

AI is at the center of the Federal Aviation Administration's new plan to overhaul how America manages its crowded skies, anchored by a predictive traffic-management program known as SMART that aims to spot conflicts hours before they materialize. Rather than replacing human controllers, the FAA wants AI to function as a powerful decision-support layer that makes the existing system safer, more efficient, and less prone to cascading delays.

Why the system needs an overhaul

The U.S. air traffic system is under mounting strain from aging infrastructure, growing traffic, and several high-profile incidents, including a deadly airline-helicopter crash near Washington's Reagan National Airport that exposed weaknesses in how risk is managed. The Department of Transportation (DOT) and FAA have responded with a multibillion-dollar modernization drive to replace decades-old radar, wiring, radios, and software and to reduce the chances of system failures that can ripple across the country.

This effort builds on the long-running NextGen modernization program but goes further by aggressively introducing advanced analytics and AI into operational decision-making. Transportation Secretary Sean Duffy has framed the goal as nothing less than building a "brand-new air traffic control system" that is more predictive, resilient, and data-driven than the reactive system in use today.

From reactive control to predictive AI

Today, controllers primarily manage aircraft separation in real time, while a national command center balances demand and capacity at a broader scale using schedules, weather forecasts, and experience. The tools they use typically give about a 15-minute horizon on emerging conflicts or bottlenecks, forcing last-minute holding patterns and reroutes when things go wrong.

The core AI initiative, SMART—Strategic Management of Airspace Routing Trajectories—is explicitly designed to stretch that window to as much as two hours, allowing potential conflicts to be resolved while planes are still at the gate. Instead of everyone “just reacting to something happening,” the system would help the FAA and airlines plan around capacity hotspots a day or more in advance, smoothing traffic flows before storms, staffing shortfalls, or schedule surges trigger widespread disruption.

Inside the SMART program

SMART is being personally championed by FAA Administrator Bryan Bedford as a central pillar of the agency's airspace redesign. Three companies—Palantir Technologies, French aviation and defense giant Thales, and startup Airspace Intelligence—are competing to deliver the underlying AI software.

Each bidder brings a different strength: Palantir has deep experience mining government data and already holds FAA analytics contracts; Thales has decades of air traffic management hardware and software deployments; Airspace Intelligence's “Flyways” platform is already making routing decisions for a major U.S. carrier and touches a significant share of domestic traffic. Congress has already put roughly 12.5 billion dollars toward the broader modernization push, and FAA officials have signaled that tens of billions more may be needed to fully replace aging systems and deploy AI-enabled tools nationwide.

How AI will work in the sky

Technically, SMART and related tools aim to create a kind of “digital twin” of the National Airspace System, ingesting decades of flight, weather, and operational data into models that can simulate how the network will behave under different conditions. AI and machine-learning algorithms identify patterns and trends in this historical and real-time data

to predict where congestion, conflicts, or safety issues are likely to surface, from low-visibility at a specific airport to thunderstorms sweeping across a region.

In practical terms, that means the system can recommend small schedule or routing changes—shifting a departure time by minutes, rerouting a stream of arrivals slightly, spreading airline bank times—that prevent overloads before they form. Controllers and traffic managers would receive early alerts and suggested strategies but would retain authority to accept, modify, or reject those recommendations, keeping humans firmly “in the loop.”

Safety, human factors and limits

Both the FAA and DOT have gone out of their way to stress that AI will not replace human controllers, particularly after recent accidents and public anxiety about automation. Duffy has been blunt that “AI managing the airspace” on its own is off the table, insisting instead that the technology will function as a tool to make people “superhuman” in handling complex data.

Internally, FAA- and NASA-backed research has focused heavily on human-factors guidance for integrating AI into decision-support tools, emphasizing careful design of alerts, explanations, and workflows so controllers understand and trust system outputs. At least in the near term, the AI focus is on planning and traffic-flow management rather than safety-critical split-second separation decisions, which will remain the domain of trained professionals in towers and centers.

Money, trust and workforce challenges

Even with political backing, the overhaul faces daunting challenges in funding, implementation, and public acceptance. The FAA acknowledges that the initial

12.5-billion-dollar allocation is only a down payment on a larger modernization bill, and officials are making a strong case to Congress that replacing legacy infrastructure and building custom AI platforms cannot be done on the cheap. At the same time, the agency is grappling with controller shortages and the need to train thousands of people to work effectively with new tools rather than resist them.

Security and reliability questions also loom large: critics worry about concentrating so much decision-making in complex software that might itself become a point of failure or a target for cyberattack. The National Air Traffic Controllers Association has generally supported modernization but insists that any AI must augment, not undermine, human judgment and must be introduced in a way that preserves workload manageability and situational awareness.

What this means for passengers

If SMART and the broader AI overhaul deliver as promised, most passengers will never see the algorithms at work—but they may notice fewer last-minute ground stops, missed connections, and unexplained holding patterns. By predicting conflicts earlier and managing traffic more smoothly, the system could cut delays, reduce fuel burn, and lower airline operating costs, benefits that may translate into more reliable schedules and potentially lower fares over time.

Those gains, however, will arrive incrementally as systems are tested, certified, and rolled out, and any high-profile failure could quickly erode public trust in AI “in the sky.” The FAA’s plan ultimately represents a high-stakes bet that carefully designed, tightly supervised AI can shore up an aging air traffic system at a moment when demand, weather volatility, and safety expectations are all rising—and that humans and machines together can manage the skies better than either could alone.