

Airlines ban cell phones -- but why?

Here's the real reason airlines are dealing you the mute button on your cell phone.



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As anyone who has flown has heard, using a cellular telephone aboard an airplane is dangerous.

American Airlines warns passengers that cell phones "may interfere with the aircraft's communication and navigation systems." Similar warnings come from Delta, United and Continental. British Airways links cellular interference to potential problems with compasses and even cabin pressure.

What the airlines don't tell passengers is that there is no scientific evidence to support these claims. What concerns there are about cellular phones in airplanes dwell in the realm of anecdote and theory -- and to some extent in that of plain finance. There is money to be earned or lost by cell-phone companies and airlines if cell phones are used in-flight.

Battery of tests

A 1996 study commissioned by the U.S. Federal Aviation Administration looked at thousands of flight records and failed to find a single instance in which equipment was affected by a wireless phone. The study was conducted by RTCA Inc., a nonprofit organization that sets industry standards for airplane electronics.

Plane makers Boeing Co. and Airbus Industrie have bombarded their aircraft with cell-phone frequencies and discovered no interference with communication, navigation or other systems. One likely reason that no problems were found: cellular phones don't operate on any of the frequencies used by airplane



"The airlines are misleading the traveling public," says John Sheehan, who headed the RTCA study and says he has often used his own cell phone in the sky. "There is no real connection between cell-phone frequencies and the frequencies of the navigation" or communications systems.

Using cell phones aloft on commercial and private aircraft is banned not by the FAA but by the Federal Communications Commission, which regulates telephone use. In prohibiting airborne use in 1991, the FCC was mainly concerned about cell phones' potential to interfere with ground-to-ground cellular transmission.

The FAA has never outlawed cell-phone use in airplanes. But the agency supports the FCC ban "for reasons of potential interference," according to an FAA advisory. Despite the findings of the 1996 RTCA study, the FAA remains concerned about anecdotal evidence of cell-phone interference in flight records, says an FAA spokeswoman.

The FAA isn't the only party still concerned. Boeing continues to advise airlines against cell-phone use in the sky. That's because the electrical charge from the batteries in most handsets exceeds the plane maker's standards. Although Boeing's tests have never shown this to be a problem, in theory the electricity emanating from the device could create interference with airplane systems.

Economic incentive

The airlines and telecommunications companies also have an economic incentive to keep cell phones turned off in the air. The carriers receive a cut of the revenues from the telephones installed onboard. The two main providers of this air-phone service, GTE Corp. and AT&T Corp., charge about \$6 for a one-minute call, more than 20 times typical cell-phone rates.

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These in-flight telephones also operate on cellular technology -- using a single airplane antenna to which the onboard phones are typically wired. AT&T and GTE, which recently agreed to sell its Airfone service, decline to discuss air-phone financial arrangements, as do several airlines. But Sheehan says airlines pocket about 15 percent of all air-phone revenue generated on their planes. GTE declines to discuss Airfone revenues, but analysts estimate the unit's annual revenues at \$150 million.

Some airlines also restrict cell-phone use on the ground, which isn't covered by the FCC ban, and which the FAA leaves to the airlines' discretion. Sheehan says he believes air carriers have resisted allowing cell-phone use on the ground because it "detracts from the revenue they get from the air phone."

Airlines deny this, and say the bans are for the benefit of the passengers. "We don't believe it's a good safety issue" to allow normal cell phones, says Andy Plews, spokesman for UAL Corp.'s United Airlines. "We'd like people to use the air phones." The FCC's concern about air-to-ground cellular interference is real enough. From high in the sky, a cell phone acts like a sponge, sucking capacity out of the cellular sites that carry calls. For ground users, cell phones communicate by connecting to one cell site at a time; from the air, because of the height and speed of an aircraft, the phones often make contact with several sites at once. If allowed, this would limit call capacity, which would mean less revenue, says Howard Sherry, chief wireless scientist at Telcordia Technologies Inc., formerly the research arm of the Baby Bell telephone companies, in Morristown, N.J.

The cellular signal from the air is also especially strong, since it is unimpeded by buildings or other ground clutter. That often means it can jump on a frequency already in use on the ground, causing interruptions or hang-ups. And airborne cellular calls are sometimes free because the signal is moving so fast between cells that the software on the ground has difficulty recording the call, says Bentley Alexander, a senior engineer at AT&T's wireless unit.

Jailed in England

The FCC says no passengers in the U.S. have been prosecuted for violating its regulation because airlines have diligently enforced the ban. But Neil Whitehouse, a British oil worker, is serving a one-year jail sentence in England for refusing to switch off his cell phone on a 1998 British Airways flight from Spain.



Sue Redmond, a British Airways PLC spokeswoman, says Whitehouse put the plane at risk because cellular phones can disrupt the plane's automatic pilot, cabin-pressure controls -- and "every system that is needed to keep that airplane safe for flying."

One expert witness at Whitehouse's trial was Daniel Hawkes, the head of avionics systems for the Civil Aviation Authority, the British counterpart to the FAA. In a telephone interview, Hawkes says phones have a "potential for a problem," but he concedes that there is no "hard evidence" of any problems. Still, he says it wouldn't be wise to allow cell phones on airplanes because the constant chatter might annoy other passengers. "You'd probably have more instances of air rage," he says.

Indeed, the recent trend by some U.S. airlines to allow cell-phone use in planes parked at the gate coincides with growing passenger frustration with flight delays and poor service. These carriers include Northwest Airlines Corp., United, AMR Corp.'s American and Delta Air Lines Inc. Letting passengers chat on the ground is "good passenger service," says Delta spokesman John Kennedy.

The early days

Cell phones on airplanes first became an issue in the late 1980s. At the time, many wireless devices, including laptop computers and audio-cassette players, were proliferating. The responsibility for setting guidelines fell to the FCC, which has joint jurisdiction with the FAA for regulating wireless use on aircraft. Cellular companies were overwhelmingly opposed to allowing cell phones in the air, but broadly supported their use in aircraft on the ground.

At first, the FAA favored banning cell phones at all times. In a 1989 letter to the FCC, the FAA warned that cell-phone use could "significantly increase the risk to aviation safety," whether "operated on the ground or in the air."



This position was supported by most of the major airlines. Trans World Airlines Inc. told the FCC that allowing cell-phone use, even on the ground, "could be a detriment to public safety."

The cell-phone companies were already on the record as being opposed to in-flight use -- but for different reasons. In a 1988 letter to the FCC, McCaw Cellular Communications Inc. wrote that air use could cause "highly disruptive interference to cellular systems" because of the "greatly increased transmitting range" that cell phones have aloft. Nynex Mobile Communications Co. warned that air use would "likely result in significant interference to other cellular transmission."

Debating on the ground

As the FCC continued to mull regulations, cellular companies sought to debunk the FAA's claims of potential cellular interference with critical aircraft systems while the plane is on the ground. McCaw, Motorola Inc. and Alltel Mobile Communications Inc. -- now a unit of Alltel Corp. -- noted the absence of scientific studies to support these claims. If cell phones do truly interfere, Alltel wrote in a 1990 letter to the FCC, "one wonders why problems have not resulted from the widespread use of cellular telephones in airport lobbies, parking lots and other facilities in close proximity to aircraft." McCaw cited the wide use of walkie-talkies by airport employees and ground crews.

In 1991, the FAA backed off on ground use, saying airlines and pilots could use their own discretion. Later that year, the FCC passed its regulation banning airborne cellular use. The ban didn't apply to preinstalled air phones. As an integral part of the airplanes, those devices had to undergo strict FAA tests before they were allowed on planes. Those tests showed no problems. As passenger carry-ons, cell phones have never been run through the FAA equipment-testing process.

The installed air phones also posed no problems for cell systems on the ground. The outside aircraft antenna that carries the air-phone calls also connects to a ground-based cellular network -- but with cells that are spaced much farther apart to avoid multiple phone-to-ground links.



The issue began heating up again in 1992, when Rep. Bob Carr, then a Michigan Congressman, and vice chairman of the Transportation Appropriations subcommittee, asked the FAA for a detailed look at alleged cellular interference. Rep. Carr had been reprimanded by a United flight attendant for using his cell phone while a flight to Chicago was delayed on the ground in Detroit. Carr, a pilot, says he regularly used his cell phone while flying on commercial planes in the late 1980s. He says he is convinced the airline ban was, and is, "bogus" and not founded in science. The FAA asked RTCA to look into the issue. When anything goes wrong on a flight, pilots or operators are required to file "incident reports," which are collected in a database kept by the National Aeronautics and Space Administration. RTCA, which began its study in 1992, sifted through a decade's worth of such incident reports, about 70,000 in all, covering both commercial and private flights. RTCA, formerly called the Radio Technical Commission for Aeronautics, also was given access to confidential reports kept by some airlines in later years.

Of 384 incidents that pilots suspected involved electronic interference, RTCA found most were baseless or didn't appear to be related to any electronics. Only 10 "had the potential for being interference from electronic devices carried onboard," says Sheehan. Of those 10, none involved a cell phone.

In theory, any device that emits electronic waves -- including laptops, electronic games, pacemakers and hearing aids -- has the potential to cause interference to an airplane. Part of the problem is that airplanes are packed with a huge amount of electronic equipment, from radios and navigational equipment to smoke detectors and in-flight video. These systems can interfere with one another. Moreover, planes in the air are constantly flying through what engineers call a thick electronic soup of emissions from television and radio towers, satellite transmissions and other emitters. This makes pinpointing a single interference event in many cases nearly impossible.

Six years ago, Boeing received word that a laptop computer was suspected of shutting off the autopilot system on one of its jets during a commercial flight from London to Paris. The pilot conducted tests by turning the computer on and off, which the airline said again triggered the autopilot error. The airline "felt 100% confident that it was a particular laptop" causing the problem, says Bruce Donham, a senior electromagnetics engineer at Boeing.



Boeing sent engineers to Europe, purchased the laptop from the passenger, and tried unsuccessfully to re-create the problem from the same seat and during the exact time of the flight. Later, Boeing arranged to fly the empty plane on the London to Paris route, moving the laptop throughout the aircraft. No interference was discovered. The aircraft maker then brought the laptop back to Seattle and tested it in a Boeing lab. Donham says the tests showed no correspondence between electronic emissions from the laptop and the autopilot computer.

'No empirical data'

After its study, RTCA decided to recommend allowing laptops, electronic games and CD players in the air because it couldn't duplicate interference. To be safe, RTCA recommended banning all electronics during critical phases of a flight, which are generally considered to be during takeoff and landing, when a plane is below 10,000 feet.

As for cell phones, RTCA's study found "no empirical data" linking their use to safety issues on the ground or in the air. But the RTCA ran out of money and time before it could conduct tests using actual cell phones in various aircraft. So the organization, acting conservatively, recommended that cell phones and other so-called intentional transmitters -- such as radio-controlled toys -- be banned in the air.

Aircraft makers conducted their own tests for interference as the use of wireless devices grew. Airbus, the No. 2 plane maker, was close to releasing its first fully computerized jet in the mid-1980s. It brought that jet, the A320, to a French Air Force base in Toulon, and parked it within 10 feet of a series of radar beams and electronic transmitters, including ones that simulated cell phones and other wireless devices, says spokesman David Venz. "There was no impact" on aircraft systems, says Venz. Boeing put its jets through a similar test in 1991, and no interference was found, Boeing says.



But when the airlines, concerned about growing cellular use on the ground, came to the company seeking guidance in 1993, Boeing advised them not to allow intentional transmitters, including cell phones, on the ground or during flight. Donham, the Boeing engineer, says the company adopted a "conservative position" because it didn't know enough to clear them.

Boeing kept testing. In 1995, engineers at the aircraft maker conducted a four-hour test on a 737, setting up about 20 cell phones throughout the jet and monitoring the plane's radios, navigational equipment and other controls. A variety of flight conditions were simulated. The results: "Absolutely nothing," says Donham.

Airbus has told airlines it sees no problem with onboard cell-phone use anywhere. "We haven't come up with any indication" that cell phones have "any negative impact," says Venz, the spokesman. Donham says Boeing is revising its cell-phone guidelines to suggest use on the ground is now acceptable. But Boeing still advises the airlines against cell-phone use in the air because the devices exceed the company's guidelines for electrical emissions.

Sheehan, who is also a certified pilot, notes that cell phones are regularly used on private and corporate planes "thousands of times every day" without incident. He says he has dialed from the air on many occasions. When asked whether cell phones should be included among the list of devices such as laptop computers that are now permitted above 10,000 feet, he says "that would be OK. It's not a problem."



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