

# TRANSFORMING THE NATIONAL AIRSPACE SYSTEM

**The United States has the world's busiest and most complex airspace. MITRE's work helps ensure that our National Airspace System (NAS) functions safely and efficiently. With a rich heritage in aerospace innovation, we focus on what lies beyond the horizon.**

MITRE's Center for Advanced Aviation System Development contributes systems thinking and technical expertise to the Federal Aviation Administration (FAA) and its mission of operating a safe and efficient air traffic system. CAASD partners with public and private research centers to provide technologies, methods, and training systems for commercial, civil, unmanned, and surface-to-space travel through increasingly crowded skies.

CAASD played an integral role in planning and implementing the Next Generation Air Transportation System (NextGen), which takes a holistic approach to transforming the aviation industry globally. Around the world, air travelers and industry stakeholders benefit from CAASD's vital contributions.

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Yesterday was about expanding runways and flights. Today and tomorrow are about communication and collaboration among diverse air traffic stakeholders.

Gregg Leone, Vice President and Director, CAASD

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CAASD plays an essential role in the world's aviation sector. Innovation from our laboratories and collaboration teams has advanced safety and efficiency for airlines, general aviation, and the flying public in the United States and many other countries.

### **An Enduring Record of Safety Innovation**

The CAASD-developed Traffic Collision Avoidance System uses radar transponders to warn pilots of other transponder-equipped aircraft that pose a threat of mid-air collision. The Airport Movement Area Safety System provides runway-conflict alerts at the country's busiest airports. CAASD studies have driven enhancements in airfield marking and lighting to prevent runway collisions. Our contributions to Automatic Dependent Surveillance-Broadcast, a satellite-driven system for transmitting and receiving information about an aircraft's movements, is a cornerstone capability for the NAS.

### **Enhancing Safety Through Data Analytics**

In our role as an objective, trusted partner, CAASD manages and safeguards the Aviation Safety Information Analysis and Sharing (ASIAS) program. ASIAS is a central repository of safety information from commercial airlines, flight crews, air traffic controllers, maintenance personnel, and other stakeholders. ASIAS makes it possible to query millions of flight data records and de-identified reports to identify safety trends and assess the impact of changes in the aviation operating environment.

### **Connecting Systems to Enable Air Traffic Efficiency**

Sophisticated onboard navigation capabilities allow pilots to fly precise point-to-point routes across time and space. CAASD contributed to the development of Trajectory-Based Operations (TBO), which helps identify a predicted flight plan, as well as the times it will cross specific points along the path. Using this information, air traffic managers can adjust for weather, unexpected runway conditions, or changes in airport capacity. As it deploys, TBO will mean more predictable arrival and departure times for passengers, lower fuel usage for airlines, and reduced aircraft emissions.

### **Applying AI to Improve Incident Analyses**

Aviation Risk Identification and Assessment (ARIA) uses advanced algorithms to analyze noncompliance with procedures and regulations as it occurs and flag events for further investigation, saving time and enabling refinement of procedures and regulations. Using Artificial Intelligence (AI), ARIA enables machines to evaluate raw data and prioritize cases based on specified parameters. The system frees investigators to focus on the highest-risk events in near-real time.

### **Expanding the NAS for What's to Come**

Building on our NextGen successes and lessons learned, CAASD and MITRE are playing a critical role in launching the next evolutionary phase in our skies. With government, industry, and academia we are creating standards, operational principles, and frameworks to support a growing commercial space industry.

## **BENEFITS OF NEXTGEN BY THE NUMBERS\***

Transforming the National Airspace System, delivering on our NextGen promise

# 15,000 hours

FLIGHT DELAYS AVOIDED BY REROUTING FLIGHTS AROUND WEATHER AND CONGESTION

# 25,000 hours

COMMUNICATION TIME SAVED THROUGH NEW TECHNOLOGIES AND PROCEDURAL EFFICIENCIES

# \$6 billion

CUMULATIVE BENEFITS OF NEXTGEN, 2010-18 INCLUDING SAFETY IMPROVEMENTS, FUEL SAVINGS, LOWER AIRCRAFT OPERATING COSTS, AND SAVINGS TO PASSENGERS

\* The FAA collaborates with aviation experts to reach a consensus on statements of fact regarding the impact of NextGen.

*MITRE's mission-driven teams are dedicated to solving problems for a safer world. Through our public-private partnerships and federally funded R&D centers, we work across government and in partnership with industry to tackle challenges to the safety, stability, and well-being of our nation.*

**MITRE** | SOLVING PROBLEMS FOR A SAFER WORLD™