International Civil Aviation Organization

The First Meeting of Air Traffic Management Automation System Task Force of APANPIRG (ATMAS TF/1)

Web-conference, 28 – 30October2020

Agenda Item 5: Issues and Challenges in implementation

5.2 Systems interoperability

(Operational concepts and flight plan interoperability standards, such as OLDI, AIDC, FF-ICE, SWIM-IOP)

APPLICATION OF FLIGHT PLAN CENTRALIZED PROCESSING SYSTEM IN ATM AUTOMATION SYSTEM

(Presented by China)

SUMMARY

This paper presents the flight plan centralized processing system and simply describe the influence of flight plan centralization on ATM automation system.

1 BACKGROUD

1.1 As we all know, China is one of the largest international civil aviation transportation markets in the world. In recent years, with the rapid development of economy, people prefer to choose aircraft as the first choice of travel. At the same time, it brings a lot of challenges.

- The requirement for ability of ATM information systems raised by future growth of air transportation and ATC workload.
- Higher cost-benefit and maintenance performance requirement.
- Higher reliability, flexibility, Concentration and security requirement.

2 INTRODUCTION OF FLIGHT PLAN CENTRALIZED PROCESSING SYSTEM

2.1 Flight plan centralized processing system (FCPS) is a set of intelligent control system independently developed by ATMB, which is responsible for processing National flight plans and telegrams. It was officially put into operation in September 2017. With the construction of National Flight Plan Processing Center, the unified processing of flight plans of 237 airports in China has been completed. The rudiment and new business mode of unified management of national flight plans have been preliminarily established.

2.2 The main function of the system is to integrate civil aviation AFTN / SITA message resources and flight plan data in the whole country, and realize the automatic processing and intelligent forwarding of telegram.

2.3 The main purposes of the construction are as follows:

- Provide accurate and reliable flight plan service for ATM automation system and establish a collaborative environment for flight operation.
- As an important data source, it provides accurate and reliable data services for other ATC systems.
- The system synchronously accesses the National Flight repetitive plan data, CAAC domestic aviation information data (NAIP), CDM system and tower system real-time flight operation data, and automatically associates with the flight plan data to realize the centralized collection of national flight operation status.
- Improve the quality of flight plan data of air traffic control units, reduce the work pressure of flight controller, optimize human resources, and provide more efficient information system for all control users.

3 APPLICATION OF FCPS IN ATM AUTOMATION SYSTEM

3.1 ATM automation system includes radar data processing system (RDP) and flight plan processing system (FDP). FDP refers to the use of information system and database to process flight plan input, modification, flight dynamic display, flight data generation, coupling with radar data and other related information.

3.2 ATM automation system mainly identifies the format of AFTN telegram and its role in the system.

- FPL: It is sent 150 minutes before the flight takes off. After the FDP receives FPL, it creates a flight plan according to the content and stores it in the system for activation. The main function of FPL is to create and supplement flight plan.
- DEP: It is sent out before the flight takes off. It is mainly used for the flight taking off at the local airport. After receiving, the corresponding flight plan is activated and the secondary radar code is assigned to it. Once the RDP searches the tracks with the same secondary radar code, it will be associated. At the same time, a strip will be printed on the tower.
- ARR: It is sent out after the flight landing， the FDP will terminate the corresponding flight plan and release the occupied secondary radar code.
- CHG: When some information of the flight plan is changed, the FDP receives and modifies the flight plan data.
- DAL: When the flight is delayed, the FDP will delay the termination time of the flight plan.
- CNL: When the flight is cancelled for some reason, the FDP will terminate the corresponding flight plan.

3.3 The flight telegram reflects the whole process of a flight from take-off to landing. The system will automatically complete the corresponding processing in term of the telegram instructions. However, before the operation of FPCS system, ATM automation system often receives the telegram with nonstandard format or incomplete content, which causes great workload to the FDO seat .

3.4 For FPL, in the ATM automation system, most of the semantically error telegrams are related to airways and routes, Such as:

- Route element is unknown
- A known route item must proceed

- Cannot determine entry point to FDRG
- ETI X to Y too long
- X does not start from ADEP

3.5 The error of other telegrams is mainly due to the corresponding FPL telegram, which does not create the flight data record (FDR), and cannot match correctly. Therefore, it will be recognized as "the requested FDR is not stored".

3.6 The flight plan centralized processing system is a powerful barrier. The system receives the national flight telegrams through the Data and Message Handling System. The original telegrams are preliminarily de-duplicated and format checked. After that these telegrams are judged by complex logic. Then the normal telegrams are matched and associated with the flight plan depending on the key elements of the message content. Finally, program sends the telegrams to the relevant control units and ATM automation systems.

3.7 The flight plan centralized processing system analysis route based on GIS：

- According to the information of route, airway point, airport, sector and control area in NAIP database, GIS environment model is established.
- The system collects the route data in the text of the flight telegram to form a GIS route model, and calculates the sector control area that the route crosses and the correct receiving address of the telegram.

3.8 Telegram processing business rule engine: rule base is composed of many telegrams processing logic. The establishment of a complete, rigorous and efficient rule base cans effectively improve the ability of automated telegram processing and reduce the amount of manual processing.

- There are three sources of rules in the system：
  a) 《MH/T 4007-2012/The formats of message content and data convention for civil aviation air traffic service》.
  b) Regular telegram processing rules.
  c) Some unique business logic.

3.9 Since the flight plan centralized processing system was put into operation in 2017, the accuracy of flight plan data released through the system platform is more than 99%, the daily average flight data processed by the system has reached 20000.Shanghai ATM automation system can receive relevant telegrams through two address ZSACFMUX&ZSACZQZX, and the number of error telegrams manually processed by FDO seats has been reduced from 600 to 10.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the information contained in this paper; and
b) discuss any relevant matter as appropriate

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