# Air-Ground Communications Briefing Note
# 3- Loss of communication

## 1. Introduction

1.1. Loss of communication incidents usually result from one of three main causes:
(a) radio interference;
(b) frequency change; or,
(c) communication equipment problems.

1.2. Pilot workload, frequency congestion, similar call sign and language problems are also factors in some cases.

1.3. Loss of communication may be brief (e.g. when the pilot de-selects the radio to make a PA call, not realising that the other pilot is not monitoring the frequency), or prolonged (e.g. in the case of "sleeping receiver").

1.4. Prolonged loss of communication (PLOC) has not yet been officially defined. Typically, PLOC involves loss of communication measured in minutes. The term COMLOSS is used by the military to refer to PLOC.

1.5. Whether brief or prolonged, loss of communication has obvious flight safety significance; possible dangerous outcomes include the following:
(a) failure to receive (and therefore to follow) a new clearance, leading to loss of separation and perhaps an AIRPROX;
(b) inability to pass important information to ATC;
(c) the workload of controllers and pilots is increased because of the necessity to resolve the confusion.

1.6. Since 11 September 2001 PLOC events have assumed greater security significance, because controllers are unable to distinguish between communications failure and a loss of communication due to potentially sinister causes. On several occasions, military aircraft have been scrambled to intercept aircraft which are experiencing PLOC.

1.7. A recent EUROCONTROL report[1] based on a study carried out by the Dutch National Research Laboratory (NLR) found that 40% of all "loss of communication" occurrences resulted in PLOC, while the frequency of PLOC occurrences approximately reflected the amount of time spent in each phase of flight.

1.8. Reports following interception by military aircraft suggest that civil pilots do not routinely monitor the international emergency frequency (121.5 MHz), since the military pilots involved were unable to contact the civil pilots on that frequency.

1.9. If for any reason communications on the designated frequency are lost, pilots should be able to refer to a list of alternative frequencies in use on their sector.

## 2. Radio interference

2.1. "Radio interference" is the term used to describe a range of different situations in which transmissions other than those from authorised users of an RTF frequency interfere with radio reception. Full discussion of this subject is included in Briefing Note 4 – Blocked transmissions.



1 - Air-ground Communication Safety Study – An analysis of pilot-controller occurrences

## 3. Frequency change

3.1. The process of changing frequency offers many possibilities for error, for example:
(a) controller assigns incorrect frequency;
(b) pilot mis-hears frequency assignment (perhaps due to radio interference);
(c) pilot hears frequency correctly but makes an error when setting it;
(d) pilot sets frequency correctly but fails to select radio;
(e) pilot mis-sets volume or squelch control;
(f) pilot anticipates next frequency and selects it on the panel, but ATC assigns another frequency.

3.2. Frequency change occurrences are often of short duration because the pilot realises on checking in that he/she is on the wrong frequency: either the frequency is silent, in which case the pilot returns to the previous frequency, or it is active, in which case the controller directs the pilot to the correct frequency.

3.3. Frequency change incidents can have serious consequences if the pilot is unable to re-establish contact quickly. This might occur if the previous frequency is very busy, or if the aircraft is out of range of the previous controlling station.

3.4. Frequency change occurrences are most likely to occur in areas of high density air traffic, especially during climb and descent, where many frequency changes are required as the aircraft is passed from one agency to another. Since these occasions coincide with periods of high pilot work-load, there is an enhanced likelihood that an error in copying the frequency or in setting it correctly will go undetected.

## 4. Communication equipment problems

4.1. The EUROCONTROL report[1] already refers to found that the most common factors contributing to communication equipment problems were:
(a) sleeping VHF receivers (53%)
(b) radio equipment malfunction – air (17%);
(c) radio equipment malfunction – ground (15%); and
(d) stuck microphones (6%).

### Sleeping receivers

4.2. "Sleeping receiver" is the term used to describe incidents when the radio apparently goes dead so that no incoming calls are heard, either those directed to the flight or those between ATC and other flights. Usually, the situation continues until the aircraft transmitter is keyed – often because the pilots have noticed the silence and wish to check their receiver; thereafter, radio operation is normal.

4.3. At first, the rate of occurrences was low – around one or two per month – and concentrated in Terminal Control Area (TMA) airspace. From about the summer of 2001, the rate of reported loss of communications began to increase and this rate now appears to be constant. Additionally, it has become apparent that the geographical extent of these incidents is not confined to UK airspace and involves other areas.

4.4. It seems probable that many cases of "sleeping receiver" go unreported, possibly because those involved suspect that communication was lost through some other cause (e.g. poor radio propagation, their own

inattentiveness, or equipment mishandling). When the first incidents were reported in the late 1990's there was widespread scepticism that the phenomenon actually existed; it may be that similar scepticism still exists in parts of Europe.

4.5. The sleeping receiver phenomenon has been the subject of much research in recent years. Possible causes under investigation include interference sources from inside or outside the aircraft from various spectrum bands (e.g. from mobile telephones or paging systems), receiver design, receiver software, etc. To date, these investigations have been inconclusive.

### Radio equipment malfunction

4.6. Radio equipment malfunction can include inadvertent changing of correctly set radio controls, especially in a cramped cockpit.

## 5. General recommendation

5.1. In order to increase the knowledge base and so aid the identification and understanding of the causes of PLOC, operators and air navigation service providers (ANSPs) should give wide publicity to the issue. This publicity should be extended to ground engineers and cabin crew.

## 6. Recommendations for operators

6.1. Ensure that flight crews, cabin crews and ground engineers are aware of the loss of communications issue through publicity.

6.2. Ensure that company policy for the monitoring of 121.5 MHz is in accordance with ICAO recommendations and is contained in operating manuals. Do not refer to 121.5 MHz as a Guard frequency: 121.5 MHz is an Emergency frequency.

6.3. Ensure that standard operating procedures (SOPs) for copying, setting and cross-checking frequency changes are practical and effective, and that they are followed by all pilots.

6.4. Ensure availability of an updated list of sector frequencies for all flight plan routes as part of SOPs (pre-flight preparation activity).

6.5. Review radio equipment fitted to aircraft in your fleet and install anti-blocking devices if appropriate.

6.6. Investigate communications redundancy, including establishing clear procedures for the use of commercial telephone links in the event of PLOC.

# 7. Recommendations for pilots

7.1. Be alert to the possibility of loss of communication.

7.2. Do not switch immediately to the next sector frequency following read-back of the controller's instruction. Ensure confirmation of your read-back is received.

7.3. Always follow standard procedures for copying, setting and cross-checking RTF frequencies. As soon as a loss of communication is suspected, check radio equipment settings and carry out a radio check.

7.4. Always use headsets during times of high RTF loading. Always wear a headset when members of the flight crew are involved in other tasks and may not be monitoring the RTF.

7.5. Check the audio panel settings after any use of the passenger address system.

7.6. If any part of a message for you is garbled or unclear, request confirmation or clarification (i.e. "say again…").

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

7.8. On observing any radio interference, note the nature and effect of the interference, time and position of commencement, time and position where the interference ceased, and any other factors that would help the authorities to identify the source.

7.9. If the squelch control is adjusted to reduce the effect of interference, take care to ensure that transmissions from ATC or other aircraft are not cut out.

7.10. Always report any radio interference experienced whether or not it affected safe operation.

7.11. If in your opinion interference affects safe aircraft operation, request a frequency change. If the interference prevents satisfactory communication with your assigned ATC unit, request instructions using another listed frequency.

7.12. When conditions permit pass full information concerning interference to the ATC unit affected. Additionally, report the incident to your national authority using the mandatory occurrence reporting scheme.

7.13. If unable to establish contact on a new frequency, check all equipment settings (including volume) and return to previous frequency if contact is not quickly established.

7.14. Make use of other aircraft to relay messages when operating at extreme range or when poor propagation is suspected.

7.15. Inform cabin crew of any suspected "sleeping receiver" occurrence and ask for any relevant information (e.g. recent use of cabin address, or portable electronic equipment).

7.16. Follow company procedures for the monitoring of 121.5 MHz. If PLOC is suspected, select 121.5 MHz and listen out for any transmission from intercepting aircraft.

## 8. Recommendations for air navigation service providers

8.1. Ensure that all controllers are aware of the loss of communications issue through publicity.

8.2. Ensure that communications with aircraft are only undertaken within the Designated Operational Coverage (DOC) for the frequency being used.

8.3. Ensure that proper procedures are promulgated for PLOC and interceptions of aircraft.

8.4. Ensure that controller responsibilities in the case of an interception of a civil aircraft are clearly laid down.

8.5. Investigate communications redundancy, including establishing clear procedures for the use of commercial telephone links in case of PLOC.

## 9. Recommendations for controllers

9.1. Do not pass on RTF frequency changes as part of a multi-part clearance.

9.2. Do not delay passing on any vital instruction until after a frequency change (e.g. heading or level change to avoid confliction).

9.3. Pay close attention to read-back of RTF frequency changes and correct any error.

9.4. On observing or being informed of radio interference, arrange for transfer of affected aircraft to another RTF frequency.

9.5. When conditions permit, request full details of the incident, including the nature and effect of the interference, time and position of commencement and time and position where the interference ceased.

9.6. Report any radio interference to the appropriate national authorities, which in the case of malicious interference should be the police.

9.7. Also report any radio interference incidents using your national mandatory incident reporting scheme.

9.8. If loss of communication is suspected, attempt to contact the aircraft by other means, including relay through other aircraft (which may also be prepared to attempt contact using 121.5 MHz), through the previous operating agency/RTF frequency and through the operator, who may be able to contact the aircraft by other means, e.g. SELCAL or ACARS.

9.9. Make use of other aircraft to relay messages when you believe aircraft is operating at extreme range or in conditions of poor propagation.

9.10. If attempts to restore two-way communications with the aircraft are unsuccessful, inform the appropriate military authorities. Keep the military authorities informed of action taken by the ATS unit as well as any further action intended.