHARTER | 34 |
| SERVICE | 30 |
| AIRWAYS | 26 |
| WINGS | 24 |

Flight Identifiers:

Purely numerical aircraft identifications are still wide spread across Europe even if the trend has been towards alphanumeric CS allocation over the past 4 years.

The similarities are different types:

| Similarity type | Example |
|--|-------------|
| Visual parallel | 1458 & 1478 |
| Block figures | 128 & 128T |
| Anagrams | 1524 & 1425 |
| Identical final figures | 648 & 748 |
| Partial parallel | 1025 & 1427 |
| Phonetic parallel | 712 & 7012 |
| Semi anagram and last identical figure | 8502 & 5282 |

Apart from potential call-sign confusion, there is also a risk of confusion with flight levels, headings, frequency channels and QHN/QFE.

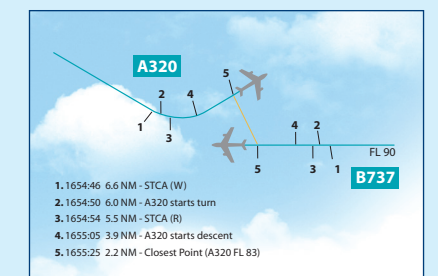
Event ...

A B737 was told to leave the Alpha hold heading 270° at FL 90; the pilot acknowledged and the a/c did as instructed. An A320 was then instructed to leave the Bravo hold heading 130° at FL 90. After leaving Alpha the B737 was instructed to descend to FL 80. There was no reply to multiple transmissions to this a/c.

As the B737 would eventually conflict with the A320 the controller decided to descend the A320 to FL 80 instead. Again, despite multiple transmissions to the A320 there was no reply from this a/c either. Multiple transmissions were made to both a/c using normal equipment and

the emergency handset. Attempts were made to see if the a/c were on other frequencies. Another company flight was also asked to try and see if the A320 could be contacted on the company frequency. However, neither a/c responded to these attempts to contact them. In 10 years of controlling, this was the most helpless the controller had ever felt; he thought he was going to witness a mid-air collision without being able to do anything about it.

The a/c had closed to 8.8 NM, still converging, when the A320 broke through a transmission with "are you still there?" The A320 was instructed: "C/s turn left



immediately heading 060 – it's avoiding action." The pilot was then given a descent to FL 80. The a/c were still on a collision course at the same flight level until about 6 NM apart when the A320's avoiding action began to take effect. By 1655:11 the A320 had left FL 90 and lateral separation.