Opinion

Who Controls the "Blue"?

Michael Boyd *(President)* **and Research Staff** | Boyd Group, International
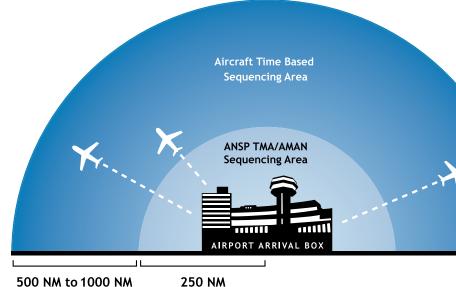
From my perspective, the future of FAA's Air Traffic Control (ATC) system and FAA's cornerstone task, NextGen, is in trouble. It has become a combination of wishful thinking, unfilled promises, and unaccountable direction. Recently, we had this statement from the U.S. Government Accounting Office (GAO):

"FAA lacks well-defined policy, equipment standards, certification and operational approval guidance, procedures, and ground automation – all prerequisites for a successful rulemaking effort... as a result, FAA will not be in position to mandate ADS-B for several years."

The statement above describes a program out-of-control, particularly when objectively viewed through the lens of ATC upgrade failures in the past. There is no question the FAA's approach to delivering a viable future ATC system is a bureau-cratic fable of promises made – but not kept.

Airlines continue to cede more control of their aircraft to the FAA ATC system. By default, even though airlines have significant flexibility to change speed and altitude during flight (i.e., the "Blue"), which would have a huge impact on delays and congestion, they have allowed the FAA to control more and more of the movement of their aircraft – the airlines' primary production process.

Therefore, "Who Controls the Blue?" (i.e., the movement and sequencing of the aircraft); is a critical question airlines have yet to consider seri-ously. *[See diagram below]*

Regardless of repeated GAO statements of findings such as the one quoted above, according to many sectors of the aviation industry, the FAA is doing a superb job. Inside the beltway, NextGen is considered the new "secret sauce" for the challenges facing air traffic control.

We have an ATC system that inflicts billions of dollars in excess costs on airlines and the flying public while NextGen continues to receive widespread public support. Airlines, aviation consultants, and industry alphabet groups – all of whom know better – cheer NextGen. Somebody needs to ask, "Why?"

Airlines Need To Lead and Speak Up

Five years ago, at an annual Boyd Group International Aviation Forecast Summit, we discussed aviation infrastructure issues. In regard to the non-progress of NextGen, the head of the Air Transport Association (ATA, now A4A) assured delegates the Association was doing everything possible to get airline executives in front of Congress to urge funding for NextGen.

"Why not urge results from the FAA," I asked, "instead of spending dollars to keep a poorly-directed project going?" The aviation industry is failing to do its job in keeping their prime separa-tion supplier (the FAA) focused on results. That represents not only a failure for the flying public, but also a disservice to the FAA itself.

FAA Needs Strong, Honest Feedback

After reading the FAA's latest NextGen Report (*faa.gov/nextgen/implementation*), I still do not know specifics concerning the commercial requirements and benefits of NextGen, let alone what it will cost. In my opinion, this is not a program airlines should be supporting, particularly in light of past program failures. The FAA NextGen Report talks about reducing delays, flight time, improving through-put, and safety, the specifics of how NextGen technologies actually accomplish this are woefully inadequate. The

Aircraft Time Based Sequencing Area

ANSP TMA/AMAN Sequencing Area

AIRPORT ARRIVAL BOX

500 NM to 1000 NM
(or more)

250 NM

relationship between demand in the skies – versus how NextGen will deliver results – is just not there.

For example, FAA's 2013-06 NextGen Implementation Plan states: "The movement to the next generation of aviation is being enabled by a shift to smarter, satellite-based, and digital technologies and new procedures that combine to make air travel more convenient, predictable, and environmentally friendly."

Requesting Hard Forecast Data Based on Hard Analysis and Facts

Do we accept this statement as proof NextGen is going to be effective? To be blunt, the media and much of the aviation industry swallows this "hook, line, and sinker" about a program lacking, according to the GAO, "a well-defined policy." How do we explain the following:

In terms of specific increases in ATC throughput and efficiency, what is "magic" about satellite-based comm/ nav or automatic dependent surveillance-broadcast (ADS-B) in the domestic airspace? How much do these tools increase capacity within the U.S.? Can we have hard forecast data based on hard analysis and facts?

Why should domestic U.S. airlines equip with controller-pilot data link communications (CPDLC), when there are less expensive, more beneficial ways to increase capacity and reduce delays?

Why does FAA tout NextGen routes and approaches when these could have been done 30 years ago with distance-measuring equipment (DME-DME) flight management systems (FMS, an aircraft installed navigation and performance computer), and instrument landing systems (ILS)?

What about the NextGen "holy grail," an idle descent to a five nautical mile (NM) final? How do you do this (give specifics), and why aren't we doing this today at smaller airports? Current commercial flight management systems (FMS) have been able to do an idle descent to a five-NM final at any airport for decades. The limitation is not the aircraft, but the ATC separation and sequencing process.

Airlines Don't Use the Tools Already in Place

A few years ago, Southwest spent tens of millions of dollars for shorter approaches at Love Field in Dallas and William P. Hobby Airport in Houston, but, according to airline CEO Gary Kelly, an FAA airspace redesign added miles to the Hobby to Love route, and Southwest still didn't get the shorter approach. It makes no sense for airlines to spend money to increase data accuracy and speed, with no benefit.

Outsourcing the Production Line

Airlines outsource various parts of their operations: ground handling, maintenance, etc. Double-digit percentages of flight activity are outsourced to other certificated carriers. But U.S. carrier also outsource something even more critical to profitability – their primary production process. Would General Motors or Ford let Goodyear determine how many cars per day they could build?

From the time a flight leaves the gate until it arrives at the destination, how the airplane gets across the sky is something airlines and pilots abdicate to the FAA's ATC system. In 1958, airlines and pilots reluctantly gave up control to the ATC system when Positive Control Airspace was introduced – and, only then because it was a political necessity after a United/TWA accident over the Grand Canyon.[1] Further, this transfer of control was agreed to as a *temporary* measure.

Since that time, instead of recapturing control of their aircraft, airlines have unprofitably ceded more and more control over the movement of the aircraft to the ATC system. Sadly, NextGen will accelerate this trend.

The initial NextGen Time Based Flow Management (TBFM) plan, which has controllers manually metering to a metering fix, which meters to a metering fix, etc. – is very inefficient.

Airlines will surrender more control of their aircraft, and be forced to continue increasing scheduled block times. In addition, this manual, controller-centric aircraft flow process will require even more controllers.

FAA's Credibility Gap

Beyond the control issue, FAA also has a credibility problem in implementing ATC programs. Sequester, budget battles, and the debt limit already have FAA delaying critical programs. Moreover, for example:

Microwave Landing System (MLS), Advanced Automation System (AAS), Global Positioning System (GPS), FreeFlight (the FAA's version), and Satellite Communications (SATCOM) have produced little to no benefit.

Gerald L. Dillingham, Ph.D., Director, Civil Aviation Issues, U.S. Government Accountability Office (GAO) recently reported, "We've looked at FAA for decades, and part of the problem is the culture."

National Airspace System (NAS): Improved Budgeting Could Help FAA Better Determine Future Operations and Maintenance Priorities (GAO-13-693, August 2013) states: "NextGen program delays and cost overruns lead to keeping aging systems and facilities in place years longer than planned."

Department of Transportation (DOT) Inspector General's (IG) 12/16/2013 report (Top Management Challenges For Fiscal 2014, PT-2014-09) states:

"Until FAA addresses these (NextGen) obstacles and clearly demonstrates the type and timing of expected benefits, airspace users will remain reluctant to equip with new avionics needed to advance new procedures and NextGen."

Using Technology to Solve a Process Problem

With all the potential communication and controller workload issues – even if implemented – NextGen fundamentally is:

- A technology solution to a process problem;
- Radar replacement, for radars that, for security reasons, won't be replaced any time soon;
- A manual, controller-centric solution;
- Generating very long term return on investment (ROI);
- A system to make delay more efficient – not consistent with an airline's real-time business requirements; and

---

FOOTNOTE 1: *A TWA Super Constellation and a United Airlines DC-7 – both heading east from Los Angeles collided over the Grand Canyon.*

- An irregular operations solution that is not 24/7 – which must be a requirement.

After 30 years and billons spent, little has changed in the ATC system. Pilots fly about the same way today in a new B787 with the latest avionics – SatCom, GPS, ADS-B, and ADS-C, etc. – as they did 40 years ago aboard a Boeing 707 with high-frequency radio (HF) and a navigator.

With today's equipment, we are safer. Nevertheless, avionics alone do nothing for the passengers' value proposition or the airlines' production process. Now, airlines are being urged to spend millions to equip their fleets with equipment to satisfy yet another program with "some" future promise for potential benefit.

Amateur Assumptions Lead to Non-Solutions

In the media, delays are characterized as the result of ATC problems or over-scheduling or too few runways or too little airspace. The reality is most ATC and airline problems are internal airline production problems based on the fact airlines don't track or manage their aircraft in real time – let alone from a system perspective.

Building a business case for NextGen, as currently outlined, is a very questionable proposition, based on FAA's promise to work harder and do better.
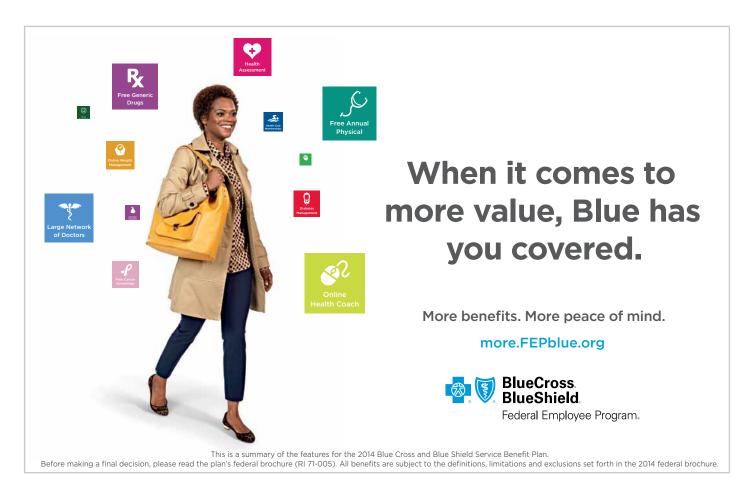
In 1994, the Boyd Group co-authored the first independent analysis of the ATC system. The document, FreeFlight, generated Congressional hearings in August of that year, as well as the RTCA FreeFlight Select Committee.

At those hearings, the FAA presented its then-current solution solution which was "right around the corner." The lack of ATC problems were inflicting over $9 billion in inefficiency costs on airlines, which should have generated a "conga line of airline CEOs" marching into the FAA demanding accountability and results. That was two decades ago. The demonstrated "solution" never materialized.

Getting Results Starts and Ends with the Airline Industry

The lack of an ATC fix since those hearings may be more the responsibility of the airline industry than the FAA. In general, the airline industry is a full supporter of the FAA. Although the FAA has continually failed, the airline industry has simply accepted it. In fact, the FAA hasn't had the guidance it needs from the industry it serves.

As I discovered at our 2009 Summit during the discussion with the head of the ATA, it's apparent the guidance the airline industry receives is focused on accepting whatever the FAA proposes with regard to NextGen progress. If the FAA gets no effective feedback from the airlines they serve, how can we expect them to do anything differently?

RTA – A New Path to NextGen

There is another path to building an ATC system – an alternative to NextGen: the Required Time of Arrival (RTA) Path to NextGen – a proven way to dramatically increase the airline industry's ROI using the current equipage base as the starting point.

RTA is a simple, logistical, just-in-time arrival process. Airlines decide internally what time their aircraft should land, the updated arrival time is sent to the aircraft, and the pilots adjust the speed to meet that time.

For example, if a pilot's instruments shows a landing at 11:28, and the airline decides, based on business needs (traffic, schedule, gate availability, etc.) it is more profitable to land at 11:32, the airline would email the RTA to the pilot who would adjust speed to meet the new, more profitable arrival time.

Currently operational, the RTA solution proposed has been independently validated by two universities as profitable for the airlines, less costly to the FAA, good for the NAS, and, most importantly, gets passengers where they want to be, when they want, at a higher level of quality. At right (*sidebar*) is an outline of the RTA Path to NextGen.

Replacing FAA's current linear-based sequencing process with a time-based sequencing process (RTA), a proven solution already operational, using currently installed avionics, allows both the airlines and the FAA to build the processes necessary for near-term cost reduction and bottom line benefits. RTA provides immediate benefits and builds the necessary infrastructure for the future,

"pulling" NextGen technologies forward based on a profitable business case.

Rethinking and Refocusing ATC

Like any logistic or engineering problem, airlines (not ATC) must define the goal, and then find the minimum technology and process to meet that goal. The FAA works for the airline industry. It is time for the industry to provide the feedback FAA needs – and it is time the FAA becomes fully accountable.

Back to the original question: "Who Controls the Blue"? While it is appropriate for the FAA ATC system to manage separation, sequencing near the airport, and equitable access to airports, profitability requires airlines to manage their arrival sequence from a business perspective.

When each airline determines what they want their aircraft to do much farther from landing – coordinating with FAA as the "honest broker" – most delays and congestion we now see will be gone. Supply chain logistics have proven this to be true for the last 40 years.

Airlines already have the avionics tools necessary to mitigate much of today's ATC's delays, congestion, and throughput problems – but these tools are not being fully utilized. Further, this can absolutely be done!

Finally, the overarching question is, outside of the actual separation process, who will manage the movement of the aircraft (the Blue) – the airlines or the ATC system. The answer to this question will decide the profitability of the airlines for decades to come. O

About Mike Boyd

Mike Boyd is an expert in futurist aviation issues, often called upon by national media to provide input regarding events and trends affecting airlines, airports, and aircraft manufacturers. He has directed hundreds of projects ranging from small airports to global companies such as GE; Delta, American, Continental, and Southwest Airlines; Aerostructures; and Embraer Aircraft.

For the last three decades, Boyd Group's forecast expertise has assisted aircraft manufactures in feasibility analyses regarding billion-dollar investments in new airliner platforms as well as in analyzing global market demand for engine and component manufacturers.

PRESENT DAY *(within 3-5 years)*

Requires no new aircraft equipment or ATC equipment

- Utilize current ATC procedures and separation standards.
- RTA is issued to aircraft by and/or through airline System Operational Control (SOC) for management.
- RTAs issued to current arrival fixes issued once airborne, inputting the airline's business criteria into the aircraft arrival flow.
- Implementation of "Best Equipped, Best Trained, Best Served" through compliance to the RTA time based process.
- FAA to act as the "honest broker" to equitably merge the competing requested RTAs (and other provided data) from different users in real time.
- RTA as Universal Unit of Currency within ATC system.
- Aircraft to meet RTA (+/- 30 second accuracy).
- RTA process to provide Constant Descent to five NM final starting at smaller airports.
- Slow removal of structure around airports by moving the arrival fixes closer to the airport.
- PBN/RNP for approach and landing precision

FUTURE *(within 5-8 years)*

Requires additionally-implemented NextGen technologies

- 4D trajectory (RTA plus 3D path) as Universal Unit of Currency within ATC system.
- FAA as the "honest broker" to equitably merge the competing requested RTAs (and other provided data) from different users.
- Computerized Conflict Probe for ATC controllers to identify all 4D conflicts (i.e., provide angular separation during climb and descent).
- Reduced separation standards for operators who equip and train (Best Equipped, Best Trained, Best Served), based on aircraft specific RTA/PBN/RNP and comm capabilities.
- ADS-B position, speed, intent, and real-time wind data (especially for descent).
- Upgraded FMS to meet RTA and accomplish Constant Descent (+/- 10 second accuracy).
- PBN/RNP for approach and landing precision.
- Constant Descent arrival to three to five NM final.