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Agenda Item 5: Regional AIM Guidance and Planning

DIGITAL NOTAM IMPLEMENTATION IN HONG KONG, CHINA

(Presented by Hong Kong, China)

SUMMARY

This paper presents the progress of Digital NOTAM (D-NOTAM) implementation in Hong Kong, China and its challenges. The current D-NOTAM Specification (version 2.0) formulated by EUROCONTROL does not cover typical scenarios in APAC Region such as the activation of cross-border ATFM measures. To fully accommodate the distinctive operation characteristics in APAC Region, this paper suggests the development of regional specific D-NOTAM coding scenarios, particularly for Air Traffic Flow Management (ATFM) related events, to ensure interoperability and harmonisation across the APAC Region.

1. INTRODUCTION

1.1 Hong Kong, China recognised the importance of transition to data-centric aeronautical information management to meet the performance target (objective) of the ICAO Global Air Navigation Plan (GANP) and its Aviation System Block Upgrade (ASBU) framework, and made steadfast progress in the consolidation and digitalisation of aeronautical information since the adoption of AIXM 4.5 in the last decade. To support full digitalisation of a data-centric aeronautical information management (AIM) system, allowing for the seamless and real-time exchange of quality-assured data across all aviation stakeholders via System-Wide Information Management (SWIM), the Civil Aviation Department of Hong Kong, China (HKCAD) has commenced the implementation of an enhanced AIM system, which will support the AIXM 5.1.1 (or commonly short-termed as AIXM 5.1) framework.

1.2 The enhanced system, expected to be commissioned in 2028/29, will allow the coding of digital datasets in AIXM 5.1, in compliance with Annex 15, Doc 8126 and PANS-AIM. The existing eAIP Hong Kong would be revamped to highlight the provision of AIP datasets, alongside the digital product specification for users to download. The static and dynamic database (SDD) of the enhanced system would also support the issuance of digital NOTAM (D-NOTAM), while maintaining parallel operation on the legacy NOTAM service.

1.3 However, during the project initiation phase, gaps were identified regarding the standardised application of AIXM version 5.1 for dynamic data, specifically D-NOTAMs. In this regard, the operational necessity is outlined for standardised coding scenarios for the frequent use cases to prevent fragmented implementation within the APAC Region.

2. DISCUSSION

Compliance with ICAO APAC Regional AIM Capability Phase III and GANP ASBU

2.1 The implementation of AIXM version 5.1 is a critical enabler for ICAO APAC Regional AIM Capability Phase III of the aeronautical information exchange through digital data sets in a SWIM environment. It also aligns directly with the ASBU, notably the Block 2 and 3 of DAIM threads. DAIM-B3/4 NOTAM replacement is intertwined with SWIM Block 2 elements, it is also a dependent element for Trajectory-Based Operations (TBO).

2.2 Key features to be implemented in the enhanced system will include the ability to provide Digital Data Sets as mandated by Annex 15 and PANS-AIM. Furthermore, the system will support the D-NOTAM, where NOTAM information is provided as structured, machine-readable data. The XML message allows automatic and instant processing and interpretation for airspace users to make operational decisions in real-time. It also allows flight planning system to automatically ingest D-NOTAM data to validate against any route segment closure (e.g. due to navaids unserviceability or airspace blockage) and calculate the optimal flight plan routing or whether alternate flight route shall be adopted henceforth, i.e. the essence of FF-ICE.

Challenge Encountered During the Development of D-NOTAM Specification

2.3 D-NOTAM is primarily evolved on the temporal change of digital datasets, i.e. XML-coded information. The scope of the digital datasets is governed by PANS-AIM, though the coding structure and specification belongs to Doc 8126 Part IV which is not yet available. Therefore, States/Administrations need to make reference to the standard specification from EUROCONTROL. The absence of ICAO specification creates uncertainties to States/Administrations during the software development stage and may lead to inconsistent and divergent coding practices for the same aeronautical features.

2.4 Unlike the Q-code used in the AFTN text-based NOTAM, D-NOTAM requires specific "Event Scenarios" to ensure that pertinent information like "Runway Closure" or "Ad-hoc Special Activity Area Creation" is coded with identical structures. The EUROCONTROL Digital NOTAM Specification Version 2.0 tailored primarily to the European operational environment and regulatory framework, may not suffice to cope with the operational need in the APAC Region, in particular the proliferation of NOTAM on cross-FIR ATFM measures.

2.5 With the insufficient standardised coding, common conditions like the initiation of minute-in-trail (MINIT) that are often communicated via traditional NOTAM cannot be coded other than free text, defeating the purpose of the digital transition.

Benefits of Standard Templates

2.6 XML coding offers high flexibility and extendibility on new extensions. To address the limited coding scenarios, some AIS providers have developed (or intended to develop) their own set of / additional coding scenarios to fully utilise the benefits of D-NOTAM.

2.7 The availability of standardised templates ensures the interoperability of D-NOTAM. Taking the example on NOTAM with cross-border ATFM on limitation of certain available levels on the route or at waypoint across FIRs, it will affect the route capacity and the ATFM service provider would need to review demand-capacity balancing of affecting route or ATC sector, and to formulate any tactical counter-measures. It will enhance the efficiency if such information can be automatically processed by ATFM system with the help of interchangeability of XML messages. The standardisation would also ensure the needed supplementary information and justification are in place, i.e. no ambiguity

during interpretation. Furthermore, the ATFM or ATC service providers will be able to compose a D-NOTAM independently, without manual verification / intervention by NOTAM office.

2.8 A number of States has already undertaken implementation of D-NOTAM. Any experience shared would be of significant benefits, as it would enable other States/Administrations to gain a deeper understanding of the development process, especially with the production of customised coding scenarios. With broader knowledge base, the APAC Region can determine if any production rules can be elevated into Specification and be deployed as new regional templates to supplement the default scenarios provided by EUROCONTROL.

2.9 The provision of a common set of APAC-specific D-NOTAM coding scenarios and standard formats will help mitigate the chance of creating "silos of digital data" – bunch of valuable data yet incompatible with other AIS providers.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the progress of AIXM 5.1 implementation in Hong Kong, China;

b) recognise the limitation of Digital NOTAM default scenarios provided by EUROCONTROL;

c) recognise the need to explore customised Digital NOTAM scenarios catered for the distinctive operational environment in APAC Region; and

d) discuss any relevant matters as appropriate.

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