Facilitating Airport Growth Opportunities

In a 1996 report, AIDS TO PRECISION APPROACH AND LANDING: PROPOSED STRATEGY TO SUSTAIN PRESENT LEVEL OF ILS SERVICES, the Republic of South Africa's Civil Aviation Authority highlights the tension that often exists between the growth objectives of an airport and the sensitive and critical area requirements of an Instrument Landing System (ILS):

> *"…the engineers responsible for the safeguarding of ILS operations are often under pressure from developers to allow further development. This inevitably means that the ILS engineers responsible for protecting the ILS from development become involved in designing or approving buildings to a limit at which they believe there will be no significant effect on the ILS signal. There are two major risks associated with this. First, there is likely to be a gradual degradation in performance due to the combined effect of all the buildings, even though the effect of each one individually is acceptable. Secondly, there is always the possibility of an error in judgment which, in effect, allows one building too many. These problems could be intensified by the development of new hangers, which are significantly larger than existing 747 hangars."*

Whereas the more common perception is that of one large structure causing a multipath effect, multipath degradation of ILS performance can be a problem brought about even by the cumulative (and by themselves, minor) encroachments of a series of structures. As early as March 2000, Watts Antenna Company was stressing strategies aimed at static multipath reduction in order to assure the continued viability of ILS and spur additional airport growth. (Instrument Landing System (ILS) Solutions for 2000 and Beyond. Here's an excerpt:

"A detailed analysis requires that sources of error for the ILS localizer be grouped into two categories. ICAO recognizes the two part composition of errors as follows; 1) static i.e. hangars, power lines, parked aircraft etc; and 2) moving objects herein referred to as dynamic i.e. aircraft, vehicles, etc…Reductions in the magnitudes of static and dynamic errors are necessary for continued use of the ILS."

Another ILS industry practice involves selling a 'low cost' (read: small array) ILS which, despite its lower sticker price, incurs significant hidden, or opportunity, costs due to the small-aperture-wide-RF-beam design encouraging greater multipath effects and thus embargoing larger swathes of valuable airport real estate. Unless the industry can do a better job conveying the enhanced value that state-of-the-art ILS solutions can deliver, ILS will continue to slide down the value-chain, becoming a commodity business dominated by low-cost providers. In effect, Watts believes cheap ILS solutions impose a costly burden across the totality of the airport enterprise.

This penny-wise-pound-foolish strategy stems, we feel, as much from unsophisticated marketing as it does the capital budget constraints of the airport. A small and inexpensive ILS can strangle an airport's economic viability, all in the name of saving money on the initial ILS purchase. An integral part of appropriate ILS selection should be the opportunity cost impact to the airport as a whole. In many respects, the **WATTS MODEL 201 HIGHLY DIRECTIVE LOCALIZER SYSTEM** is the culmination of ILS localizer design in that it's narrow RF beam renders ILS, for all practical purposes, invisible. By this, we mean the multipath 'load' on surrounding airport real estate is reduced to a 300-foot-wide critical area. When one considers the wingspan of a 747 is 211 feet, and then allow for the unavoidable separation distance between aircraft, ILS no longer imposes itself beyond the threshold of need. The only remaining impediment is the irreducible Obstacle Free Zone (OFZ). As Watts points out on its promotional literature, *we have taken ILS out of the game*, and in the best way possible.

So why are these exciting financial benefits, brought about by recent ILS developments, not more widely recognized in the industry? The fact is sponsored ILS R&D funding has fallen victim to the GPS juggernaut. Unlike Loran, another besieged legacy technology, ILS has no industry association or lobbying arm. However even before the advent of GPS, the evolutionary path of ILS development was typified by "fixing the problem rather than fixing the system" as Watts Antenna Company characterized it in a year 2000 letter to Senator John McCain, then-Chairman of the Senate Commerce, Science and Transportation Committee. For better or worse, the tradition of ILS has been utilitarian in nature. Dating back to its origins in WWII, the mission has always been about putting out fires without the luxury of long-term strategic coherence.

To the extent that sustained ILS R&D effort has occurred at all, Watts Antenna Company has been at its forefront. Watts is not in the business of NextGen speculation. ILS solutions exist *today*. The absence of a large-scale, vocal R&D effort or industry trade group reflects itself in diminished FAA support. Viable ILS solutions go begging for lack of FAA certification.

Airports operate within two fundamental spheres of activity. One is transporting people safely and efficiently. The second is serving as a vital economic hub for their region. Watts Antenna Company is convinced a renewed partnership between the ILS industry and airport development interests is long overdue. The latter has much to gain from a better understanding of ILS' diminishing impact on crucial airport assets. For example, it might surprise many airport managers to learn that the old fears relating to degraded ILS signal quality have been extinguished by ILS advances. The concerns are familiar ones:

- Construction permits for buildings can be denied.
- If approved, the length, height or orientation of the building may be dictated.

- Taxiway separation or orientation needs to consider the ILS signal.
- Critical areas are dictated and can greatly reduce capacity and efficiency.
- Larger aircraft mean greater restrictions, i.e., the Airbus A380.

(Other factors such as obstacle free zones OFZ may also contribute to some restrictions)

Pressure is intense on airports, particularly smaller ones, to employ their facilities in the most economically advantageous ways. For example, the inability to situate large hangars due to multipath concerns can disqualify some airports from coveted hub status.

For its part, the Federal Aviation Administration (FAA) has a very detailed and stringent policy relating to the submission and approval of an Airport Layout Plan (ALP.) Key dimensional criteria are included for the airfield geometry based on FAA design standards. This includes, but is not limited to, the size of the runways and various taxiways, runway safety areas and runway object free areas, building restriction lines, navigational aid (e.g. ILS) critical areas, and other dimensional data recommended by the FAA.

Making matters worse, the consolidation trend towards fewer, larger airports is undeniable. The Airports Council International North America's 2009 Capital Needs Survey bears this consolidation trend out in its capital development cost estimate for 2009 through 2013. The ACI-NA surveys approximately 3,400 airports, ranging from the largest commercial service airports to general aviation airports which comprise the national airport system. ACI-NA found that airports' capital development costs for 2009 through 2013, amounted to $18.9 billion annualized compared to $17.5 billion annualized for 2007 through 2011. Large hubs recorded an increase of 19.0 percent from $46.5 billion to $55.3 billion. Medium and small hubs saw the largest decreases of capital investment by more than 22 percent and 8 percent respectively among all the airport hub categories, leading to the decrease of their share of total development by 6.6% from the 2007 estimate. Medium and small hub airports are particularly affected by the current downturn in the economy and aviation industry.

As the financial pressure grows on smaller airports, ILS systems that perhaps looked cost-prohibitive a short time ago should be re-appraised particularly in light of Watts Antenna Company's recent gains in ILS multipath reductions through enhanced RF and multi-array design. Studies have shown that, as traffic throughput grows, non-aviation revenues become a larger percentage of the airport's revenues. An entire region's economy can rest on the continued existence of its regional airport. If the FAA's NextGen capacity projections are even close to actual 2025 needs, passenger miles across America will rise sharply even as total airport capacity will lag across major metropolitan areas. The routing of passengers through secondary facilities, while not perhaps optimal, will no doubt happen as a function of first-tier capacity shortfalls. Though the present economy is challenging,

a small airport equipped with a state-of-the-art Watts ILS will be a National Airspace asset in the out-years.

What Watts Antenna Company related in its 2000 letter to the U.S. Senate is no less relevant today than it was nearly a decade ago: “Watts Antenna Company already has new and effective designs that can solve problems. They need implementing.”

At Watts, NextGen is happening *now*.