Reducing Aircraft Fuel Consumption

While Watts Antenna Company rejects a radical ‘green’ agenda, we wholeheartedly embrace reasonable steps aimed at eliminating the needless waste of airplane fuel. In this sense we are in broad agreement with NextGen’s commitment to *“reduce aviation’s environmental footprint through a combination of enhanced air traffic procedures...that reduce delays and save fuel.”*

Moreover Watts’ commitment extends beyond merely endorsing the spirit of this NextGen objective. We believe the Watts ILS product line materially contributes to optimized fuel consumption. How?

In this increasingly congested environment, any technology that demonstrably reduces aircraft fuel consumption while expediting air travel by mitigating travel delay is a welcome complement to an airport’s configuration.

A key metric of airport efficiency is Runway Occupancy Time (ROT) which is the length of time required for an arriving aircraft to proceed from over the runway threshold to a point clear of the runway. The concept is rather intuitive; the shorter the ROT, the better the through-put of the airport and the greater the efficiency of fuel consumption.

This is where Instrument Landing System (ILS) optimization can also play a crucial role. For the layman, ILS is a ground based precision approach system consisting of a localizer and glide slope antenna array that provides lateral and vertical guidance, respectively, to landing aircraft.

The ILS signal can be reflected or distorted by proximate structures as well as by moving objects such as aircraft and vehicles, a phenomenon referred to as *multipath*. Thus structures such as fuel tanks, hangars and hotels cannot be situated as close to runway activity as an airport manager perhaps might like due to multipath restrictions. As the word implies, the radio signal scatters across multiple paths due to reflection off ancillary structures and objects. In this way the multipath phenomenon reduces the navigational effectiveness of the original RF signal. In order for ILS to perform effectively, certain buffers or designated areas are defined wherein airport activity must be minimized. These curtailments on airport activity, though in part a precautionary safety measure independent of ILS, work to restrict the economic viability of the airport facility.

Thus the integrity of any ILS signal depends on appropriate protection of the critical and sensitive areas. The Critical Area (CA) is defined as an area of defined dimensions about the localizer and glide path antennas where vehicles, including aircraft, are excluded during all ILS operations.

The Sensitive Area (SA) is larger than the Critical Area (at least by ICAO, Annex 10 requirements), extending to the parking and/or movement of vehicles, including aircraft, in order to prevent the possibility of unacceptable interference to the ILS signal during ILS operations. The sensitive area is protected against interference caused by large moving objects outside the critical area but still normally within the airfield boundary.

If the size of these areas can be reduced, the landing capacity of the airport can be increased and with it, the *economic throughput* of the airport facility. For example, the narrower the beam width of the localizer antenna, the smaller the Sensitive Area becomes. At the very least beam width should be carefully considered when contemplating an ILS purchase since the operational benefits can be significant. An unclassified 2008 NLR report (NLR-CR-2008-255-VOL-1) *"Improvement of the Landing Capacity by Optimisation of the Size and Shape of the ILS Sensitive Area"* showed that the WATTS MODEL 201 HIGHLY DIRECTIVE LOCALIZER SYSTEM makes it possible to reduce the sensitive area width from 450 ft to 300 ft.

Any now-gen solution that favorably impacts fuel consumption is a solution well worth re-examining. The numbers are huge by any metric. According to the Bureau of Transportation Statistics (BTS is a RITA division within DOT), the US airlines industry's fuel cost, both domestically and internationally, was $2.5 billion in May 2009. This equated to 1.4 billion gallons of fuel. In terms of delays, the economic opportunity costs to the broader US economy in lost productivity are equally enormous, according to a 2008 U.S. Congress Joint Economic Committee (JEC) report amounting to $41 billion in 2007.

At the 2008 peak, fuel costs represented up to 40% of an airline's operating costs. This was up significantly from 10-20% levels in the 90's. Some experts believe U.S. airlines waste $9 billion a year on delays beyond their control. That's more than the combined losses of all the world's airlines in 2008. Thus carriers themselves should be incentivized to reduce delay-related costs. But there's more than fuel efficiency at stake. For instance, the JEC report helps to illustrate both the breadth and extent of the cost impact:

"When a plane is delayed, the airline must pay more for crew, fuel and maintenance. The airline must also pay more in overhead costs, because a less efficient system requires a greater number of aircraft, support facilities, and

related personnel. For 2007, the total estimated cost of operating delay is $19.1 billion."

After a post-911 dip, flight delays have been on the rise, setting record levels in 2007. Clearly things will get worse before they get better. The FAA recently projected that air traffic will increase by the equivalent of two major hub airports each year through 2020. As fuel consumption appears set to increase anyway for entirely legitimate reasons, any NowGen alternatives for reducing waste must be pursued aggressively. More efficient air traffic management via Watts' advanced ILS products is one of those initiatives.

Watts is making NextGen happen *now*.