This is your captain: Turn off that cell phone!

By Jay Apt, M. Granger Morgan and Bill Strauss

Airline travel has always been a balance between safety and convenience. At a time when some airlines have become more serious about enforcing rules against operating iPads, Kindles and other electronic devices during takeoff and landings, the Federal Aviation Administration is now considering relaxing its rules to accommodate "consumer interests."

Pressure is mounting. The Wall Street Journal has examined the issue, and The New York Times has ridiculed the FAA ban in three recent pieces.

The prohibition applies to moments when airliners are at greatest risk -- as they speed near the ground guided by very low power navigation signals, some from GPS satellites whose faint signals travel 12,000 miles from orbit.

Facts from our research may help to inform the discussion.

There are hundreds of reports in NASA's Aviation Safety Reporting System database identifying electromagnetic interference events caused by portable electronic devices, or PEDs. Although interference with the enroute navigation system was most often cited, landing navigation, radar altimeters, autopilot systems, ground proximity warning systems and, once, even an engine fuel controller were all affected during passenger flights. Significantly, in a number of cases, the cockpit crew verified that a PED was the source of a problem by having it turned off and back on and seeing the problem repeat before requiring that the device be turned off.

Corporate pilots have reported that GPS navigators can lose satellite signals in flight because cellular telephones are turned on, even when they are not being used for a call. In one report, interference from a cell phone occurred at different locations, involving three different GPS systems, and was repeatable on multiple flights. NASA performed laboratory tests and reported that the tested phone model presented a real threat to GPS navigation.

We conducted a survey of frequent travelers which indicated that passengers are not aware of the reasons for limiting in-flight PED use. Many doubt that safety is an issue. The survey confirmed that these travelers were using prohibited electronic devices and using permitted devices at prohibited times.

With support from the FAA and assistance from three major airlines, we recorded radio emissions in the cabins aboard 37 commercial flights. Key findings were that onboard cell phone activity is taking place, GPS frequencies are polluted by PEDs in a way that could result in
interference and that passenger use of PEDs, including wireless devices, is occurring at prohibited times.

Some argue that some PEDs do not produce radio emissions above FAA standards and are pleading with the FAA to allow them at any time. Such devices may be safe when they are new, but if they are dropped or improperly repaired they may no longer be safe. The airline radio industry standards group has conducted thorough testing of numerous PEDs and concluded that there is insufficient information to support a wholesale change in policies.

So what should be done to prevent accidents caused by the passenger use of electronic devices?

First, measure what's going on in flight. Our study was limited and should be expanded to allow data mining (now routinely practiced by airlines) to correlate interference events with onboard PED use. As things now stand, if PED interference caused an accident, we would probably never know.

Second, develop and deploy simple real-time tools which can allow a crew to detect radio frequency emissions so they can make sure devices are turned off before and during takeoffs and landings.

Third, foster more industry-government and inter-agency cooperation to ensure that rules and policies align with current technology.

Fourth, don't discard safety reports submitted by pilots; budget cuts at NASA have meant that only a fraction of reports are entered into its database.

Fifth, clearly communicate to passengers that PEDs are restricted due to the risks posed by their use. Turkish Airlines' announcement is straightforward: "Mobile phones interfere with the flight instruments and have a negative effect on flight safety." This message is accompanied by a drawing of a cell phone controlling the aircraft.

Our research has convinced us that the use of PEDs in flight should continue to be limited and that no one should be allowed to operate such devices during critical phases of flight. Clearly, communicating this to the flying public would be the most effective way to prevent an aviation disaster involving interference from portable electronic devices.

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