The Airline Delay Problem
- Random Point Overloads -

With decades of expertise in airline operations, Air Traffic Control (ATC) and piloting (USAF, corporate, United B400 Captain, retired), airline operations research, airline economics and resource planning, it is clear to us that waiting for ATC to mitigate airline delays, congestion and excess CO2 is not working, and hasn't been working for 50 years. Not only does this cost individual airlines billions of dollars annually (analysis below), but it unnecessarily reduces productivity, product quality and safety while increasing costs, and adversely impacting passengers, investors, and employees.

For example, in the mid-1990s when Michael Baiada introduced FreeFlight he asked a simple question, "*How should airlines want to fly their aircraft*". Surprisingly, airlines had no answer for this question, and despite the widespread availability of real-time resource data and communication capability, airlines still have no answer today.

Critical Point: Airlines need to understand that which flight lands first, second, third, fourth, etc., and at what more profitable times is critical to the success of an airline's "*day of*" operation, something only each individual airline can know and efficiently accomplish.

Yet airlines continue to unnecessarily abdicate control over the moment of their aircraft to ATC.

Of course, separation/safety belongs to ATC, but this leaves lots of "*day of*" operational flexibility (gate departure time, speed, altitude, flight path, etc.) for airlines to step in (and step up) to manage the movement of their aircraft to meet their safety and "*day of*" business.

Critical Point: ATC Centric plan uses delay to correct the point overload defect and leaves the airline's/user's business goals and pilots 4D navigation capabilities out of the solution.

At a time when available technology allows airlines/users to easily input their real time "*day of*" business goals into the movement of their aircraft (schedule, connections, gate availability, crew legality, fuel, maintenance, galleys, lavs, etc.), and especially the arrival flow (thus preventing most delays), and when pilots are capable of arriving at a point in space within seconds (4D navigation), airlines still abdicate flow control to ATC. ***Why?***

So, let's get to it.

The root cause of most airline delays is the highly variable, yet predictable and easily preventable, random "*day of*" point overloads of our aviation assets (airports, runways, airspace, ramp, gates, ATC sectors, etc.). These can only be efficiently and systematically prioritized, managed, and optimized internally by each individual airline/user, and only during the "*day of*" operation, starting hours prior to landing and take-off.

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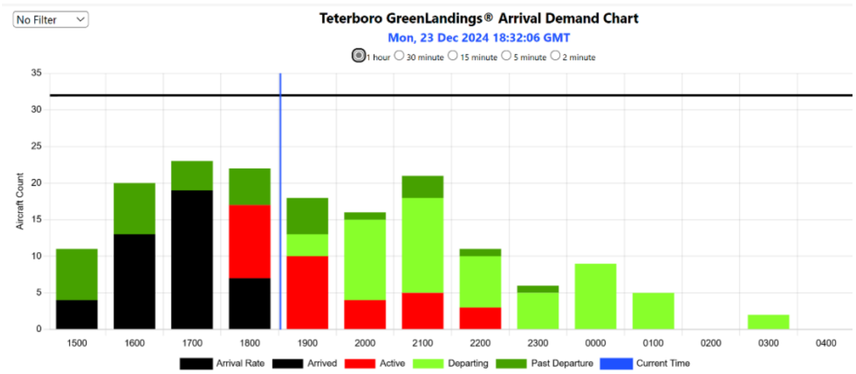
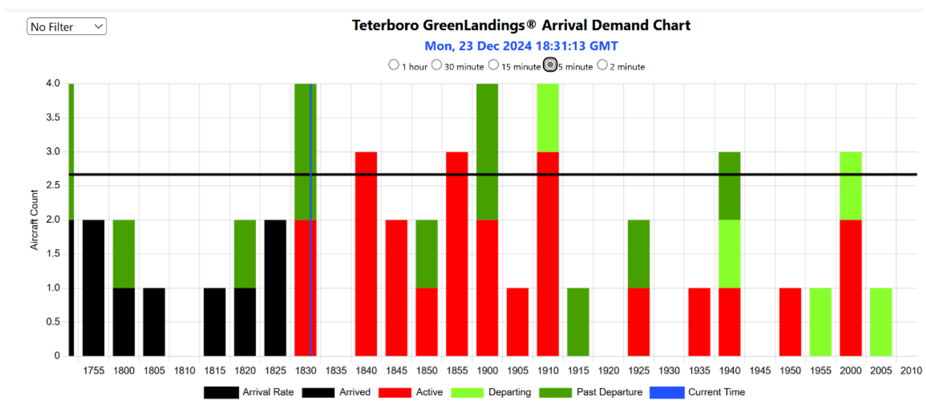
Not by ATC, not by FAA/Eurocontrol, not by adjusting schedules, not with slots, not by a focus on Departure Zero (D0), not by airports, not by labor, and not with a local solution.

The following 2 graphs from the joint Port Authority of New York and New Jersey (PANYNJ) Teterboro and ATH Group's Flow Management Solution Phase 2 web site highlights the "*day of*" random airport point overload problem at the one of the busiest Business Jet airports in the United States, operating in the midst of the New York/New Jersey metropolitan airspace.



The first slide is a view of TEB demand versus capacity in 1-hour bin-size increments. From the bar graphs on this slide, there appears to be no capacity problem (where demand exceeds capacity) between 1830z and 0300z. In fact, it looks like there is plenty of capacity -- so delays and congestion shouldn't be a problem.

But if you look at the same traffic load for the same period with a 5-minute bin-size breakdown, it is easy to spot point overloads (where demand is above or close to capacity for short periods of time), causing ATC to vector arrivals and extend finals, leading to delays, congestion, and excess noise and fuel burn at low terminal altitudes.



ATC accomplishes these de-peaking delays by moving aircraft later in time with ground holds (Ground Delay Program), enroute delays (Miles in Trail), vectors, speed reductions, reroutes, long finals, etc.

Critical Point: Once the point overload develops, ATC's only option to safely queue the arrival flow is to de-peak/de-congest/separate the aircraft flow later in time (delay).

Conversely, the airline/user can predict these point overloads hours prior to landing and de-peak their overall aircraft flow from a business perspective, forward in time (earlier), by applying small, coordinated speed up or slow-down directives to some of their pilots – operations that optimize their arrivals flow form a system, business and safety perspective.

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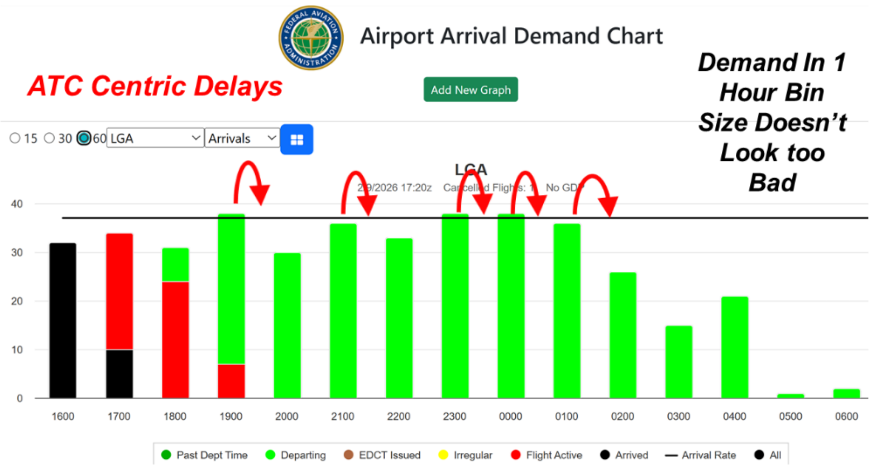
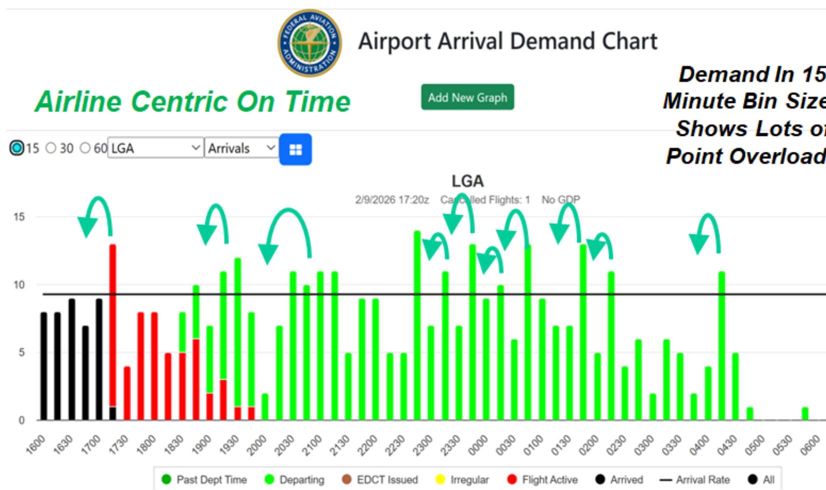
Further, you can illustrate and reach the same conclusions at any airline or business aviation airport using FAA's Airport Arrival Demand Chart (AADC) when you compare AADC's hourly bin chart with AADC's 15-minute or 5-minute bin chart.

Below are 1 hour and 15-minute bin graphs of FAA's Airport Arrival Demand Chart on Feb 9th, 2026.





Same airport (LGA), same arrival traffic load, same day and same time. The benefit of Airline/User Centric de-peaking forward in time from a system/business perspective, has been independently validated by FAA and others to rapidly reduce airline delays, congestion, excess fuel burn, CO2/NOx emissions, and government spending/complexity.

It is these numerous, preventable, "*day of*", random point overloads that airlines/users, using ATH Group's Flow Management Solution, operations planners (e.g., dispatchers) and pilots efficiently move the aircraft both earlier and later in real time (e.g., small speed change as their business needs dictates), where available capacity exists, and do it tactically, "*day of*", hours prior to arrival/departure, from a business optimization perspective.

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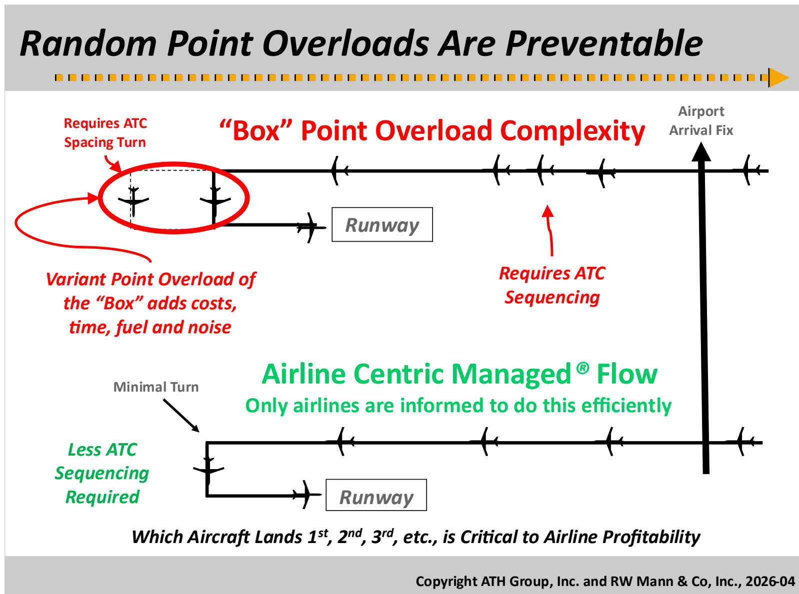
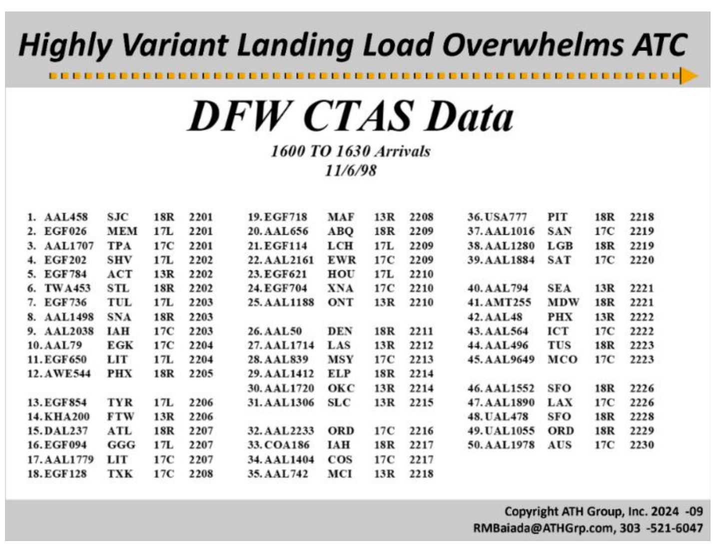
This pre-sorting makes the aircraft flow more stable, predictable, efficient, and easier for ATC to handle (less complexity) as validated by FAA's Task J Report and GE Aviation's Dubai FLOW Report.

Graphically, this is what occurs with an ATC Centric flow (red) and could occur with an Airline Centric Flow Manager (green) in the terminal airspace.



Or maybe 27-year-old Dallas-Ft. Worth Airport landing data from FAA's CTAS program can help.

The landing data is separated into 5-minute bins, where the runway demand varies from 13 aircraft per 5-minute bin down to 5 aircraft per 5-minute bin. Of course, ATC must build a system and *Structure* to handle 13 aircraft (or more) for each 5 min bin, whether it is needed or not.



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ATC's Job

ATC cannot make airlines/users efficient. They never could, never have, and never will. Only each individual airline/user has the business interest, business objectives/rules, worldwide communication, real-time resource status data, and cross sector/border control to make their "*day of*" operation efficient, and to optimize from a system perspective, all done, "*day of*" in real-time.

Critical Point: ATC's job is safety and separation, *not airline/user efficiency*.

Consider that after literally 5 decades of FAA program failures to reduce delays (slots, MLS, GDP, Miles-in-trail, AAS, ISSS, RNAV, Fans, GPS, FreeFlight, RNP, ADS-B/C, CPDLC, ERAM, STARS, TBFM, Trajectory Based Ops, CDM, NextGen, etc.), airlines still put all their eggs in FAA's basket ($31.5 Billion Hail Mary Brand New ATC System or BNATCS).

Further, FAA's BNATCS plan will do little, if anything, to reduce airline delays. But what BNATCS will do is further institutionalize ATC's control over the movement of the airline's aircraft, lock out the airline's "*day of*" business goals and increase scheduled block times now and decades into the future. This will haunt the airline's "*day of*" operation, and all of aviation, far into the future (Airline Centric Aircraft Flow Solution vs. ATC Centric TBFM, 2025-02).

For example, an airline/user might want to move an early aircraft with a gate forward in the arrival queue to land 10 minutes early to avoid a point overload (bunching) or because the pilots are close to becoming illegal for the next flight. Or the airline/user might slow a late flight enroute, save fuel, and land later since the gate is not available or the ramp is congested. Or the airline may speed up a flight to make it 20 minutes early because of required maintenance or priority revenue onboard. Or... but you get the idea.

Critical Point: Only each operator has the required business objectives, rules and real-time resource status information about which the ATC service provider is unaware and is outside the scope of ATC's role of safety and separation.

Only each individual airline/user can make these "*day of*" proprietary business decisions efficiently based on a system optimization, since moving one aircraft may impact 5 other company aircraft. In fact, different airlines/users with the exact same data may make different decisions, which is what business priorities are all about.

Conversely, ATC cannot do this and never should.

Critical Point: ATC does not cause delays. "*ATC delays*" are a myth that everyone keeps repeating without a basis in fact.

Does ATC vector and delay aircraft near the airport - of course. But these ATC actions are '*inherited'*, simply reactions (e.g., symptoms) of the "*day of*" unmanaged, random-point overload that airlines/users allowed to occur.

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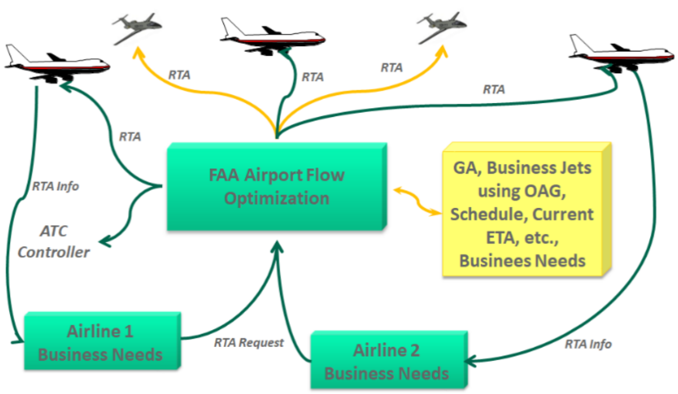
Most of these point overloads were knowable and preventable by the individual airline/user hours prior to landing. Yet today, airlines allow ATC to inherit unmanaged congestion and respond with complex safety and separation structure and actions.

Of course, ATC equipment failures or staffing shortages will cause delays, but these are Air Navigation Service Provider (ANSP) delays (FAA, Nav Canada, etc.) and not "*ATC*" delays. There is a difference. This subset of issues are **ANSPs' to fix.**

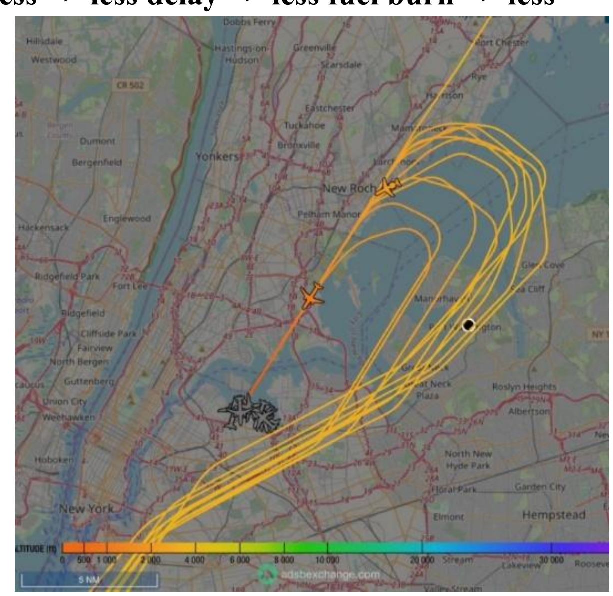
Therefore, what we now incorrectly assume are ATC delays (vectors, holding, long final approach segments, complex airspace structure and other controller actions) are symptoms of the underlying, unmanaged aircraft movement problem, creating random point overloads that force ATC to react. This is the much larger problem that o**nly airlines/users can fix.**

But what ATC can do is facilitate Airline Flow Management by hosting and participating in an airline's/user's managed Flow Management Exchange process which would allow airlines/users to input their business needs for each aircraft, while ATC acts as an honest broker of multiple user's system-optima, blending these into an industry system optimum for a specified location or airport at a specified time.



And this starts with "*day of*" aircraft management by individual airlines/users — not ATC.

Critical Point: A pre-sorted aircraft arrival flow (managed by the individual airline/user partnered with ATC) => less vectoring => less stress => less delay => less fuel burn => less CO2/NOx => a more efficient and safer airline and ATC system.



Additionally, FAA's *manually run, Defect Correction, remediation-oriented* separation process requires one basic factor to allow it to safely deal with these random point overloads: structure. This ever-increasing ATC structure, driven to accommodate the worst of the "*day of*" random-point overloads, late in the process, causes most of the restrictions within the ATC system -- such as 30-mile final approach segments, as shown in the LaGuardia trombone.

And, no, an independent, ATC Centric managed arrival flow (e.g., TBFM) will not make the

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airline/user efficient. In fact, the increase of ATC control farther from landing, without "*day of*", real time input from the airline/user base, including their "*day of*" business needs, will haunt the airlines/users $31.5 billion 'Brand New ATC System' for decades.

Delay Costs are off the charts

Next, let's look at the cost of the airline's preventable "*day of*" inefficiencies for a single large airline.

As you can see, the largest cost of poor quality is not fuel or labor, but the lost productivity of the aircraft.

In other words, individual large airlines leave over $5 billion on the table each and every year for the pleasure of doing what they have always done.

Given that airline delays are a preventable outcome, this means that airlines could easily be a lot more profitable (4,250 flts/day, 11 min schedule buffer, 6 min easily recoverable, fuel $3/gal).

Single Airline Annual Flow Management Benefit Analysis

Preventing Defects, Costs, Revenue Loss and Productivity Loss

Annual Crew Buffer Cost	$	241,736,458
Annual Defect Rework Cost	$	365,513,281
Annual Overnight Rework Cost	$	168,698,438
Annual Fuel Buffer Cost	$	827,719,216
Annual Aircraft Lost Productivity Cost	$	3,973,344,375
Annual Lower Ticket Revenue with Low A0 Quality	$	337,396,875
Total Single Airline Annual Buffer/Rework Cost	**$**	**5,914,408,644**
Annual Recoverable Crew Buffer Cost	$	131,856,250
Annual Recoverable Defect Rework Cost	$	91,378,320
Annual Recoverable Overnight Rework Cost	$	42,174,609
Annual Recoverable Fuel Buffer Cost	$	451,483,209
Annual Recoverable Aircraft Productivity Revenue	$	404,034,469
Annual Additional Ticket Revenue with A0 Quality	$	50,609,531
Total Annual Recoverable Buffer/Rework Cost	**$**	**1,171,536,389**
Total Annual Tons of Single Airline CO2 Generated		**42,640,081**
Total Annual Tons of Buffer/Excess CO2 Generated		**2,759,064**
Total Annual Tons of Buffer/Excess CO2 Easily Prevented		**1,504,944**
Total Annual Fuel (gallons)		**4,264,008,085**
Total Jet Fuel Costs		**$ 12,792,024,254**
Total Annual Buffer/Excess Fuel (gallons)		**275,906,405**
Total Annual Buffer/Excess Fuel Easily Saved (gallons)		**$ 150,494,403**
Total Annual Buffer/Excess Fuel Easily Saved (Dollars)		**$ 451,483,209**
Total Buffer/Excess Aircraft Required		**65**
Total Buffer/Excess Percentage of Total Aircraft		**6.8%**
Total Buffer/Excess Aircraft Easily Recovered		**10**
Total Flight Hours Wasted		**284,396**
Total Flight Hours Recovered		**155,125**
Total Number of Buffer Pilots Required		**799**
Total Number of Buffer Pilots Easily Recovered		**436**

"*Good enough isn't good enough if it can be better. And better isn't good enough if it can be best*." (Rick Rigsby commencement speech, 2017-10-05).

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Or the same costs can be seen int United Airlines' 1995 analysis of their operational inefficiencies.

Sample Value of Productivity Gains

Domestic Aircraft Only (727, 737, 757, DC10-10)	411 aircraft
Average Daily Flight Hours (Block)	10.85 hours/day
Average Number of Flights	4.92 flts/day
Average Hours per Flight (Block)	2.21 hrs/flt
Average Time Savings (all sources)	18.08 mins/flt

18.08 mins/flt x 4.92 flts/day x 1 hour/60 mins = 1.48 hrs/day/airplane

1.48hrs/day x 1flt/1.91hrs x 411 airplanes = 319 flights per day

100 pax/flight x $160/pax = $16,000 per flight (does not include cargo)

$16,000 revenue/flt - $5,000 direct cost/flt = $11,000 contribution per flight

$11,000 contribution/flight x 319 flts/day x 365 days/year =

$ 1.3 Billion per year additional contribution

Source: United Airlines *1995 Analysis = $2.75 Billion in 2026* Note: Unaudited Data, for illustration purposes only

And this does not include United's losses of $670 Million in direct operating costs for these inefficiencies, for a total of $1.97 Billion in 1995 dollars or $2.75 Billion in 2026 dollars.

Also notice that United's 1995 internal aircraft lost productivity analysis and our 2026, more in depth analysis, both show aircraft productivity losses as the biggest loss driver at around two thirds of the total inefficiency loss.

Or consider the words of Greg Wells of Southwest, "*It would cost us approximately 8 to 10 airplanes of flying per day if we were to add just a couple of minutes of block time to each flight in our schedule.*" (*As Southwest Airlines tries to cope with its success, problems at Midway will get team's attention*, Chicago Tribune, Mar 3rd, 2011)

A new Boeing 737 Max 10 lists for $135 Million but is usually discounted by upwards of 50%. Using Mr. Well's statement, the number of the extra aircraft for 11 minutes of schedule buffer waste now in airline schedules is somewhere around 50 aircraft unnecessarily flying around accomplishing nothing but buffering the airline's inefficient "*day of*" Operational Dismality.

This represents over $2.5 Billion of wasted aircraft assets. And this is just the start as you need pilots, flight attendants, maintenance, hangars, etc. to operate and maintain these aircraft.

In other words, airlines allow a preventable, very expensive and very solvable problem to materialize at the airport and then they chastise ATC since the ATC controller is forced to delay and vector aircraft to safely queue the traffic in the last 30 to 40 minutes near the airport.

And the worst part is that airlines then bake these 'achieved' delay minutes back into future schedules in a destructive 'cycle of deterioration', institutionalizing the adverse cost and utilization impacts, wasting even more money.

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Real World Benefits

Integrating the airline's "*day of*" business needs into the ATH Group's Flow Management Solution in real time and using the pilot as the 4D goal seeking agent to meet the assigned arrival fix time represents two very unique elements of ATH Group's Flow Management Solution that dramatically reduces the complexity of the problem, while increasing the airline profitably.

ATH Group's Airline Centric Flow Management Solution can be rapidly and inexpensively implemented at every airport across the world, something an ATC Centric solution will never accomplish.

Additionally, the benefits of the airline/user centric solution:

1. Is inexpensive, with a rapid ROI
2. Has a rapid implementation (months, not years)
3. Incorporates the airline/user's business needs (**critical benefit**)
4. Uses the pilot as the 4D goal seeking agent (**critical benefit**)
5. Easily/smoothly crosses sovereign airspace and ATC sector boundaries (**critical benefit**)
6. Is easily scalable, starting with a single airline, at a single airport
7. Allows airlines to manage their aircraft flows in real time to meet their business goals
8. Allows real time gate assignment 3 to 5 hours prior to landings
9. Allows real time management of the ramp assets
10. Builds the integrated command-and-control infrastructure for a rapid recovery from irregular ops
11. Improves product quality for an individual airline (pax where promised, when promised)
12. Improves airline profitability
13. Increases crew productivity
14. Increases aircraft utilization (**Critical capital cost benefit**)
15. Reduces airline maintenance costs
16. Reduces airline generated CO_2
17. Reduces noise around airports
18. Reduces "*day of*" operational disruptions
19. Able to manage every aircraft, into every airport, 24/7-365
20. Requires no new aircraft/ground equipment or new ATC procedures (**Critical Benefit**)
21. Makes ATC better, but does not interfere with ATC
22. Allows ATC to slowly remove airspace structure around airports
23. Allows ATC to act as the Honest Broker in a multi-user system
24. Reduces airspace complexity
25. Reduces ATC and airline costs
26. Reduces government spending on features reactive to unmanaged flows

Finally, ATH Group's Flow Management Solution is a 'shovel ready, off the shelf' solution that has been independently validated by FAA, Embry-Riddle University, Georgia Tech, GE

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Aviation, Delta Air Lines, and others in actual airline operations at airports around the world (Atlanta, Minneapolis, Detroit, Charlotte, Dubai, among others).

Conclusion

Current airline "*day of*" operation is like trying to fly a dynamically unstable aircraft—the worse it gets, the worse it gets, a cascade of ever-increasing delays throughout the operating day.

For example, at every airport on the DOT Air Travel Consumer Report, on-time arrivals degrade throughout the day. And this is DOT's A14 data (up to 15 minutes late), and not what we believe should be targeted and reported: A0 (actual on-time zero arrival).

AIR TRAVEL CONSUMER REPORT

TABLE 3. PERCENTAGE OF REPORTING OPERATING CARRIERS FLIGHT OPERATIONS ARRIVING ON-TIME BY AIRPORT AND TIME OF DAY (30 LARGEST AIRPORTS)

OCTOBER 2025

	ARRIVAL AIRPORT[1]															
SCHEDULED ARRIVAL TIME	ATL	AUS	BNA	BOS	BWI	CLT	DCA	DEN	DFW	DTW	EWR	FLL	IAD	IAH	JFK	LAS
0600-0659	91.4	90.3	95.3	84.0	88.3	94.0	95.4	92.1	88.8	87.0	85.3	91.7	92.2	93.6	87.9	97.3
0700-0759	93.0	96.1	95.9	92.9	95.9	94.4	87.9	94.2	87.2	94.3	90.8	82.5	93.7	89.3	87.3	93.3
0800-0859	91.5	95.0	92.8	90.5	96.5	93.0	90.7	89.4	84.8	94.9	94.8	96.0	93.5	85.0	89.4	89.1
0900-0959	89.5	93.0	90.6	89.5	93.4	92.3	86.4	89.7	85.7	94.3	92.4	92.8	85.5	87.9	92.7	87.4
1000-1059	91.4	93.0	86.3	84.7	92.2	91.0	86.6	86.1	87.6	92.6	89.1	89.5	96.1	90.2	89.9	86.1
1100-1159	91.3	85.0	83.0	84.4	91.9	89.7	85.7	87.0	84.3	92.2	88.8	85.3	88.5	91.6	91.1	82.9
1200-1259	89.6	88.7	80.1	79.0	91.3	89.9	86.1	87.9	84.6	90.0	83.5	82.7	90.9	85.8	87.1	79.7
1300-1359	90.3	79.7	79.9	71.7	88.1	87.6	80.9	87.3	80.8	88.9	78.0	81.4	93.7	84.8	84.0	80.1
1400-1459	85.3	78.9	76.9	58.5	86.9	88.4	73.4	85.9	82.8	88.6	73.3	78.5	89.0	90.2	80.4	74.2
1500-1559	86.4	79.4	72.1	44.2	85.5	84.8	73.6	82.9	76.9	89.1	70.4	77.0	88.0	86.6	83.9	74.9
1600-1659	84.4	75.2	66.5	47.0	80.9	85.2	66.3	78.6	74.4	80.4	69.5	83.2	82.8	75.5	74.1	72.3
1700-1759	79.9	71.7	64.0	44.6	77.1	82.3	70.1	68.6	72.0	84.4	59.1	69.8	69.0	70.5	71.9	69.3
1800-1859	82.2	67.3	65.4	42.2	76.3	80.3	71.4	69.8	68.6	81.0	54.8	66.1	82.6	69.3	71.5	71.3
1900-1959	79.8	68.5	66.7	44.0	70.7	75.4	63.0	71.4	69.4	84.2	53.2	72.4	85.5	74.4	67.5	72.6
2000-2059	79.8	64.2	69.0	48.5	72.5	81.3	64.7	67.3	68.4	82.9	44.4	71.9	80.5	76.8	72.0	68.7
2100-2159	76.7	68.5	61.6	52.5	63.9	73.2	56.3	70.5	71.3	76.1	48.8	71.8	84.7	74.7	69.0	65.5
2200-2259	73.4	74.0	67.2	61.8	69.7	70.0	59.0	78.4	70.1	70.1	59.7	68.9	65.3	80.5	67.0	69.8
2300-0559	77.9	71.2	68.0	66.0	78.6	80.2	68.0	75.0	78.2	74.1	72.8	67.4	79.4	76.3	77.4	73.5
TOTAL	85.6	78.1	75.3	63.4	82.7	85.5	74.8	81.3	78.6	85.9	71.4	78.2	85.0	81.5	79.4	77.6

[1] See Appendix at end of this section for list of airport codes.

Additionally, while this article is focused on airline/user arrivals, ATH Group's Airline/user Centric Flow Management Solution can also manage departures, enroute congestion and all aspects of aviation (Biz jets, General aviation, military, etc.).

Finally, and time-critically, we have two choices going forward:

- An ATC-centric aircraft flow solution (privatized, corporatized, or not) using ATC managed Time-Based Flow Management (TBFM), Trajectory Based Operations (TBO), Ground Delay Program (GDP), Severe Weather Avoidance Plan (SWAP), ATC weather reroutes, System Command Center/Central Flow Management Unit control, etc. In this scenario, ATC controls every aspect of aircraft movement, without regard for user business interests, while leaving the airline's/user's needs and pilots out of the solution—an ever more expensive, failed approach for the past 50 years.

or,

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- A real-time informed airline/user and pilot-actioned, "*shovel ready,*" inexpensive system flow optimization solution where airlines/users determine their business objectives and manage the movement and efficiency of their aircraft utilizing the 4D navigational abilities of their pilots. ATC provides separation and safety and acts as an honest broker of user optima in the most complicated multi-user airspace.

You choose!

ATH Group's Airline Flow Management Solution is the only "*shovel ready*" solution independently validated by FAA, Embry-Riddle University, Georgia Tech, GE Aviation, Delta Air Lines, and others in actual airline operations at airports around the world (Atlanta, Minneapolis, Detroit, Charlotte, Dubai, etc.).

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Following are a few articles outlining why ATH's Operational Excellence solution (>%5 fuel burn and CO2 reduction, >85% A0, <3% day to day A0 Standard Deviation, >8-minute scheduled block/gate time reduction per flight), driven by GreenLandings®, is the achievable path forward to make airlines and ATC dramatically better and more profitable. Like Toyota did in the 1980s for the auto industry, all it takes is one airline, airport and/or ANSP to lead the way.

- Who Controls the Movement of the Aircraft? (Leeham News, 2026-03-31)
- What-Should-Airlines-Want-MTS-WINTER-2026 (MTS 2026-01)
- ATH Group's Flow Management Solution Benefit Summary ((2023-05))
- US Airline Ops - Is it ATC or something else? (R. Michael Baiada interview by Addison Schonland, AirInsight, 2025-05-11)
- Say No To This 'New Normal' And Embrace Real ATC Evolution (Aviation Week Intelligence, RW Mann, 2023-12-23)
- Aviation Needs a New Direction - Driven by Vision and Leadership (MTS, Nov/Dec 2019)
- Air Traffic Control is not the problem (MTS, Spring 2022)
- Russ Ackoff System Discussion Video (YouTube, 1994, 12 minutes)

All ATH Group's Flow Management articles can be found at Articles - GreenLandings.net.

Authors

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Using my Engineering and Business degrees (Rutgers University) as the base, I have had an uncommon career with many twists and turns that provided many unique perspectives into aviation, including piloting, airline operations, aircraft avionics and Air Traffic Control.

I started my aviation career as a USAF pilot flying KC-135 aircraft for 6 years (1973 - 1979).

After the Air Force, my introduction into the workings of Air Traffic Control (ATC) was as Ass't VP Ops/Maintenance at Ransome Airlines (1979 - 1984). Under Dawson Ransome's vision, I was responsible for his FMS/MLS, land and hold short ops at Washington National (DCA) and JFK airports, spending many days coordinating at FAA HQ and DCA Approach Control and Tower. It was during my time at Ransome that I authored my first time based flow article, DNAV: What's So Different About It (Pro Pilot, 1984-04).

My next career turn was Bendix as Product manager responsible for design, installation and certification of the Bendix Flight Management System (FMS) and other cockpit avionics.

Once recalled to United Airlines in 1995, I started my commercial flying career, but, along with my flying duties, I worked with ATC and avionics as United's GPS and FMS manager.

My ATC efforts at United convinced me that aviation needs a new direction where airlines/users had much more flexibility and control over the movement of their aircraft. This led to my introducing the Free Flight Concept, along with Michael Boyd.

During the mid-1990s, along with introducing FreeFlight and testifying at Congress about airlines delays, I met Lonnie Bowlin and started ATH group, Inc. to provide airlines and other airspace users much more flexibility during their "*day of*" operation. Lonnie was the technical and computer genius/brains of ATH Group, while my focus is on "*day of*" operations.

Finally, along with flying for United (retired in 2014, Captain B747-400), Lonnie and I worked to develop and implement the world's first, and still only, Airline/User Centric Flow Manager.

Our Flow Manager solution allows airlines/users to input their "*day of*" business goals for each aircraft into the flow and relies on the 4D navigational capabilities of the pilot to implement the assigned Required Time of Arrival (RTA).

Over the last 45 years, I have written numerous articles on our Airline Centric Flow Manager concept that can be found at www.GreenLandings.net/articles.

Robert W. Mann, Jr.

Bob is an independent airline industry analyst and consultant, founder and principal of R.W. Mann & Company, Inc. Since 1993, his firm has specialized in the identification, development and implementation of structural improvements to industry productivity, business processes, distribution and profitability.

Prior to 1993, at American Airlines, Pan Am and TWA, Bob served as a corporate officer and senior executive responsible for industry analysis, marketing, distribution, planning, IT systems and service delivery functions. From 1984, he served as an outside Corporate Director of Airline Automation, Inc., now Amadeus Revenue Integrity.

Bob has developed, implemented and managed marketing, planning, service, operations and distribution systems for his airline employers and consulting clients. He has served as an

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'on-call' EXO and CMO, consults to airline management, airframe manufacturers and employee groups on airline economics, distribution, productivity and business process improvement initiatives, restructuring, commercial and interest arbitration matters.

In addition, Bob consults on airline-oriented Intellectual Property, distribution channel and revenue/cost optimization initiatives, appears in business media, and speaks on and has authored numerous articles on a wide range of topical industry issues ranging from loyalty/customer value management to fuel hedging to fleet planning to scheduling and airline operations enhancements benefitting ATC system capacity.

Bob served as an undergraduate and graduate Research Assistant at MIT's Flight Transportation Laboratory and holds S.B. and S.M. degrees from MIT, in Aeronautical Engineering and Transportation/Management.

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Airline/User Centric Flow Management Delay, Congestion and Excess CO2 Solution versus ATC Centric Time-based Flow Management Program (TBFM)

Airline/User Centric Flow Management Solution

1. Airline/user has business control over their aircraft movement and arrival flow (schedule, gates, crew, etc.)
2. Easily scalable for every flight, every day, at every airport, 24/7-365, worldwide.
3. GreenLandings® aircraft movement is deterministic based on the airline's business needs without the need to worry about ATC, sector and sovereign boundaries
4. GreenLandings® works to prevent delays from happening in the first place (Defect Prevention)
5. Easily manages every flight at every airport 24/7-365, starting within months, all day, every day, starting "*day of*" hours prior to landing
6. Immediately reduces random point overloads, which is the root cause of delays, congestion and excess CO2
7. Low risk, fully developed, operational, tested and validated software (FAA Task J and Embry-Riddle University, 2010-2012, GE Aviation 2013, Georgia Tech, 2006, etc.), COTS solution available starting within months
8. Transparently crosses FIR and ATC sector boundaries
9. Capable of reducing ATC structure
10. Reduces controller workload with pilot managed Required Time of Arrival (RTA) flow time for each aircraft, leaving separation to the controller
11. One pilot manages one aircraft to destination
12. Utilizes onboard navigation and communication capability bought and paid for, and already in place on the aircraft
13. ATH Group's Flow Management® is a fully coordinated, real time, "*day of*" automatic arrival flow process between airlines/users, ATC and aircraft
14. Highly flexible aircraft movement environment, easy to scale up worldwide
15. Provides all ATC/airlines/users aircraft specific information on what every IFR aircraft wants to do in the future (airline, GA, etc.)
16. Low cost for users/ATC, with immediate proven, cash benefits
17. Reduces airspace complexity
18. Shovel ready, $100 million, 3-year project to cover the entire US
19. GreenLandings® process has been fully operationally tested and validated by FAA, Embry-Riddle, GE Aviation and others
20. RTA capable Flight Management System (FMS) already installed in the aircraft, allowing pilots to enter a time over a navigational fix, and the airplane automatically adjusts speed to meet that time

ATC Centric TBFM Program

1. ATC maintains control over the movement of the user's aircraft, with zero business/user input into arrival flow
2. Limited scalability to just a few larger airports when congested and internal to each sovereign airspace.
3. TBFM delay is subjective/random as each ATC center assigns each sector's delay to meet the assigned TBFM boundary time
4. TBFM does not eliminate or prevent delay, but targets more efficient delay (Defect Correction)
5. Only manages limited flights, at 20 airports during part of the day based on traffic (e.g., ATL 6 AM-10PM) with limited reach from arrival airport
6. Low impact on random point overloads, reportedly creates adjacent sector overloads and related delays
7. High risk, yet to be fully developed, computationally complex software, after ANSPs already have spent $100s Billions and decades with little impact on delays/congestion (MLS, AAS, CPDLC, GPS, FANS, RNP, ADS-B/C, NextGen, Sesar, etc.)
8. Difficult/impossible to cross FIR/sovereign boundaries
9. Perpetuates or even increases ATC structure
10. Increases controller workload, as controller must separate aircraft, receive time communication for each aircraft, manage flow time/speed for many aircraft
11. 10s of controllers manages one aircraft to destination
12. Full implementation requires many new processes and equipage (navigation, communication, etc.) at unknown added cost
13. TBFM has limited, if any, real time automatic coordination between users, ATC and aircraft with, again, zero user business preference inputs
14. Controlled aircraft movement environment, difficult to scale up, notably across national boundaries
15. Limited to no information available to other ATC/users on what other IFR aircraft are doing, or, more importantly, want to do
16. Very high cost for ATC, with limited (none proven) benefits
17. Adds to airspace complexity
18. Multi-Billion dollar, decades long project to cover the entire US, maybe
19. FAA will institutionalize TBFM such that any hope of airlines/users recapturing control over the movement of their aircraft or reduction of the structure around the airports will be lost for decades

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