

# Quieter, cleaner airplane landings on the way

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An experimental procedure that substantially reduces the noise of descending aircraft is one step closer to availability for commercial air carriers, thanks to the continuing efforts of a research team led by Professor John-Paul Clarke of MIT's Department of Aeronautics and Astronautics.

In addition to improving the lives of people living and working along airport approach routes, the new procedure reduces aircraft engine emissions and fuel consumption.

Initial tests in 2002 using two United Parcel Service-provided Boeing 767 aircraft proved that the noise of landing airplanes could be greatly reduced by modifying descent paths and procedures. The researchers have now completed a significantly more complex test, applying their protocol to multiple aircraft in scheduled service. In a two-week trial last September at Louisville Regional Airport involving 126 UPS evening flights, Clarke's team demonstrated that air traffic controllers could handle 12 to 14 flights per night using the procedure. The tests also confirmed the procedure's environmental and economic benefits.

In traditional approaches, aircraft begin descending many miles from the runway, spending substantial time at relatively low altitudes. These paths are analogous to a staircase: planes descend in steps requiring noisy engine thrusts every time they level out.

The new procedure, called a continuous descent approach or CDA, keeps aircraft at cruise altitude until they are relatively close to an airport. At this point, the aircraft make an even, continuous descent to

the runway. The result is an average noise reduction of four to six decibels. A three-decibel difference is appreciably noticeable to the human ear while a 10-decibel reduction equates to 50 percent less noise. Side benefits include reduced fuel burn and emissions, and slightly shorter flights, as aircraft operate at lower power settings, stay at higher altitudes, maintain higher speeds, and take more direct--and thus shorter--paths to the runway.

Carl Burleson, director of environment and energy for the Federal Aviation Administration, said, "the research team proved the benefits of continuous descent approaches, that the basic principles are correct, and that robust air traffic procedures can be developed and implemented to simultaneously achieve low noise, lower emissions and reduced cost."

Clarke's team includes other MIT researchers as well as representatives of Boeing, the FAA, the Louisville Regional Airport Authority, NASA and UPS. More work remains before CDA approaches are officially implemented at Louisville, and then elsewhere. The researchers' must refine the operational procedures for conditions beyond the two-week test environment. Additional research and testing is required for airports with heavier traffic volume and greater diversity of airlines and aircraft types. Other airports, airlines and the FAA are evaluating CDA for applicability to nighttime operations.

Design and approval of new flight and landing procedures is an extremely complex undertaking. Researchers and authorities must be assured that airborne and ground-based computers, flight crews, air traffic controllers and aircraft are adaptable to the new protocol, both individually and in unison.

"Safety is always everyone's paramount concern," said Clarke. "Now that the process is validated, the same tools can be used to customize similar procedures for other airports."

Source: MIT

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