CALLBACK
From NASA's Aviation Safety Reporting System
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Metroplex Mystique

The FAA is striving to improve efficiency in the National Airspace System (NAS) by increasing capabilities in 12 active or completed Metroplexes. A Metroplex is a metropolitan area that includes one or more commercial airports with complex, shared airspace and serves at least one major city. Potential benefits include reduced fuel burns, fewer aircraft exhaust emissions, and improved on-time performance.[1]

The Optimized Profile Descent (OPD), the Optimization of Airspace and Procedures in the Metroplex (OAPM), and Time Based Flow Management (TBFM) are important pieces of the Metroplex concept. Operational problems that occur in Metroplex areas are not unique to Metroplex environments nor attributable to Metroplex mystique. Threats experienced in Metroplex areas result from complex interactions and forces at play when optimizing airspace, time, and aircraft operations. Some threats are exclusive to the Metroplex environment and relate directly to a piece of the Metroplex concept. Most threats are not limited strictly to the Metroplex environment, but they are intensified by the higher traffic density. ASRS reported incidents citing Metroplex issues reveal that the usual suspects are involved when considering related factors such as degraded communication, misunderstanding, lack of procedural knowledge, and poor execution.

This month *CALLBACK* offers a sample of reported Metroplex incidents from Pilot and Controller points of view. Resulting complications include traffic compression, aircraft separation, vectors for spacing, airspace violations, potential airborne conflicts, and airspeed reassignments that result in unachievable altitude restrictions.

Sweet Separation

After receiving clearance for a visual approach, a Challenger Jet Captain was drawn into a compromising position. The incident illustrates a looming concern as Airport Acceptance Rates (AAR's) and Airport Departure Rates (ADR's) are increased within a Metroplex.

■ *South of Avenal, ATC [vectored] a heavy B747 1,000 feet above us, sequencing us behind them for Runway 24L with repeated cautions for wake turbulence. Both aircraft were instructed to fly heading 065 after Santa Monica, which puts them on a downwind for Runway 24L. The B747 had made the turn to final when ATC asked us if we had a visual on the B747. We acknowledged that we did and were cleared for the visual. At that point, separation from terrain and other aircraft is now my responsibility. We set up for a squared off base to final turn to maximize wake turbulence separation from the heavy B747. Before we intercepted the final approach course, the Final Controller issued us a heading of 230 degrees. This shortened our turn to final and reduced our separation from the B747. After the B747 touched down, Tower cleared a Super A380 into position on Runway 24L and then subsequently cleared him for takeoff. We had minimum traffic separation from that aircraft and zero wake turbulence separation. A follow-up call to the Tower revealed that although ATC has guidelines of 5 miles minimum separation between departing aircraft and the same standard for arriving aircraft, there is no standard separation between a departing aircraft and an arriving aircraft.*

Waking Up During the Descent

This C560XL Captain was a bit upset when he encountered the wake of another aircraft. The two aircraft were descending within a Metroplex on different STARs that serve different airports, share common waypoints, and provide guidance to aircraft whose weights could differ by two orders of magnitude.

■ *While flying the FERN5 arrival into Santa Monica, descending thru FL370, we experienced severe wake turbulence from another aircraft in front of us. I believe [the aircraft was] a Super A380, on the SADDE6 arrival to Los Angeles. The event took place between REBRG and DERBB intersections with ATC reporting that the Super A380 was 15 nautical miles ahead of us and descending. The aircraft upset was an abrupt negative g's, followed immediately by a right roll to 90+ degrees.… I quickly brought the plane back to a level attitude, assessed passenger injuries, aircraft control in approach/landing configurations, and whether any structural damage [had occurred]. [There were] no serious injuries, and aircraft integrity was verified. We continued to our destination due to close proximity of all diverts (Van Nuys, Burbank, and Los Angeles). We [advised ATC of a medical issue with a passenger], and as a precaution, to have the passenger checked out by medical personnel upon arrival.…*

The FERN5 and SADDE6 [arrivals] converge and share fixes DERBB, REYES and FILLMORE. No altitude restrictions exist [at these three fixes] on either arrival. The FERN5 is tailored for smaller General Aviation (GA) aircraft and the SADDE6 tends to be for larger commercial aircraft. These two arrivals should not converge or share fixes, and [they should] have altitude crossing restrictions. ATC should also be aware of these conflicts and not allow Heavies [and] Supers to be descending thru this airspace [without] much, much greater lateral and vertical separation.

"Control the Ball" – *V. Lombardi*

An Approach Controller experienced unpredictable compression and inadequate spacing that resulted from new procedures and an OPD serving the Atlanta Metroplex. He offers his analysis, rationale, and solution.

■ *While assisting another Controller on the combined TAR-D/L position, four arrivals were inbound from the northeast, two on the WINNG arrival and two on the PECHY arrival. All aircraft needed to be blended in order to fit on the base leg for Runway 26R. Aircraft X, the lead aircraft on the PECHY arrival, was followed by Aircraft Y, also on the PECHY arrival. The spacing provided by Center was more than the required 5 miles, but due to the overtake created by the fact that arrivals cross the airspace boundary at 280 knots "descending via" the arrival procedure, this spacing rapidly collapsed to less than 5 miles. To mitigate the situation, the Controller issued Aircraft Y 210 knots to increase spacing enough to give the Final Controller something to work with. Aircraft Y immediately responded that they would no longer be able to meet their altitude restrictions if they slowed, which would, in turn, result in an airspace violation of satellite and departure airspace.*

It is unacceptable to get aircraft at 280 knots on the base leg, with unpredictable compression (there is a 15 mile window in which the Pilot can slow to 250 knots), especially when two base leg feeds are routinely fed to the same runway. Many times it is inappropriate to feed the Final Controller at a speed greater than 210 knots (our facility standard operating procedures specifically state that the final should not normally be fed at speeds greater than 210 knots), and aircraft "descending via" are unable to make altitude restrictions if slowed beyond the 280/250 knot restrictions on the Optimum Profile Descent arrival procedures.

[We should] terminate the OPD procedures at [our airspace] boundary and have all aircraft level at hard altitudes and in trail at 250 knots, especially when feeding dual base legs. The OPD is manageable in a single stream scenario, but we are being fed dual stream OPD arrivals from the northeast and the northwest. This complexity…creates a huge safety risk. Simply slowing an aircraft to 210 knots to comply with our SOP results in the aircraft not being able to meet crossing restrictions, [which then] results in multiple airspace violations.… The dual arrivals are routinely blended into a single base leg feed, requiring additional speed control and vectors. This procedure is not acceptable.

Old Habits Die Hard

An unexpected pilot route deviation prompted this Controller to issue a new "direct to" and "descend via" clearance. All seemed in order until the Controller remembered that the new OPD STAR is not what it used to be.

■ *Center cleared this aircraft direct SMOOV and failed to enter it into Enroute Automation Modernization (ERAM) (ERAM showed the aircraft routed over the HOWRR transition for the SMOOV arrival). I eventually noticed that the aircraft was not flying the route I expected it to fly, and that's when I had to figure out how to clear him back onto the route and issue a "descend via" clearance. So I [cleared] him direct SMOOV and issued the "descend via" clearance, but I had forgotten that the crossing restriction for SMOOV is at or above 10,000 feet. It had been 12,000 feet for ages before these new Optimal Profile Descent arrivals. The aircraft descended early down to 10,000 feet into A80 (Atlanta) Macon sector's airspace before crossing the boundary for the new shelf which has been set aside for this descent. There was no loss of separation or conflict.*

[At or above] 10,000 feet at Transfer of Control Point (TCP) SMOOV is a terrible design. It dramatically increases complexity and Controller phraseology in any situation where an aircraft isn't flying the entire arrival as published. Today, it was because a prior Controller in Jacksonville ARTCC cleared the aircraft direct SMOOV even though they're not supposed to. During thunderstorm season, there will be many times when aircraft will be deviating off of the published route for the STAR. The TCP, SMOOV, should be changed to at or above 11,000 feet, at the very least, thus totally eliminating any risk of an aircraft descending too soon into approach airspace without excessive verbiage from the Controller.

1. https://www.faa.gov/nextgen/snapshots/metroplexes/

ASRS Alerts Issued in April 2017

Subject of Alert	No. of Alerts
Airport Facility or Procedure	1
ATC Equipment or Procedure	1
Company Policy	1
TOTAL	**3**

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April 2017 Report Intake

Air Carrier/Air Taxi Pilots	4,703
General Aviation Pilots	1,156
Controllers	566
Flight Attendants	365
Military/Other	335
Mechanics	179
Dispatchers	151
TOTAL	**7,455**