

# **Mobile Phone Use in Aircraft**

## **Background**

For decades the aviation industry has been aware of the adverse effects of external electromagnetic radiation (from lightning, high power radars and radio/TV transmitters) on navigational and flight management systems and has implemented protective measures to combat them.

Since the 1990s, mobile phones have steadily increased in popularity and, as they emit electromagnetic radiation, their use on board planes can affect navigation and flight management equipment internally. In order to avoid this, as well as potential interference with land-based phone networks, regulatory agencies in Europe and the United States implemented a ban on the use of mobile phones and many other electronic devices during flight.

A step towards removing the ban was taken on 19 June 2007, when Airbus became the first aircraft manufacturer in the world to receive approval from the European Aviation Safety Agency (EASA) for an on-board GSM (Global System-Mobile) programme. This will allow the making and receiving of calls, texts and emails to and from mobile phones during flight.

## **Recommendations**

- **Independent research should be conducted on the new technology introduced by Airbus.**
- **Airlines should review their pre-flight announcement to ensure it adequately explains that mobile phone use carries a risk of interference with flight and navigational systems.**
- **A conference should be organised that would bring together all relevant stakeholder groups to discuss how to create the “global framework” necessary to limit the risks associated with this issue.**

## **The Research**

The debate on the use of mobile phones in aircraft is complicated by the lack of definitive evidence tying the functioning of electronic devices on aircraft to the causation of an accident or the interference of ground-based phone networks. Most agree that electronic devices, when operating at high power, can and do interfere with flight and navigational systems, but it has not been replicated reliably in tests.

A study completed in 2006 by researchers at Carnegie Mellon University in the U.S. found that electronic devices “can pose dangers to the normal operation of critical electronics on airplanes,” including GPS (Global Positioning System). Furthermore, the research team found that, “the risk posed by these portable devices is higher than previously believed.”

The researchers monitored electromagnetic emissions on 37 passenger flights in the U.S. in 2003 and found that a normal flight had between one and four calls made from the aircraft. This report, supported by an earlier study by NASA and anecdotal evidence, indicates that mobile phones can potentially interfere with GPS systems used primarily for landing. However, the researchers admit that, “there is no smoking gun to this story: there is no definitive instance of an air accident known to have been caused by a passenger’s use of an electronic device.”

In the UK, studies on the effects of mobile phone use in aircraft have been conducted by the Civil Aviation Authority (CAA), the most recent of which was concluded in 2003. According to Tom Hamilton of the CAA, based on the research, “there is sufficient evidence to indicate that the potential exists for the use of mobile phones to interfere with the flight systems of aircraft.”

**Recommendation: Independent research should be undertaken on the new technology introduced by Airbus.**

### **Recent Developments in Technology**

As mentioned earlier, EASA recently approved an on-board GSM programme for the first time. GSM is not new technology, as the first GSM call was made in 1991. Global System-Mobile uses digital technology and time division multiple transmissions methods and it can transfer data at speeds up to 9.6 k per second. More important to GSM users, it provides seamless connectivity to the same phone number in more than 210 countries.

The GSM system that has been cleared for use on Airbus aircraft is known as OnAir and a similar system is being developed by Boeing, but it has yet to be approved. Currently, mobile phones that operate in-flight are functioning at high power because they increase their wattage to one watt whilst searching for a network. The higher wattage increases the potential for interference with the frequencies of flight systems and ground-based phone networks. The OnAir system plans to solve this problem by providing a ‘base station’ (also known as a picocell) on every plane which will make and receive calls and connect them to the GSM network via a satellite uplink. The ‘base station’ will ensure that mobile phones will operate at a much lower wattage (one milliwatt) because the phones will no longer be searching for a network.

In the past, mobile phone operators have been wary of mobile use on aircraft due to network interference that could be caused by one phone being roughly equidistant from more than one tower, a situation that would frequently occur whilst flying. It is believed that such a scenario would confuse the operator's computer system, leading to interrupted calls and reduced system capacity. The system being proposed by Airbus aims to overcome this through use of the 'base station,' which will connect via satellite uplink to a single tower.

### **Effects on Passenger Behaviour**

A number of airlines are worried that mobile use in aeroplanes could lead to 'air rage' scenarios between passengers due to invasive noise levels. GSM system designers have devised a number of solutions that could reduce this likelihood. The OnAir system, for example, will be controlled by the cabin crew and they can switch the system to "voice off" (text only) at night or completely shut the system down. Another proposed measure to limit passenger annoyance is the creation of a designated mobile use section of the aircraft, similar to 'quiet' carriages on trains.

An interesting finding from an earlier Carnegie Mellon report was air passengers' lack of knowledge about the reasons for the ban on mobile phone use. A survey of frequent fliers conducted in 2001 found that the majority did not know the reasoning behind the ban on the use of mobile phones.

Some see the ineffectiveness of the ban as a problem of enforcement. They believe that the cabin crew should police the use of mobile phones more consistently and there are even those who advocate the implementation of penalty fines for those who break the ban. Whilst we believe that some monitoring of mobile phone use by the cabin crew is necessary, we do not think it is feasible to expect the cabin crew to spend a substantial amount of time as mobile phone police.

**Recommendation: Airlines should review their pre-flight announcement to ensure it adequately explains that mobile phone use carries a risk of interference with flight and navigational systems.**

### **Stakeholder Groups**

**Mobile network operators** – Operators will receive a portion of the revenues from per minute and per message fees levied on all calls and texts made using the OnAir system. The operators' previous worries about interference with their towers seems to have been alleviated by the new technology in the OnAir system and others comparable systems.

**Aircraft manufacturers-** Airbus and Boeing invested a substantial amount of capital into developing GSM systems for their planes and as such, they would favour widespread implementation. According to Airbus Senior Vice President for Cabin and Cargo Customisation, Rainer von Borstel, “This certification [of OnAir] is Airbus’ first response to the growing market demand for on-board connectivity.” Airbus believes that the growing market demand will result in profit, as Airbus subsidiary OnAir will receive a portion of the revenues generated by the system.

**Airlines-** Air France will be the first airline with the OnAir system, but RyanAir, BMI and TAP have all agreed to offer the service as well. The intense competition of the aviation industry suggests that many more airlines are likely to follow the lead of the first wave of ‘mobile-friendly’ airlines, as well as compete with some train lines.

**Regulatory Agencies-** In America, the Federal Communications Commission, is maintaining the ban. In April, citing a lack of technical information, the FCC announced that they were terminating an inquiry into allowing the use of mobile phones on airplanes. There has been no indication that the FCC will reopen its inquiry in response to the decision by EASA.

**Passengers-** There is a demand for the use of electronic devices on aircraft from business travellers. However, the response of the rest of an aircraft’s passengers to a mobile-friendly environment is difficult to predict.

In June 2006, the International Airline Passengers Association (IAPA) conducted an online survey of its members on the topic of mobile phone use in aircraft. They received 1500 responses from members in 120 different countries, though the majority were from Europe and North America. The results showed that passengers were not as enthusiastic about mobile phone use on aircraft, especially for voice calls, as many in the aviation industry thought. When asked whether they agreed with the statement, “Using cell phones on planes will be more useful than disruptive”, only 37 per cent agreed or strongly agreed, whilst 50 per cent disagreed, including 27 per cent that strongly disagreed. Only 50% responded that the ability to make voice calls would be somewhat useful or very useful, but the demand appears higher for email and text services – 68% thought the ability to email would be somewhat or very useful and 66 per cent thought the ability to text would be somewhat or very useful. 45% of respondents said that someone sitting next to you making a phone call was highly annoying (10% higher than a child crying) and only 5 per cent of respondents said that a passenger seated next to them making a call was not annoying at all.

### **International Cooperation**

The approval of the OnAir system by EASA at the same time as the opposite action from the FCC has placed a priority on developing what the International

Civil Aviation Organization calls a “global framework” for dealing with mobile phone use on aircraft. Due to the high level of competition in the aviation industry, airlines and air manufacturers are already seeking approval of OnAir systems and others like it in different aeroplane models and markets. It is possible that approval for more models in more markets could be granted before the risks of unrestricted mobile phone use in aircraft are completely understood.

**Recommendation: A conference be organised that would bring together all relevant stakeholder groups to discuss how to create the “global framework” necessary to limit the risks associated with this issue.**

### **Conclusions**

Since the Carnegie Mellon research suggests that mobile phones are being used on aircraft, it is clear that due to a lack of compliance, the ban as it exists now is not completely effective. One option for regulators is to simply lift the ban. EASA is already moving in that direction. PACTS believes that lifting the ban at this point in time is premature. Future research on picocell systems like OnAir should guide any decisions made about this issue.

### **References:**

“Airbus wins European approval in-flight cell calls” *USA Today*. 19 June 2007  
[http://www.usatoday.com/travel/flights/2007-06-20-airbus-cellphone\\_N.htm](http://www.usatoday.com/travel/flights/2007-06-20-airbus-cellphone_N.htm)

Crampton, Thomas “Europe opens the door to in-flight phoning” *International Herald Tribune*. 19 June 2007  
<http://www.iht.com/articles/2007/06/19/business/mobile.php>

Elgan, Mike “Why cell phones are still grounded” *ComputerWorld*. 7 April, 2007  
<http://www.computerworld.com/action/article.do?articleId=9015839&command=viewArticleBasic>

Lawson, Stephen “In-Flight Cell Phone Systems Gain Altitude” *PC World*. 15 June, 2005  
<http://www.pcworld.com/article/id,121399-page,1/article.html?RSS=RSS>

Strauss, Bill, M. Granger Morgan, Jay Apt and Daniel D. Stancil “Unsafe at any airspeed?” *IEEE Spectrum* <http://www.spectrum.ieee.org/mar06/3069>

Wassell, Tony “The Air Safety Group’s concerns about GSM as applied to aircraft” PACTS ASWP meeting, 21 June 2007