

**NATIONAL CIVIL AVIATION REVIEW COMMISSION PUBLIC HEARING
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Testimony of Captain R. Michael Baiada

I come here today on my own, simply as a taxpayer and user of the FAA's services. In fact, I speak for no one. No one pays me to be here. In fact, there's probably a few people that would pay me to not speak on the other side.

But, be that as it may, I have 25 years of experience as a military and commercial pilot. I am now a captain for a major airline. For 20 years starting in the late 1970s, I worked on ATC, air traffic control, and airline operations and airline productivity issues. I'm here to talk today about the air traffic control system and its impact on both safety and economics.

The FAA is incapable of continuing to technically manage our nation's ATC systems. They have proven time and again that they are unable to maintain the current system, let alone move it into the Twenty-First Century.

MLS and AAS were outright failures that cost the taxpayers billions. DSR and STARS are already experiencing problems, cost billions, and are less capable than the systems they replace. If you doubt my conclusions, GAO, DOT, CNA have chronicled FAA's continual equipment failures and its inability to move technology into the workplace.

The real down side, though, is not economic in the billions of dollars that are wasted but the ever-increasing risk to the flying public caused by the deterioration of what we consider a flight-critical service: the separation of airplanes.

But we're not here to highlight FAA's well-publicized failures. We're here to discuss what can be done to provide FAA's customers more flexibility; significantly reduce FAA's cost; and, more importantly, improve safety.

Although RMB Associates, the company that I have and run outside of my flying, like all of aviation, applauds the overall increased safety in our aviation system, this does not tell the complete story.

Sadly, while the safety of the aviation system rises in general, the safety of the air traffic control system continues to spiral downward. Yet, little is done.

The increasing risk apparent in our air traffic control system demands a more rapid solution than the FAA has proposed or is even considering for the foreseeable future. Inaction is no longer an option and degrades safety in and of itself.

Regardless of the fact that the separate of aircraft is a flight-critical function, the software running in the ATC computers is an undocumented kluge of patches and fixes installed over the last 20 years.

The 10-9 criteria so routinely applied to aircraft flight-critical functions is not equally applied to the ATC system. It should be and must be.

The aviation community continues to mistakenly view the reliability of the ATC service in the same light as a telephone dial tone. It is always available.

But what are the safety and economic implications for all of aviation if it is not? We have already seen this on too many occasions for a limited period.

There exists a real possibility for a major ATC's facility to be offline for an extended period of time. This is unacceptable. Yet, little is done.

In 1993, I persuaded United Airlines to do an analysis of the cost of the ATC system. The outcome? Two billion dollars a year in lost profit directly attributable to the current ATC system for United alone on an annual basis.

In 1994, American Airlines said that their numbers were about the same. Also in 1994, our study, "Free Flight: Reinvesting Air Traffic Control: The Economic Impact," led to a congressional hearing on the subject, sparked RTA and numerous others into action, forcing free flight to center stage, and calculated a minimum five billion dollars per year in aviation dollars shredded by our antiquated air traffic control system. It was also in our study that anyone first applied the production line analogy to the movement of aircraft, which I read in your first report.

But our numbers, as large as they are, are only the tip of the economic iceberg. The actual losses accrued across our nation are actually in the tens, if not hundreds, of billions of dollars.

While safety and economics demand rapid changes to our NATC system, why not just fix it? What are the constraints stopping us from going out and rapidly solving the ATC problem today? One of the biggest roadblocks is defining the problem.

FAA continues to deal with symptoms, rather than attacking the core problem. This is a result of assuming the following very popular misconceptions are gospel. The following are simply not true. Runways are the limiting factor.

I fly into every airport in the United States and have yet to have been to an airport where the runway has been full. Airspace is crowded. Only the airspace FAA forces me to fly in is crowded. There's lot of airspace out there. Unfortunately, because of the system, we can't utilize it.

Voice communications are so crowded that data link is required for change. This is a problem of the current process, not a problem of aircraft communications, voice communications.

The ATC system is a regulatory function. It is not. Flight standards handles that.

Airlines have no control over the movement of the aircraft. In fact, they have chosen not to control them. It's not that they can't.

The users cannot control or direct the FAA, their supplier. In actuality, reality, that is a true statement, again, but that's by choice, not by regulatory authority.

These problems which FAA attacks individually are all symptoms of the same problem: our current separation process, the ATC system, if you will. You do not represent physical constraints in any way but constraints of a process.

Eurocontrol, which manages the European ATC system, has stated it's widely acknowledged that a prime limiting factor in current airspace capacity is controller workload. GPS, data link, and more runways do nothing to help the controller.

Next we must discuss why the ATC system is so complex. And I do agree that the current system is complex. In reality, we are victims of our own success.

The current NAS system was an incredible piece of engineering and quite elegant by the standards of its time. We have generations of controllers who are trained in the system, its procedural basis, its response to stimuli, and even its idiosyncracies.

Air traffic control is pretty much defined and embodied in the NAS. How do we define the replacement? Well, of course, the natural tendency is to build one just like the one we have. This works pretty well as long as you're content with what the NAS does.

FAA's future plans revolve around new systems as only incremental changes within the margin of the current NAS. Industry spends valuable and limited technological capital to develop systems based on generations-old design. Simply put, the ATC system complexity is based on the process now in place, a process developed over four years ago and predicated on 1950s technologies.

Although expansive in the extreme, this system could be maintained for this life for quite some time. It cannot, however, grow functionally in any meaningful way.

The implementation plan outlined by my company and the Boyd Group in blueprint to free flight bypasses these limitations. The ATC problems we are now facing can be fixed within three to five years at no cost to FAA's customers, much lower cost to FAA, and at the same time significantly improve safety while providing a free flight environment.

This is an extremely difficult thing to believe but a relatively simple thing to prove. Unfortunately, even explaining why such a simple solution could solve so many complex problems at once has proven difficult at best.

Expensive avionics and aircraft, including GPS, data link, does not and will not get the job done. The ground-based automation tools that provide a complete solution to our ATC system problems by correctly addressing the controller workload issue include: computerized conflict probe, which increases safety and frees up en route airspace, allowing random path routings. FAA has already proven that this can be done with properly processed radar data, negating the immediate requirement for data link.

Time-based sequencing, controlled by the users and made equitable by FAA. This moves the flow of aircraft to what we now determine are constrained hubs and increases arrival capacity, eliminating much of the very expensive low-altitude maneuvering. This is a simple logistics problem that the just-in-time manufacturing process has solved decades ago.

Final approach spacing tool. This NASA-developed computer tool has already proven at Dallas-Fort Worth that runways are not the constraint and has the capability to increase capacity at most airports beyond demand much of the time.

Technology is not the problem. The nation's air traffic control system has not pushed the envelope of software and systems technologies. To the contrary, with each day, we seem to slip farther and farther behind the state-of-the-art.

When aviation compares itself to other industries, it becomes quite obvious. To be sure, the banking industry keeps its money flying free, if you will, at security levels above and beyond the requirements of the ATC system. AT&T networks handle amounts of traffic that dwarf the numbers of messages typically moving around the ATC system.

If there is any doubt about the database capability, try mislaying an IRS 1099 form for a few dollars of your income tax sometime. The point is all of the technology already exists.

What does our blueprint offer and why does our blueprint offer the right solution? Because it correctly starts with the operational requirements. Safety, unlimited en route flexibility, and maximizing airport capacity implies the minimum technology to meet those goals.

Conversely, our critics, who have yet to even take the time to understand what we propose, incorrectly start at the wrong end of the problem, technology force-fed into the current process.

The following quotation from "Reengineering the Corporation" summarizes the mistake FAA is making. The fundamental error that most companies commit when they look at technology is to view it through the lens of their current process.

As an example of an FAA program destined to fail, the FAA recently proposed wasting over \$400 million for the Flight 2000 demonstration. Best case, this program will prove that every transport category airplane will require a minimum of one million dollars worth of avionics to capture the benefits of a free flight system. And by the time the Flight 2000 program is complete, the new technology will make it obsolete. Why the airlines would even want to prove they require all of that equipment is beyond us.

Worst case and the obvious outcome, the FAA will waste years. And the ATC system will be identical today; in fact, less safe. Given FAA past failures, this approach is doomed from the outset.

Our proposal has nothing to do with privatization. Neither do we think that FAA capital funding is or ever has been a problem. The simple fact is the FAA continues to waste very large sums of money buying the wrong things.

We find it interesting that airline CEOs are willing to spend their very considerable energy and time arguing about how FAA collects money and the ticket tax issue, yet ignore how FAA spends money.

FAA's current plan to replace the ATC equipment is analogous to forcing Windows '95 into an 8086 computer. Given unlimited time and money, there are probably engineers smart enough to get the job done, but when you can buy Pentiums off the shelf for \$1,500, the question is: Why?

Incredibly, our analysis shows that the FAA's national airspace plan architecture calls for future spending of over four million dollars per work station to handle the en route computers used by the controllers. This does not include the R&D required to design the system.

Compare this with typical high-end engineering local area networks of \$250,000 per work station. Although differences exist between the air traffic controller's role and the engineer's requirements, 16 times multiple is a little much for anybody's consideration.

Delving slightly deeper into the problem, everybody has at one time or another bought a personal computer. Unlike air traffic control system, which today are very complex, as I said, the personal computer represents more or less the lowest common denominator of technology. Even so, much to your dismay, by the time you unpack the box, you probably saw another one for cheaper, faster, better, for less than you paid. The point is obvious: Technology is changing at break-neck speed. That's not a major revelation.

If we're not going to be left in the starting blocks, we need to change, too, "we" being FAA and aviation as a whole. The way to do this is not bigger, better, faster technology but to realign the development process such that a risk reward and incentive are used to our advantage.

The computer technology must be relegated to a commodity, effectively limiting it from differentiating among bidders. As many industries have already learned, there's the system functionality that will drive the future. The focus must be redirected from the letter of the technical specification towards the base functional requirement of an ATC system, the safe separation of aircraft.

Given the above, the government should take the responsibility for designing the service, design the service the system should provide, not the hardware or software to provide that service. The limited amount of NAS expertise that exists should be used to determine service levels of requirements of our next generation systems.

Lower-level operational requirements, hardware, software implementation details to meet the specific requirements are best managed by private industry on a competitive level.

Private industry then should take the capital risk for the development of the system that meets these service needs. They would supply the hardware, software, and support. FAA would manage the system for safety and provide the personnel.

There was a time not long ago when the development of a complete ATC system was so complex and carried such a liability risk that only the government could take it on. We believe that situation has changed considerably. More and more private industry is investing in ATC technologies for the international workforce.

Our proposal removes FAA from the technology side of the equation, an area that they have proven they simply can't manage. It allows industry to do what it does best: compete, innovate, and move technology into operations quickly while allowing FAA to focus on its job: safety.

Our proposal also very neatly bypasses the contentious privatization issue and the politics involved with that while gaining most of its benefit.

Can we replace our aging ATC system completely while increasing safety and flexibility and providing flexibility to FAA's customers? Of course, we can. Private industry has the technology and the capital to develop such a system in a very short time.

If the government will commit to exploring such a service, a simple screening information request, which I've submitted in my written material and I have a copy here, will determine whether or not industry is willing to take the required steps forward. This

costs the government nothing and determines whether what I have proposed is valid or not.

Finally, FAA continues to choose complex over simple, expensive over economic, grandiose over minimal. Aviation can no longer afford this path. GPS and data link are not requirements for free flight but, rather, enhancements to. Safety alone dictates that we must act faster to solve our ATC problems. DRS, STARS, or Flight 2000 will not accomplish this.

With the continuing degradation of the current ATC equipment causing a rapid rise in system risk factor, we must move rapidly to replace all the ground-based ATC equipment. Additionally, we must offload the controller by providing a free routing system to the FAA's customers.

This is a tall order but can be done within three years at a cost to the taxpayers of less than one billion dollars, what costs slightly more than FAA's complete Flight 2000 program, which will accomplish little. This can only be accomplished if FAA narrows its focus to safe separation while leaving technology to private industry.

In conclusion, the FAA answers to no one and never has: not Congress, not DOT, not GAO, and certainly not to their customers. Pilots, suppliers, and, yes, even the airlines are afraid of FAA and refuse to rock the boat.

In the end, there really is no leadership. There are solutions available today to rapidly fix the air traffic control system. We ask this Commission to rock the boat and force the FAA to immediately issue a screening information request concerning the replacement of the entire ATC system and explore alternative solutions.

Safety demands it. Economics demand it. And all of aviation should demand it. Unfortunately, FAA will not allow this to happen. This should be unacceptable to aviation. It is unacceptable to us.

Thank you, sir.