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COMMITTEE A

- Agenda Item 1: Air navigation global strategy**
1.3: Air navigation roadmaps

GLOBAL HARMONIZATION OF DATACOM IMPLEMENTATION FOR TBO REALIZATION

(Presented by Japan)

EXECUTIVE SUMMARY

This paper presents a fundamental solution for a problem on the proliferation of various DATACOM applications over different standards/specifications as future air navigation systems (FANS), pre-FANS and aeronautical telecommunication network (ATN)/ open systems interconnection (OSI) in air traffic management (ATM) operational context.

With proliferation of complex DATACOM standards/technical specifications, which has developed by ICAO and standards making organizations (SMOs), it brings significant challenges of effective implementation for the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global Aviation Safety Plan* (GASP, Doc 10004) and the *Global Air Traffic Management Operational Concept* (GATMOC, Doc 9854) under the No Country Left Behind (NCLB) initiative.

The global technological harmonization activity led by the United States and the European Union and development of DATACOM/Internet Protocol Suite (IPS) Standardization Road Map would be essential to ensure the realization of future trajectory-based operations (TBO) infrastructure. This is due to the fact that reliable and resilient global DATACOM infrastructure is absolutely essential for realization of seamless/interoperable TBO in the future ATM community.

The Japan Civil Aviation Bureau (JCAB) is confident that DATACOM/IPS is indispensable for a fundamental solution to existing fragmented DATACOM infrastructure.

Action: The Conference is invited to:

- a) encourage States/SMOs/ATM community to support the global technological harmonization activity for DATACOM/IPS implementation; and
- b) urge ICAO and SMOs to actively contribute to the development of DATACOM/IPS Standardization Road Map to support the effective implementation for GANP, GASP and GATMOC under NCLB initiative.

1. INTRODUCTION

1.1 With the proliferation of various DATACOM applications, which has developed by ICAO and standards making organizations (SMOs), there are significant challenges for effective implementation of seamless/interoperable DATACOM infrastructure over air traffic management (ATM) operational context. This situation also brings some difficulties for functional capabilities of DATACOM avionics equipage.

1.2 As keeping up on DATACOM technological harmonization activity, which has been conducted by the United States and European Union, the Japan Civil Aviation Bureau (JCAB) will be joining them and is enthusiastic over the possibilities for seamless implementation and interoperable DATACOM/Internet Protocol Suite (IPS) infrastructure throughout all phases of flight. Besides, given that the DATACOM/IPS Standardization Road Map would be essential to ensure the realization of future trajectory-based operations (TBO) infrastructure, ICAO and SMOs should strengthen collaborative activity under the treaty negotiated agreement, which were signed on the side-lines of the Second Global Air Navigation Industry Symposium (GANIS/2) held in December 2017.

1.3 Global technological harmonization for implementation of DATACOM/IPS infrastructure with standardization cooperation between ICAO and SMOs would be bringing a fundamental solution for realization of TBO infrastructure.

2. DISCUSSION

2.1 Over the last two decades, existence of fragmented DATACOM context is obviously due to the fact that there is a lack of global technological harmonization. As already known, ICT/IPS would make a fundamental shift in communication technology, breaking away from old-fashioned aviation data-link technology brings a significant revolution for TBO infrastructure in ATM community.

2.2 ICAO standards A/G communication-medias, plain old aircraft communications addressing and reporting system (ACARS) (POA), very high frequency (VHF) digital link mode-2 (VDLM2), ACARS over aviation VHF link control (AOA), Mode-3, Mode-4, universal asynchronous transceiver (UAT), high-frequency data link (HF-DL) and CLASSIC-AERO/satellite communication (SATCOM), are available to handle various old-fashion DATACOM applications as typified future air navigation systems (FANS), Pre-FANS and aeronautical telecommunication network (ATN)/open systems interconnect (OSI). It is consequently bringing fragmented communication infrastructure with complex on board avionics equipage.

2.3 Focusing on the avionics equipage, there are many challenges in various security levels, quality of service (QOS)/continuity of service (COS) levels and complex operation in the cockpit. It would be also forced to eat the cost of multi-stacks for avionics. Those challenges are caused by fragmented DATACOM infrastructure of each states/regions.

2.4 Moving on the perspective of public communication network technology, the IPS is obviously the global standard and most of mission critical system is operating over the IPS. Furthermore, maritime and land mobile communication service are also provided over IPS.

2.5 As latest satellite service provider trend, IPS based broadband safety communication medium would be available over various new SATCOM services in a few years. Besides, some ground based high speed communication medium as typified AeroMACS would be able to support IPS basically.

2.6 Whereas some cabin communication service are supported by broadband IPS over the SATCOM service, cockpit communication is out of step with ICT even now. That means cockpit crew would be able to get a situational awareness through the cabin communication environment.

2.7 Considering that the affinity of system-wide information management (SWIM)/eXtensible markup language (XML) to IPS and realization of cockpit access to SWIM, existing legacy A/G links should support the IPS to integrate for future common core network infrastructure. Furthermore once an integrated IPS common core network would be realized, it is available an integrated safety voice and data communication application among ATM communities.

2.8 With lesson learned from the fragmented standardization and lack of harmonisation in last two decade, the United States and European Union launched technological harmonization activity for DATACOM implementation throughout all flight phase. This significant development shall be welcomed in all states and outcome of this will be beneficial for ATM community.

2.9 Besides, as a remarkable topic for standardization, ICAO and SMOs agreed for joint activity of standardization/specification, which were signed on the side-lines of GANIS/2. This activity should cover the development of DATACOM Standardization Road Map, which would be essential to ensure the realization of future TBO infrastructure.

2.10 In order to recapture the global, seamless and interoperable DATACOM/IPS infrastructure, ICAO, SMOs, States, ANSPs and ATM industry should be strengthen collaboration to keep up with advanced ICT in ATM community.

3. CONCLUSION

3.1 The Conference is invited to:

- a) encourage States/SMOs/ATM community to support the global technological harmonization activity for DATACOM/IPS implementation;
- b) urge ICAO and SMOs to actively contribute to the development of DATACOM/IPS Standardization Road Map;
- c) urge to develop an appropriate regulatory framework for DATACOM/IPS on-board equipment/software list; and
- d) agree that ICAO and SMOs conduct a DATACOM/IPS seminar/symposium.