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ASSEMBLY — 36TH SESSION

TECHNICAL COMMISSION

Agenda Item 31: Continued evolution of a performance-based global air traffic management (ATM) system

APPLICATION OF ADS-B SYSTEM IN CIVIL AVIATION FLIGHT UNIVERSITY OF CHINA

(Presented by the People's Republic of China)

EXECUTIVE SUMMARY

Automatic Dependent Surveillance – Broadcast（ADS-B）is an aircraft surveillance technology based on GPS and ground-air data-link communication. This paper introduces the ADS-B's characters and its construction process at Civil Aviation Flight University of China (CAFUC). ADS-B can not only enhance the safety but also the flow and the capacity.

Strategic Objectives:	This working paper relates to Strategic Objectives D – *Enhance the efficiency of aviation operations*
Financial implications:	N/A
References:	

[1] Chinese and English versions provided by China.

1. INTRODUCTION

1.1 As the largest in Asia, world famous civil aviation flight school, CAFUC has five training airports and more than 200 training airplanes, and performs training flights in almost 100 airplanes every day. Therefore, real time surveillance of flight's moving status is very important for ensuring of flight safety. But if all five airports are installed with second surveillance radars (SSRs), it will be a tremendous investment.

1.2 Automatic Dependent Surveillance-Broadcast (ADS-B) System is an aircraft operation surveillance technology based on Global Positioning System (GPS) and ground/air data link communication. Its facility construction expense is low compared with SSR, and it is very suitable for the general aviation and flight training organization; and, differed from SSR, ADS-B can not only implement the surveillance from the ground to the air, but also the inter-surveillance from airplane to airplane, in the air collision avoidance issue, this makes the pilots have the ability from the original passive style to initiative style, reinforce the flight safety.

1.3 In May 2006, under the support of CAAC, CAFUC started the application of ADS-B construction, and until now, have completed six type of aircraft, total 113 aircrafts airborne equipments' installation, five ground base station construction and network connection work between the stations. Other aircrafts' installation work is continuing in progress.

2. STRUCTURE OF CAFUC ADS-B SYSTEM

2.1 ADS-B system used by CAFUC includes two parts, airborne equipments and ground base stations.

2.2 The airborne equipments are composed of Universal Access Transceiver (UAT) and cockpit traffic information display. UAT collect real time airplane's position data such as heading, altitude etc. through the internal installed GPS receiver, automatically broadcast airplane identification code and other relative data outwards, consequently establish airplane-airplane data inter-communication and air-ground bidirectional data link. Airman monitors the airplane in the airspace around its airplane through cockpit traffic information display.

2.3 The ground base transceiver (GBT) of ground base station receives airplane's data, display the airplane's position on the display computer.

2.4 Display scope of ADS-B can be adjusted between 5-200 nautical miles. Target airplane symbol displayed is a vector arrow with speed ratio, the label adjacent to the symbol has data with aircraft identification code, attitude, heading, altitude etc. Ground map includes information with airways (segments), waypoints, closest airports, terrain etc.

3. INTEGRATION AND SHARE OF CAFUC ADS-B DATA

3.1 Five base stations located in college branches and aviation stations are connected with CAFUC ADS-B main server through the campus network to implement the data share. It can perform the whole process from take-off to landing, real time surveillance on cross country airplanes between 4 ground base stations within Sichuan province. University headquarters, relative functional departments in college branches and college of air traffic management can obtain the real time flight status.

3.2 Five airports base tower of CAFUC set up the independent surveillance terminal.

4. SIGNIFICANCE OF CAFUC USING ADS-B

4.1 The ADS-B in CAFUC can cover all training airports, airspaces and ground taxiing planes, helps to reduce airplane's separation, increase capacity, and enhances Chinese ability of flight training.

4.2 The data replay function of this system, can be used in the debrief of instruction to the student pilots, and used as the assistant teaching material for the students majored in air traffic management to improve the teaching level.

4.3 This system changed the traditional air traffic control mode, enhanced the surveillance ability of air traffic management and tower's control on airplanes, and improved the safety level. Besides the function of SSR, ADS-B system can provides efficient, economic solution for airspace surveillance in the area that SSR is not easy to reach. As an important project of CAAC NEGATS system construction, the spread and application of the ADS-B technology will have great effects on increasing the flow and capacity of transportation, general aviation, and flight safety in Chinese civil aviation.

5. OPTIMIZATION OF CAFUC ADS-B SYSTEM

5.1 As a set of air traffic management surveillance system, network and computer hardware accompanied with ADS-B facility need to be optimized, so as to improve the stability and reliability of ADS-B system operation more.

5.2 ADS-B is a brand-new system to us, and no uniformed industry applied standards, we would like to continue optimize and develop this system during the application, and work with other states, make great efforts in optimizing the standards.

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