International Civil Aviation Organization

Sixteenth Meeting of the FANS Interoperability Team – Asia (FIT–Asia/16)

Bangkok, Thailand, 9 – 11 June 2026

Agenda Item 3: PBCS Developments and Implementation

DOMESTIC CPDLC EXPANSION AND MLM IMPLEMENTATION

(Presented by JAPAN)

SUMMARY

In Japan, CPDLC services are provided both domestic and oceanic airspace, with oceanic operations having over 25 years of experience and domestic operations starting in 2022.

Domestic CPDLC operates in a mixed environment primarily using VHF-AOA, and communication performance is monitored against the RCP130 standard, and it is not requirements.

Currently, only non-time-critical messages are used in domestic airspace, but message types will be gradually expanded over the next two years.

In parallel, the Implementation of a message latency monitor is planned, though domestic timer value is not decided yet. (Already implemented in oceanic airspace in 2023.)

Because of shorter clearance intervals in domestic airspace, appropriate values must be considered, and also potential impacts on adjacent FIRs must be taken into account.

1. INTRODUCTION

1.1. In Japan, CPDLC services are provided separately for domestic and oceanic airspace. Oceanic CPDLC has been in use for more than 20 years. (**Fig.1**)

1.2. Domestic CPDLC is relatively new, having started in 2022. The control methods differ significantly: ATS surveillance service is applied in domestic airspace, whereas non-radar control is used in oceanic airspace. Consequently, ATC systems used by controllers and available message sets differ, although the same controllers manage both operations.

1.3. Despite these differences, seamless CPDLC operations using FANS 1/A are maintained between oceanic and domestic airspace. CPDLC connection is maintained while transferring control between systems without address forwarding.

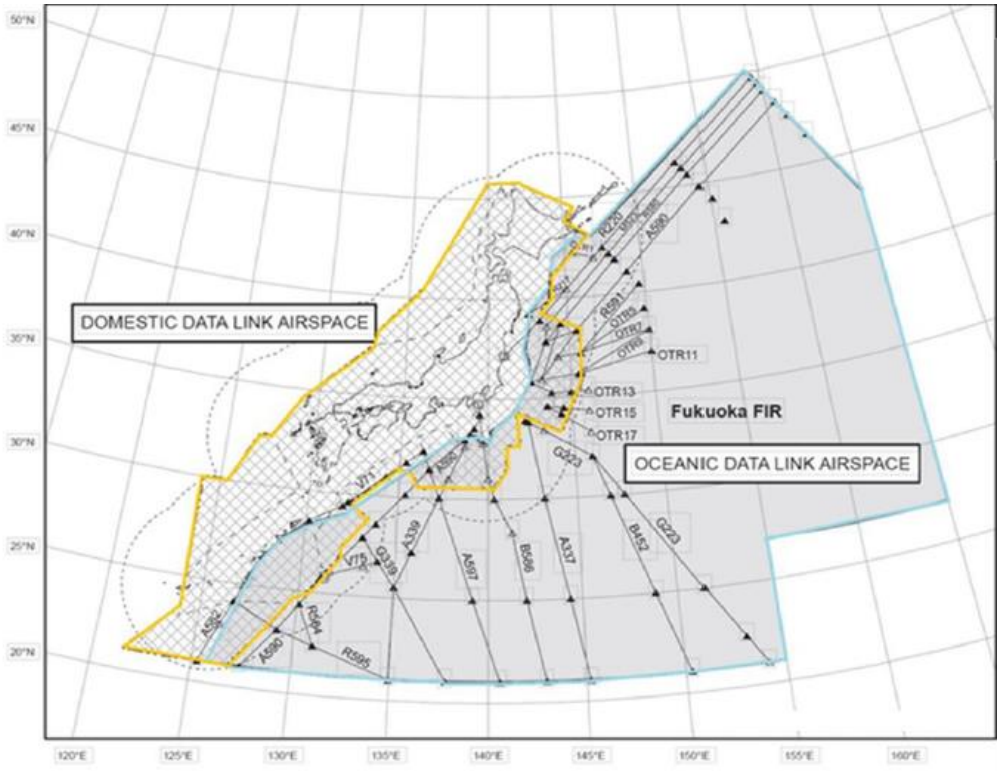

Fig.1 ATS data-link airspace in Fukuoka FIR

1.4. Within the Fukuoka FIR, CPDLC operations utilize SATCOM and VHF as communication media, regardless of whether the aircraft is operating in oceanic or domestic airspace. The pie chart illustrates the distribution of media used for Domestic CPDLC during the first half of this year. (**Fig.2**) VHF-AOA accounts for the majority and serves as the primary communication medium. Additionally, VHF-POA represents 11% and SATCOM 18%, resulting in a mixed communication environment.

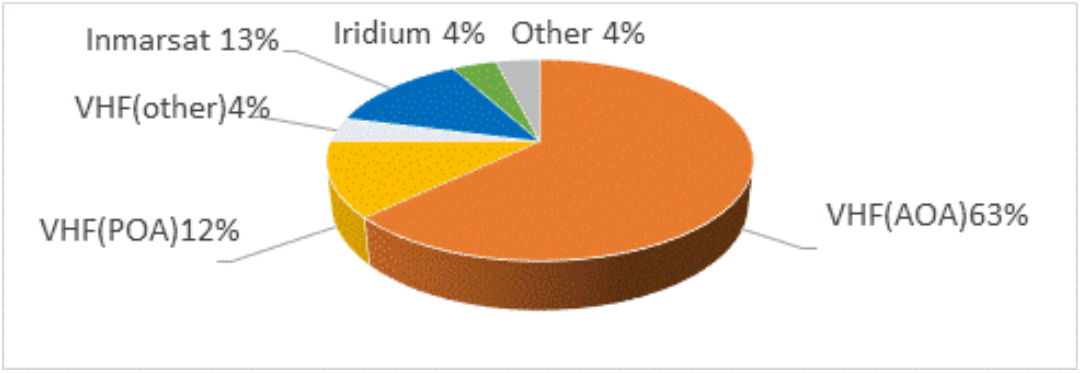

Fig.2 Proportion of Communication Media Used for Domestic CPDLC

1.5. The table shows RCP130 communication performance by media for Domestic CPDLC. Although the ATC separation (i.e., 5 NM) in domestic airspace is based on the ATS surveillance system and VHF voice communications, the domestic CPDLC's communication performance of the domestic CPDLC is monitored by using RCP130 as an index. (**Fig.3**)

Media Type	RCP130					
	Count of CPDLC	ACTP		ACP		PORT
		95% (<23s)	99.9%	95% (<60s)	99.9%	95% (<44s)
Total	952,622	94.92%	97.21%	96.84%	99.36%	98.09%
VHF(AOA)	604,942	99.08%	99.44%	99.12%	99.81%	99.00%
VHF(POA)	111,339	93.00%	96.82%	94.36%	99.29%	96.41%
VHF (other)*1	38,984	93.95%	96.51%	96.84%	99.64%	98.74%
Inmarsat	123,903	92.86%	95.55%	94.80%	99.03%	97.04%
Iridium	37,016	58.79%	81.86%	85.16%	96.47%	94.35%
Others*2	36,438	76.33%	83.18%	85.31%	95.87%	94.72%

Fig.3 Domestic CPDLC performance (Jul.2025-Dec.2025)
*1: VHF (other)…CPDLC via VHF ground stations in Incheon FIR, Taibei FIR etc.
*2: Others…cases where a media transition occurred 2025

1.6. Currently, Domestic CPDLC operations are limited to the use of non-time-critical messages.

a) Frequency change instruction (e.g. CONTACT (unit name) (frequency))

b) DBC instruction (e.g. SQUAWK (SSR code))

c) Microphone check (e.g. CHECK STUCK MICROPHONE (frequency))

d) Advisory messages (e.g. RADAR SERVICES TERMINATED)

＊Before publication of the second edition of the GOLD manual, the implementation of the following message is scheduled: SURVEILLANCE SERVICE TERMINATED.

e) Check of ETO (e.g. ADVISE ETA)

f) Prior information on route clearance (e.g. FOLLOWING ROUTE CLEARANCE WILL BE ISSUED BY VOICE(ROUTE))

＊Pre-information for issuing ATC clearances via voice communication.

1.7. To reduce communication time and workload in domestic air traffic control, Japan plans to gradually expand the range of messages available for Domestic CPDLC over the next two years. Although details are not yet finalized, the following message categories are under consideration:

Phase 1: Speed instruction, Route clearance, direct routing, weather deviation (lateral offset) instruction, and STAR clearance.

Phase 2: Altitude change instruction, holding instructions

2. DISCUSSION

2.1. To support the expansion of message use in domestic CPDLC, we plan to introduce a Message Latency Monitor (MLM) to address delayed CPDLC uplink messages. The MLM provides an onboard function to alert or discard uplink messages that exceed a predefined delay time, thereby preventing inappropriate compliance with outdated instructions. MLM has already been implemented in the oceanic airspace of the Fukuoka FIR since November 2023, with a latency time value of 300 seconds.

2.2. In domestic airspace, ATC instructions are issued more frequently than in oceanic airspace, making the impact of delayed messages more significant. Therefore, after consideration, we plan to initially set the MLM timer value to 180 seconds and review it as necessary.

2.3. From another perspective, Certain aircraft retain the message latency monitor settings even after crossing into another FIR. Based on the provisions in the GOLD Manual (GOLD Draft 9.8 Version), the behaviour of aircraft differs depending on the type and avionics. The following is a partial excerpt from the Appendix C, C.11

Airbus
For FANS A aircraft, for that there is no latency check function. For FANS A+ aircraft (with CSB4/CLR4 and CSB7/CLR7) and for FANS A+B A350/A380, when a new FANS 1/A CPDLC connection becomes active, this function automatically sets the (delayed message parameter) to the default NONE value (i.e. there is no check of a delayed CPDLC message until the flight crew manually sets a new value). For FANS A+, FANS A+B and FANS C/4D aircraft with *CSB/CLR9 standard or with CSB10/CLR10 standard*, the system applies the following rules: - a default latency of 600 sec for any FANS 1/A CPDLC connection not resulting from the transfer from a FANS 1/A center, - for any FANS 1/A CPDLC connection resulting from the transfer from a FANS 1/A center, the system keeps the latency value (if any) applied on the previous connection (default or manually entered value), - the system allows the flight crew to manually enter a Latency value at any time during a FANS 1/A connection is active. For FANS A+, FANS A+B and FANS C/4D aircraft with CSB9/CLR9 standard, the system applies the following additional rule: - for any new FANS 1/A CPDLC connection after a FANS 1/A CPDLC disconnection not resulting from a CPDLC connection transfer, the system keeps the latency value (if any) applied on the previous connection (default or manually entered value). For all Airbus aircraft (*except FANS A*), the flight crew will not see delayed messages when the function is activated. Such a message is rejected, the ATSU will receive the following downlink message: INVALID

DATA UPLINK DELAYED IN NETWORK AND REJECTED RESEND OR CONTACT BY VOICE. This message will refer to the delayed CPDLC uplink message.
Boeing (all except B747-400)
For most Boeing aircraft with a FANS-1+ connection, when a new active CPDLC connection is established, this function is automatically set to OFF with the following exceptions: a) Boeing aircraft, except B777 and B787, whose FANS 1/A+ CPDLC connection has been transferred will maintain the value of the (delayed message parameter), which was enabled during the previous CPDLC connection; b) Boeing 777 and 787 aircraft will maintain the value of the (delayed message parameter), which was enabled during any previous CPDLC connection, until the aircraft has landed at which time the value will be set to an operator-specified value in the aircraft's data base; c) it is possible the flight crew may set a value for the (delayed message parameter), even if not instructed to do so; and d) for aircraft with a FANS-1+ connection, the message is displayed to the flight crew with a delayed message indication.

2.4. Japan continues to consider the expansion of message use in domestic CPDLC, taking these impacts into account, with the aim of starting in the next fiscal year.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper.

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