58th CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGIONS

Dhaka, Bangladesh
15 to 19 October 2023

AGENDA ITEM 4: AIR NAVIGATION

DEVELOPMENT AND APPLICATION OF UNMANNED AIRCRAFT TRAFFIC MANAGEMENT INFORMATION SERVICE SYSTEM OF CAAC (UTMISS)

(Presented by the People's Republic of China)

INFORMATION PAPER

SUMMARY

This Paper presents information on the Unmanned Aircraft Traffic Management Information Service System of CAAC(UTMISS), developed by the Second Research Institute of CAAC under the guidance of the Office of Air Traffic Regulation of CAAC. UTMISS is a national-level flight data collection and management platform for unmanned aircraft, which effectively improves the efficiency of airspace utilization on the premise of ensuring the safe operations and unleashes demands for unmanned aircraft operations. It provides a valuable reference for the promulgation and implementation of the "Interim Regulation on the Administration of the Flight of Unmanned Aircraft" in China.

DEVELOPMENT AND APPLICATION OF UNMANNED AIRCRAFT TRAFFIC MANAGEMENT INFORMATION SERVICE SYSTEM OF CAAC (UTMISS)

1. INTRODUCTION

1.1 As a burgeoning global industry, the research and manufacturing of unmanned aircraft technology has fostered large-scale production capacity. The Chinese market alone features over 12,000 companies engaged in the development and manufacturing of civil unmanned aircraft and their components. Additionally, there is a strong demand for unmanned aircraft applications, spanning various industries such as entertainment, logistics, city security and manned transportation, which has given rise to a new form of digital economy.

1.2 Compared with manned aircraft, unmanned aircraft are characterized by small size and low-altitude operations. With the development of unmanned aircraft, the flight volume has also increased massively (see the "Flight Statistics of China's Civil Aircraft in 2022", as shown in Table 1). However, problems such as unauthorized flights, interference to traditional aircraft flights, injuries to persons, and privacy infringements have posed serious threats to aviation safety, public safety, and national security. Clearly, this is attributed to the restrictions of conventional air traffic management techniques that heavily depend on human involvement. Therefore, there is an urgent need for new comprehensive regulatory approaches and patterns.

Table 1 Flight Statistics of China's Civil Aircraft in 2022

	Number of aircraft	Number of flights	Flight hours
Manned flight (Commercial)	4,165	2,566,000	6,276,000
Manned flight (General Aviation)	3,186	7,152,000	1,219,000
Unmanned flight	2,448,034	252,182,000	20,670,000

Source: "Bulletin of Civil Aviation Industry Development in 2022" and data from UTMISS.

1.3 Since 2017, under the guidance of the Office of Air Traffic Regulation of CAAC, the Second Research Institute of CAAC has been tasked with developing the Unmanned Aircraft Traffic Management and Information Sharing System(UTMISS). UTMISS is the first national-level unmanned aircraft flight data collection and management platform and serves as a foundational information source for regional unmanned aircraft management and service platforms, enabling the creation of a comprehensive framework for unmanned aircraft management and services that encompasses both national and local oversight, and integrates both basic and specialized services. On the premise of ensuring operation safety, this framework effectively improves the efficiency of airspace utilization and unleashes demands for unmanned aircraft operations, providing important technical support for the construction of a modernized, high-quality, and comprehensive national transportation network and the development of low-altitude economy.

1.4 The development and application of UTMISS has provided a valuable reference for the promulgation and implementation of the "Interim Regulation on the Administration of the Flight of Unmanned Aircraft" in China.

2. DISCUSSION

The application of UTMISS in China

2.1 In November 2018, China's first pilot program for the collaborative management of unmanned aircraft was launched in Shenzhen. UTMISS, serving as a trial portal and information hub, was launched and put into operation online (as shown in Figure 1, the green portion indicates the uncontrolled airspace intended for micro and light unmanned aircraft, which is lower than 120 meters

AGL). UTMISS is capable of airspace management, civil aviation management and flight information management services, public safety management and user services, and serves as a "one-stop-service" information window for processing flight applications of various types of unmanned aircraft, greatly improving the processing efficiency of flight application. Based on the designation of uncontrolled airspace and cloud-based monitoring of real-time flight data, UTMISS provides timely notifications of airspace information and risk alerts. This system facilitates airspace management and civil aviation oversight in Shenzhen, ensuring a satisfactory, safe and reassuring environment for unmanned aircraft operations for the benefit of general public and other airspace users. It has worked as a valuable demonstration of effective unmanned aircraft management and has played a crucial role in ensuring aviation safety of terminal operations, safe operation of unmanned aircraft and safe public environment in local areas.

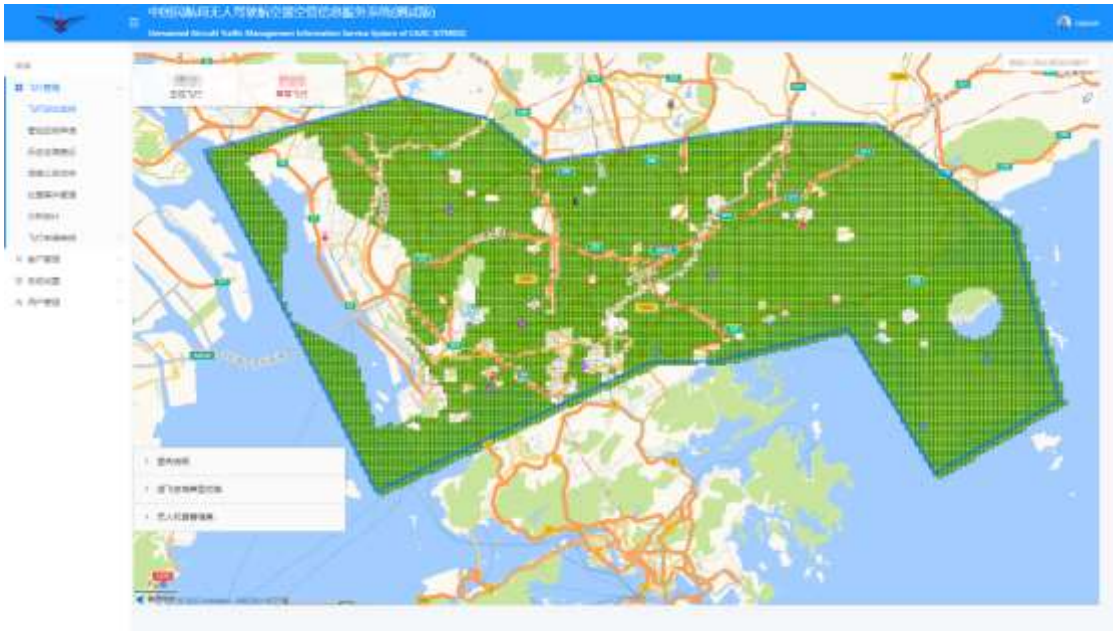

Figure 1 Main interface of UTMISS, Shenzhen (pilot)

2.2 In May 2020, China's first provincial-level pilot program for the collaborative management of unmanned aircraft traffic was launched in Hainan. Hainan Unmanned Aircraft Supervision Integrated Platform, established based on UTMISS, was put into operation online at the same time (as shown in Figure 2). In addition to the operation of unmanned aircraft at very low altitude below 120 meters AGL in segregated airspace, the pilot program of Hainan also dealt with the integrated operation of low-altitude unmanned flights and manned general aviation flights, further verifying a multi-party collaborative management model. In Hainan, within the framework of safety and regulatory compliance, UTMISS offers intelligent and quick processing of unmanned flight online applications and authorization, which greatly improves the efficiency of general aviation activities such as urban governance, maritime patrols, aviation logistics, and meteorological monitoring. This initiative has effectively promoted the social and economic development of Hainan.

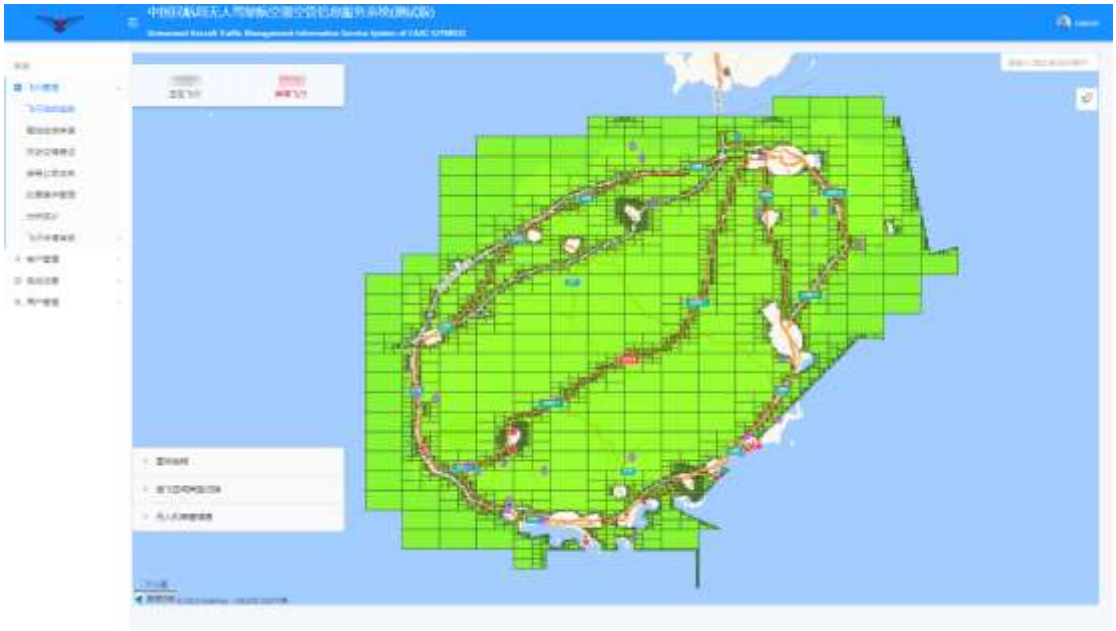

Figure 2 Main interface of UTMISS, Hainan (pilot)

China's regulations and standards on unmanned aircraft flight data

2.3 Based on the experiences in Shenzhen and Hainan, the Office of Air Traffic Regulation of CAAC issued the "Regulation on Dynamic Data Management of Light and Small Civil Unmanned Aircraft Flight" (AC-93-TM-2019-01), which came into effect on 1st May 2020. According to the regulation, light and small civil unmanned aircraft as well as plant protection unmanned aircraft nationwide, should report real-time flight data to UTMISS.

2.4 Based on AC-93-TM-2019-01, the "Interface Specification of Civil Unmanned Aircraft Traffic Management Information Service System" (MH/T 4053-2022) came into effect on 4th July 2022. It standardizes the communication protocol requirements, data transmission requirements, and data interface requirements between UTMISS and civil UAS, civil UAS operation control systems, and civil UAS monitoring systems. The introduction of this interface specification further standardizes the most basic data and information flow in China's unmanned aircraft air traffic management system.

2.5 Currently, UTMISS has accessed the flight data of a total of 151 types of unmanned aircraft from 24 manufacturers across the country, covering light, small, medium and large unmanned aircraft. It provides real-time monitoring and automatic early warning services for an average of 1 million flights and 50,000 flight-hour unmanned aircraft activities every day, processes an average of 100 GB of data per day, and has served more than 3 million unmanned aircraft in total, significantly promoting the healthy development of the national unmanned aircraft industry.

International communications on UTMISS

2.6 In April 2021, the Office of Air Traffic Regulation of CAAC and the Second Research Institute of CAAC were invited to the ICAO ANC Talk. Chinese solution of unmanned aircraft air traffic management based on UTMISS was introduced at the meeting. The ANC president and other participants responded enthusiastically to the report and highly appreciated its professional, comprehensive and innovative presentation and contents.

2.7 In November 2021, "ISO 23629-9: Interface Between UTM Service Providers and Users", which was drafted based on UTMISS and domestic standards by the Second Research Institute of CAAC under the guidance of the Office of Air Traffic Regulation of CAAC, was officially approved as a new project of ISO. This standard mainly specifies certain requirements (excluding specific communication protocol requirements) for elements of information exchange between UTM service

providers (USP) and different users so as to support relevant UTM services. Currently, this ISO standard has entered the Approval Stage and is expected to be published by the end of 2023.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note the information contained in this Paper.

— END —