



*International Civil Aviation Organization*

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**Agenda Item 7: Latest Developments in AIS Fields**

**SYSTEM OF AD RAW DATA, BASED ON AICM/AIXM 4.5**

(Presented by the China)

**SUMMARY**

The information paper describes the submit system of AD raw data. It includes deployment, major function, modularized management etc.

**1. INTRODUCTION**

1.1 Considering the actual operational situation of domestic civil aviation, the submit system of AD raw data, based on AICM/AIXM 4.5, is designed and developed to satisfy the current demand and fit the status quo.

1.2 Covering the nationwide air traffic control departments and relevant airport departments in charge of aeronautical information service, the system fulfils the functions of aerodrome raw data submission, editing, checking, publishing and update in more than 160 domestic airports, successfully realizes the structured storage and effective management for the raw data and also completes the tasks of automatically publishing National Aeronautical Information Publication (NAIP), of providing normative and full operation flow for the data submission and of improving the data quality as well as integrity.

1.3 The purpose of this information paper is to describe the outcome of that effort.

**2. BACKGROUND**

2.1 Airport raw data are significant for aeronautical information and are key to ensure that every air flight is safe, effective and on time. However, there are still deficiencies particularly in the submission, assessment and maintenance for domestic aerodrome raw data.

2.1.1. It should be noted that the high cost and low efficiency of manually handling the raw data from aerodromes generate negative effects. There are differences existing within the format of raw data finally submitted from each airport nationwide and consequently the relevant manual adjustment or revision, heavy in workload and inefficiency in labor, has to be repeatedly implemented.

2.1.2. Scientific and effective ways for data checking and examining are still lacking. Currently the work concerning data checking as well as judging or analyzing the correlation among data can be only performed on the manual basis, which may well result in errors and omissions during the whole process.

2.1.3. The utilization rate of airports raw data is relatively low. For now, the raw data offered from aerodromes nationwide are scanned and stored into databases rather than be processed and then saved by extraction and classification. This leads to an outcome that all the raw data can be hardly reutilized.

2.2. The study of AICM/AIXM4.5 provides a new idea of solving the problems emerged in the course of raw data submission. Since 2009, Air Traffic Management Bureau of CAAC has developed the raw data submission system for domestic civil aerodromes that is still in the trial-running phase.

### 3. DISCUSSION

#### 3.1. The deployment of the system installation

3.1.1. The deployment of the system installation is in line with user levels and the first level user is AIS Center of ATMB. The users of the second level are regional air traffic management bureaus, while the third level users are all the airports across the country.

3.1.2. XML files are employed by the third level users as data source, and databases are adopted to store the raw data from local airports by users of the second level. Correspondingly, the first level user gathers all the raw data collected from aerodromes nationwide and then stores them into databases for further comprehensive query. In fact, XML files are basically introduced as a medium for the data transmission which realizes raw data submission and update local AD raw data among the users at all levels.

3.1.3. In order for readily retrieving and conveniently viewing the data, the systems of the second and third level users support the function of outputting data in word document format. Moreover, the first level user system can publish the raw data in the formal NAIP document format.

3.2. The major functions of the system

3.2.1. Raw data edit

3.2.1.1. Diverse editing functions for airport raw data are provided, including the verification of data format and the highlight prompt for modified information;

3.2.1.2. The comparative function realizes the extraction and display of differences from two pieces of data;

3.2.1.3. Auxiliary data editing functions are designed which involves ‘create new airport data framework’, ‘delete’, ‘save as’ and so on.

3.2.2. Raw data typesetting

3.2.2.1. The system serves the function of setting effective date which can automatically calculate the effective date and publication date in light of Aeronautical Information Regulation and Control (AIRAC) and automatically set date information for each page.

3.2.2.2. The system realizes the automatic inheritance and update typesetting format in relation to NAIP which attains the automatic inheritance of the typesetting format from prior data.

3.2.2.3. The function of automatically publishing NAIP document is achieved and all AD raw data merging the latest typesetting format can be automatically output in PDF.

3.2.3. Raw data Finalization

3.2.3.1. This function can finalize the data that have already processed in terms of editing as well as typesetting and also generate the latest version number that ensures the accuracy for the version information, providing basic data source for data submission and update.

3.2.4. Data submission and updates local AD raw data using the latest publishing data packets

3.2.4.1. The system has the function of data submission which performs the data encryption and packing for the required raw data that should be submitted.

3.2.4.2. The receiving function of submitted data is more than simply receiving these data and can also complete the actions of data extraction and unencryption as well as the operation within the edit area when loading data.

3.2.4.3. The system additionally covers the function of data update which finishes the task of generating update packages from finalized data. Moreover, the receiving function for updating local AD raw data using the latest publishing data packets accomplishes the automatic data extraction, unencryption as well as the operation of updating local data.

### 3.2.5. Data query

3.2.5.1. Data query function assisting the edit operation for aerodrome raw data can realize the query for data submission, update and status.

### 3.2.6. User Management

3.2.6.1. This function concentrates on various control actions for system users, such as ‘Add users’, ‘Delete users’, ‘Set users authorization’ and ‘Set airports managed by users’.

### 3.2.7. System management

3.2.7.1. Within this function, the configuration of parameters during the system operation can be fulfilled. These parameters generally contain the followings:

- Server IP address
- Username and password
- Word document save path
- Template save path
- Verification information for data format
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### 3.2.8. Log management

3.2.8.1. The log management function performs the automatic logging for warning and error messages during the system operation and also provides evidence and convenience for the later maintenance.

## 3.3. System data organization and management

### 3.3.1. Airport raw data modeling

3.3.1.1. Airport raw data model is designed for fitting the status quo by referencing the definition of AICM/AIXM 4.5 and combining with the present situation of China civil aviation.

3.3.2. Airport raw data submission and update local AD raw data using the latest publishing issued data packets

3.3.2.1. Airport raw data are normally converted into XML-based files to further fulfill the data submission or update among ATMB, regional ATMBs and local aerodromes through ATM network of CAAC.

3.3.3. Modularized management of airport raw data

3.3.3.1. Each part of AD2.1-AD2.26 should be regarded as a XML file for storage and organization and those XML files from each part will be indexed for further management. However, it should be noted that each data submission only focuses on the contents of the changed parts in terms of conducting proofreading and editing.

3.3.4. Separation management for data and typesetting format in order for reducing replace number of pages

3.3.4.1. Airport raw data are organized and managed by utilizing XML files or databases, while the typesetting format is mainly set and handled by using custom template in FrameMaker. The fusion process of data and typesetting format can be automatically implemented for realizing the publication of NAIP document.

3.4. System data submission and update local AD raw data using the latest publishing data packets

3.4.1. Local airport data are edited by airport users who are users of the third level and the whole editing process generally includes first, second, third proofreading and the finalizing operation. Subsequently, the finalized data will be packed and submitted to the second level users.

3.4.2. Users of the second level load the data processed by the airport users to the local systems, after repeatedly proofreading and editing, store them in the databases and then submit the packed and finalized data to the first level user.

3.4.3. Similarly, the user of the first level loads the data processed by the second level users to the local system and store them in the relevant databases after repeatedly checking or editing. Those data stored in the databases will be further typeset and composed in order to realize publishing NAIP documents which thereby form the publishing data packets.

3.4.4. Based on receiving the particular publishing data packets released by the first level user, the users of the second level will update the airport raw data within their databases. This ensures that the local data keep pace with the data of the first level user.

3.4.5. Likewise, the users of the third level will update the airport raw data based on receiving the data packets delivered by the second level users, which insures that their local data can keep pace with the data of first and second level users.

3.5. Achievements of the system application

3.5.1. Unified national databases of airport raw data are built for the purpose of fulfilling the quick and efficient data storage as well as extraction and, more importantly, paving the way for the reutilization of the raw data afterwards.

3.5.2. The complete process and the way of management are set up involving every link of data submission, edit, proofreading and publishing, which strongly support the operation of airport data submission.

3.5.3. The format of the submitted data is normalized that improves the quality and integrity of airport raw data.

3.5.4. Based on the study of AICM/AIXM4.5 model, the new idea of its architecture is fundamentally introduced within the first technical probe for domestic civil aviation and the related technological reserve and talents reserve, during the transition from AIS to AIM, are also preliminarily realized.

**4. ACTION BY THE MEETING**

4.1. The meeting is invited to note the content of this paper..

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