International Civil Aviation Organization

Twenty Sixth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS/26) of APANPIRG

Video Tele-Conference, 5 – 9 September 2022

Agenda Item 7.2: Other surveillance issues

INCONSISTENT ICAO AIRCRAFT ADDRESS AND TARGET IDENTIFICATION BETWEEN SURVEILLANCE DATA AND FLIGHT PLAN

(Presented by Hong Kong, China)

SUMMARY

This paper presents an update on the observed discrepancies and contributing factors of ICAO Aircraft Address and Target Identification between surveillance data and flight plan for some aircraft flying within Hong Kong Flight Information Region (HKFIR). Although a Conclusion endorsed by SURICG/6 and CNS SG/25 to urge States/Administrations to proactively follow up with air operators to address discrepancies, the problems still persist as revealed by the statistics of cases observed for HKFIR. Similar problem is likely occurring in other FIRs. Remedial and preventive measures have been taken by Hong Kong, China to mitigate the impact on operation caused by the recurring discrepancies.

1. INTRODUCTION

1.1 At SURICG/6, Hong Kong, China presented working papers on recurring inconsistencies of ICAO Aircraft Address and Target Identification observed between received ADS-B data and filed flight plan for some aircraft flying within Hong Kong Flight Information Region (HKFIR). A Conclusion was endorsed by SURICG/6 and CNS SG/25 to urge States/Administrations to proactively follow up with air operators to address discrepancies of ICAO Aircraft Address and Target Identification between ADS-B / MLAT / Mode S data and flight plan, re-capped below.

<table>
<tr><td colspan="3">Conclusion CNS SG/25/13 (SURICG/6/7) - Integrity of ICAO Aircraft Address and Target Identification in ADS-B / MLAT / Mode S Data and Flight Plan</td></tr>
<tr><td colspan="2">What: To urge States/Administrations to proactively follow up with air operators to address discrepancies of ICAO Aircraft Address and Target Identification between ADS-B / MLAT / Mode S data and flight plan.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Such discrepancies will cause safety implications in ATC operation and induce additional workload to controllers and supporting staff in handling the cases.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 22-Oct-2021</td><td colspan="2">Status: Adopted by Sub-group</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SURICG</td></tr>
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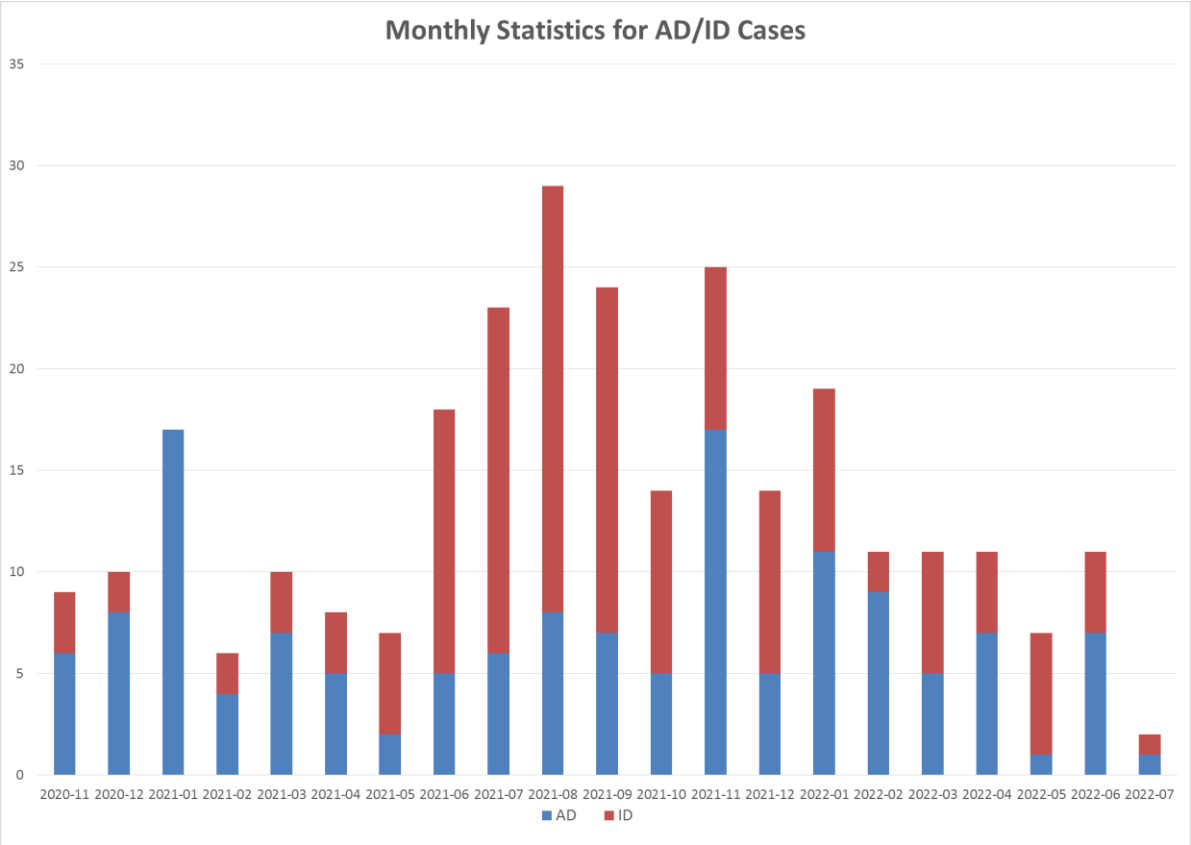
1.2 Despite the repeated efforts by Hong Kong, China in following up the problems with concerned airlines, improvement in the overall situation has not been seen. Hong Kong, China presented an update during SURICG/7 in May 2022. In the meeting, IATA expressed appreciation on the efforts by Hong Kong, China to investigate the contributory factors and present the analysis, as well as implement mitigating measures to contain the problems. IATA also agreed to continue their efforts to communicate with airlines with a view to addressing the problems. Nevertheless, considering recurrence of the problems, the ICAO Secretariat has invited Hong Kong, China to present an update in CNS SG/26 to draw attention from higher level of representatives from States/Administrations.

2 DISCUSSION

2.1 Repeated efforts have been spent in investigating and following up on each discrepancy case. Recurrence and relapse (after some improvement) are still observed with some air operators. The latest statistics of "Aircraft Address" (AD) / "Target Identification" (ID) discrepancies are summarized as follows:



2.2 For each occurrence, we have collected and reviewed the relevant surveillance and flight plan data and followed up with concerned air operators to investigate and attempt to rectify the discrepancies, which has induced considerable workload to both ANSP and the air operator concerned. Since we presented the working paper of the discrepancies at SURICG/6 in August 2021, there have been 178 reported cases of the discrepancies in the past 12 months. Comparing to the 12-month's statistics before SURICG/6 with about 108 cases of the discrepancies, improvement in the overall situation has not been seen.

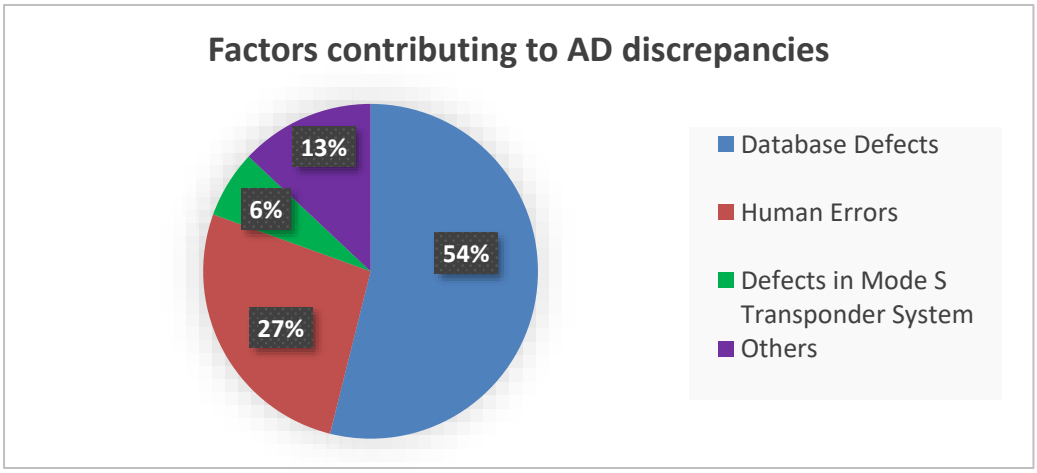
2.3 During the SUGICG/6 meeting, IATA and FAA expressed their support to follow up concerned cases with air operators. Corresponding cases had been forwarded to IATA and FAA since

September 2021. Thanks for their efforts, the situation had improved for a short duration after the air operators had taken corrective actions to address the reported cases. However, same problems were observed later in flights from the same air operators. This indicates that the effectiveness of the corrective actions taken by some air operators is not sustainable.

3 ANALYSIS OF THE FACTORS CONTRIBUTING TO AD/ID DISCREPANCIES

3.1 AD discrepancies

3.1.1 The major contributory factors on AD discrepancies are summarised as follows:



3.1.2 While the underlying factors behind AD discrepancies vary, about 54% of AD discrepancies concern about avionics database integrity and associated deficiencies, which can be further categorised as follows:

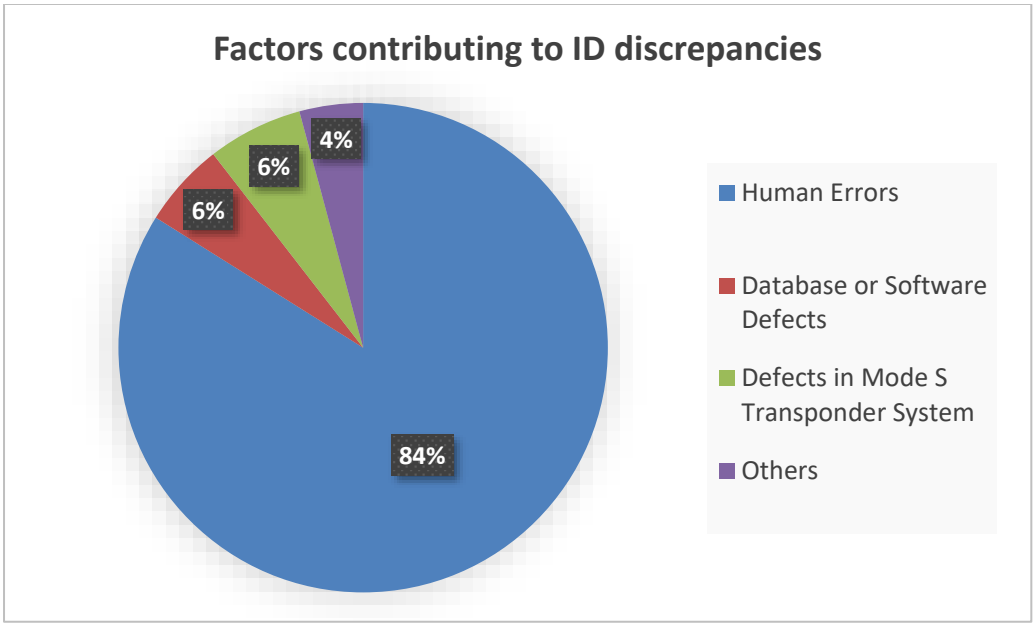
Types of avionics database defects revealed	**Percentage**
Failure to update 24-bit aircraft address upon change of aircraft registration or after aircraft maintenance	47%
Software defects in flight planning system of airline operators / ground handling agents	37%
Incorrect initial entry of aircraft data	11%
Others	5%

3.1.3 Human errors contributed to 27% of AD discrepancies, which can be further categorised as follows:

Types of human errors committed	**Percentage**
Typological error of cockpit crews, flight dispatchers and/or ground handling agents	51%
Failure to update 24-bit aircraft address after flights delay or cancellation, or before commencing the next sector of a flight	25%
Others	24%

3.2 ID discrepancies

3.2.1 The major contributory factors on ID discrepancies are summarised as follows:



3.2.2 In contrast to AD discrepancies, ID discrepancies are predominantly attributed to human factor-related issues. Amongst the ID discrepancies, about 84% can be ascribed to human errors. With further probing into the precise nature of the human errors involved, we can categorise the errors as follows:

Types of human errors committed	**Percentage**
Typological error of cockpit crews, flight dispatchers and/or ground handling agents	48%
Misuse of IATA airline designators in ICAO flight plan	32%
Failure to update ACID after flights delay or cancellation, or before commencing the next sector of a flight	9%
Others	11%

3.2.3 Database or software defects in the flight planning systems of airline operators and/or ground handling agents, as well as defects in Mode S transponder system are also contributory factors to ID discrepancies, though of a less significant extent when comparing to human errors.

4 REMEDIAL AND PREVENTIVE MEASURES TO AD/ID DISCREPANCIES

4.1 At operational level, upon receipt of ID warning (AD warning cannot be rectified in-flight) ATC may use radio frequencies inform the pilots of the broadcast of incorrect flight identification and advise rectifying action whenever workload permits. Even though most cases can be resolved upon prompt reminder and advisory from ATC to the pilots concerned, there have been a few reports with regard to aircraft of earlier generation (e.g. A300 series and old series of B737) that the mismatch could not be rectified in-flight by manually re-entering the flight data in FMS. Yet, more frequent R/T induced

by such AD/ID discrepancies adding additional workload to ATC and pilot is not desirable which poses safety implications with air traffic gradually returns to pre-COVID-19 level.

4.2 As a general reminder, Hong Kong, China has regularly issued NOTAMs reminding stakeholders the importance to ensure broadcast of correct AD/ID, and observe AIP requirements pertinent to flight data integrity. To iron out the underlying causes of AD/ID discrepancies, Hong Kong, China also follows up with airline operators, requesting a thorough investigation and actions taken to prevent future recurrence. Most airline operators would, upon receiving our reports, conduct investigation in a timely manner, to be followed by remedial measures. We have impressed the operators recurring frequently, through formal means, to commit to long-term mitigating measures addressing the deep-rooted and systematic deficiencies contributing to the recurring flight data incongruity.

4.3 Different responses from airline operators were observed. Some operators are committing to measures in long run to alleviate the concern of recurrence, e.g. automating flight plan handling and/or FMS initialisation process. These operators have thereafter improved notably. On some occasions, however, some operators only provided generic replies, which might not be particularly helpful in pinpointing and effectively addressing the precise originating part(ies) of occurrences. Some operators did not acknowledge our emails or follow up with our proposals with earnest effort, hence repeatedly incurring AD/ID discrepancies despite our requests for workable solutions.

4.4 Meanwhile, Hong Kong, China has published findings on the observed causes of occurrences and measures taken by airline operators in the form of AIC to raise the safety awareness of airline operators and appeal for more attention from the aviation community of the increasing prevalence of AD/ID discrepancies occurring within HKFIR. For airline operators with persisting track records of AD/ID discrepancies, we are considering to adopt further measures so as to deter recurrence.

4.5 The following mitigating measures have been promulgated to and are widely employed by operators to redress AD/ID discrepancies:

4.5.1 <u>AD discrepancies</u>

a) The following measures are employed to cope with database-related defects:
   - Overhauling checking and update of the entire database of the operators' fleet;
   - Adopting procedure to ensure timely removal of obsolete aircraft data;
   - Devising communication protocol for sharing of aircraft information between the engineering team and flight operations, in case of revised aircraft registration and acquisition of new aircraft;
   - Developing new system and software providing for automatic update of aircraft database.

b) Reminders and safety notices issued by operators to reduce the likelihood of human errors.

c) Aircraft defects are usually effectively tackled by a timely maintenance of the defective part(s).

4.5.2 ID discrepancies

a) The following measures are commonplace to lessen the repeating trend of human errors:
- De-briefing and additional training with the crews directly involved in the occurrences;
- Issuance of internal safety bulletins, circulars or notice to all staff members for educational purpose and enhancing safety awareness;
- Revisit and review the standard operating procedures, emphasising on cross-check by flight operations supervisors and/or captain-in-flight;
- Automating flight data handling process through software or system upgrade.

b) Database errors and aircraft defects should be tackled by a timely maintenance of the defective part(s) and software upgrade.

5 ACTION BY THE MEETING

5.1 The meeting is invited to:

a) note the recurring discrepancies of ICAO Aircraft Address and Target Identification between surveillance data and flight plan were continued being observed within HKFIR without improvement, despite the Conclusion endorsed by SURICG/6 and CNS SG/25, and update in SURICG/7, on urging States/Administrations to proactively follow up with air operators on the issue;

b) note the remedial and preventive measures taken by Hong Kong, China and share relevant experience for mitigating the impact to operation caused by the recurring discrepancies; and

c) seek further assistance from States/Administrations and IATA to stress the importance of having correct ICAO Aircraft Address and Target Identification in flight plans and surveillance data contributing to further enhancing flight safety, and urge them to comply with the requirements in the Hong Kong, China's AIP.

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