ANNEX

Air Traffic Management Concepts for Collaboration Between CAAS and SESAR JU

Minimum Implementation Path

A “minimum implementation path” (MIP) refers to the minimum set of capabilities needed to modernise the air traffic management system to support future growth in air traffic, and it is accompanied by a set of associated timelines for global implementation. The MIP allows countries and aviation organisations to introduce new air traffic management capabilities in a coordinated manner, ensuring that different regions modernise their systems in a globally interoperable way.

By agreeing on a shared roadmap before introducing more advanced features over time, airlines, airports and air navigation service providers can adopt new technologies safely and efficiently. For passengers, this means smoother international travel, fewer delays and improved safety through better use of airspace.

Common Situational Picture

A “common situational picture” enables all relevant aviation stakeholders, including pilots, air traffic controllers, airports and network managers, to share the same up-to-date operational information.

This information may include aircraft positions, flight plans, weather conditions, airspace restrictions, airport congestion and runway availability. To make this possible, ICAO is promoting the System Wide Information Management (SWIM), which enables trusted operational data to be exchanged securely and in real time. With SWIM, aviation stakeholders can collaborate with the same set of information and make decisions more effectively and efficiently, improving safety and helping flights operate more predictably and efficiently.

Trajectory-Based Operations

Trajectory-Based Operations (TBO) is a future air traffic management concept developed by ICAO. Traditionally, flights are managed step by step as the aircraft passes through the control of different air navigation service providers. With TBO, the entire flight path including route, altitude, speed and timing, is managed as one continuously updated trajectory from departure gate to arrival gate.

With TBO, real-time information such as weather, airport capacity and traffic demand will influence the aircraft's optimum trajectory. These continual adjustments enable the aircraft to fly along more efficient routes, with reduced fuel consumption and emissions. Overall, the predictability of flights is improved and delays are minimised.

Artificial Intelligence

Artificial intelligence (AI) in air traffic management is envisioned to be able to analyse large amounts of operational data and support decision-making. It can predict traffic congestion, identify possible conflicts between aircraft, improve weather forecasting and recommend more efficient flight routes. AI will enable aviation systems to become more adaptive, data-driven and efficient while maintaining high safety standards.

Importantly, AI is intended to support human operators such as air traffic controllers and pilots. Human oversight and accountability will remain at the core of aviation safety, ensuring that technology enhances decision-making without compromising trust.

This human-centric vision is common to CAAS and SESAR JU and an important foundation for future cooperation.

Automation

Automation refers to the use of technology to perform routine or repetitive operational tasks with limited need for manual input. In air traffic management, automation is already supporting functions such as surveillance, flight data processing and conflict alerts.

Looking ahead, future automation capabilities could assist with traffic sequencing, airspace management and optimisation of flight operations. Automation reduces the workload for controllers and pilots, allowing them to focus on more complex tasks and decisions. Automation is a common research interest for CAAS and SESAR JU, as Singapore and Europe manage complex traffic flows. Passengers too can benefit from improved automation capabilities, which can contribute to safer, more efficient and more environmentally sustainable air travel.