



## WHITEPAPER

# Inside the Control Tower: Why Modernizing Air Traffic Control Can't Wait

Every day, tens of thousands of flights move through the U.S. National Airspace System—safely, efficiently, and often invisibly to the traveling public. Behind that system is a workforce operating in one of the most complex, high-stakes environments imaginable.

"It's like solving a three-dimensional Rubik's Cube that changes every second," says Mike Pirrone, a recently retired air traffic controller with 35 years of experience across military and FAA operations, who now works as a consultant advising on air traffic control systems and operations.

That puzzle is only getting more complex.

As air traffic volume grows and airspace becomes more congested, the demands on controllers continue to increase. At the same time, much of the underlying infrastructure remains fragmented—built over decades, layered with upgrades, and often inconsistent from one facility to the next.

The result is a system that works—but not without strain.

### **A System Built Over Time – Not Always Built to Work Together**

Over the course of his career, Pirrone witnessed major technological advances, from analog radar scopes to fully digital displays and from manual processes to increasingly automated systems. Yet one challenge has persisted: Integration.

"How do you get systems to talk to each other?" says Pirrone.

Towers, approach controls, and en route centers often rely on different tools, interfaces, and workflows. Even

when systems are technically connected, they are not always seamlessly integrated.

**"Technology is our friend  
– as long as it's the same  
across the board."**

*Mike Pirrone, ATC Consultant*

"It would be great to have one system for the entire air traffic services," Pirrone says.

For controllers, that fragmentation has real consequences. Training becomes more complex, transitions between facilities require relearning systems, and real-time decision-making is made more difficult when information is spread across multiple tools.

The need for integration is not just a matter of convenience—it is central to efficiency and effectiveness in a high-pressure environment.

### **A Hidden Cost of Legacy Systems**

The U.S. air traffic system is built on a foundation of safety and redundancy. Even when systems fail, controllers are trained to maintain safe operations.

However, safety does not necessarily mean efficiency.

Many facilities still rely on legacy processes alongside modern tools. In some cases, this creates inefficiencies that take controllers away from active operational responsibilities. In some facilities, even routine tasks like

recording ATIS (Automated Terminal Information Service) are still done manually, taking several minutes instead of seconds with more modern systems.

These inefficiencies add up. Across shifts, facilities, and the entire system, they contribute to increased workload and reduced operational efficiency.

## Complexity Is Increasing—Not Decreasing

Air traffic control is not just about managing volume; it is about managing dynamic, constantly changing conditions.

**“Air traffic control is like a plumbing network in the sky—everything is flowing, merging, and changing in real time.”**

*Mike Pirrone*

Controllers must continuously assess spacing, timing, and sequencing while maintaining safety margins.

Technology plays a critical role in supporting this work. Tools that provide real-time information and clear visualization help controllers maintain situational awareness.

Every day, you must push yourself to become a much more skilled controller while using the available technology to your advantage” Pirrone says.

## Reliability and Resilience

Reliability is foundational to air traffic control. Systems must function continuously, and when they do not, controllers must adapt quickly.

Outages and system limitations increase workload and introduce inefficiencies. Even when safety is maintained, the effort required to manage operations increases significantly.

## The Path Forward

Modernizing air traffic control is not just about replacing old technology. It is about rethinking how systems work together.

The future system must be integrated, allowing data to flow seamlessly across platforms and facilities. It must be consistent, reducing training burden and improving usability. And it must provide clear, intuitive visualization that supports fast, confident decision-making.

## A System at a Turning Point

The U.S. air traffic control system remains one of the safest in the world. However, maintaining that standard in the face of growing demand and aging infrastructure requires decisive action.

As the FAA moves forward with plans to build a more integrated and resilient system, the role of advanced visualization and computing technologies becomes increasingly important. ScioTeq’s advanced visualization and computing solutions are designed for these high-stakes environments—delivering high-performance display and computing capabilities that bring clarity to complex operations. By ensuring that controllers can access the right information at the right time, these solutions directly support faster, more confident decision-making in the moments that matter most.

Behind every flight is a controller making real-time decisions. And behind every decision is the need for clarity, consistency, and confidence in the systems that support them—exactly what ScioTeq is built to deliver.

Clarity in complex environments is not optional—it is mission-critical.

*Mike Pirrone leverages 35 years of experience across military and Federal Aviation Administration air traffic control to support consulting and advisory efforts in the ATC domain.*