



International Civil Aviation Organization

ICAO

Twelfth Meeting of the FANS Interoperability Team – Asia  
(FIT-Asia/12)

Video Teleconference, 25 – 28 July 2022

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### Agenda Item 3: PBCS Developments and Implementation

#### LATENCY MONITOR IMPLEMENTATION IN NZZO FIR

(Presented by Airways New Zealand)

##### SUMMARY

This paper presents an update on the implementation of the Latency Monitor in the NZZO FIR and invites the meeting to formalize the adoption of the 300 second latency value in the Asia Pacific region.

### 1. INTRODUCTION

1.1 Airways implemented the latency monitor on 21 June 2018 to support PBCS safety requirement #15, that is specified in the Oceanic Safety and Performance standard (RTCA DO-306) and the PBCS Manual ICAO Doc 9869. This safety requirement mitigates late CPDLC uplink messages received at the aircraft.

1.2 This paper provides an update to the NZZO implementation previously briefed in IP 2 at FIT-Asia/11.

### 2. DISCUSSION

#### Implementation in NZZO

2.1 The latency monitor is implemented in NZZO by sending an automated UM169 free text uplink when a FANS1/A equipped aircraft enters NZZO airspace and current data authority (CDA) is confirmed. The text of the uplink is:

***“SET MAX UPLINK DELAY VALUE TO 300 SECONDS”***

2.2 On receipt of the latency monitor uplink the flight crew set the latency delay value in the FMS. When a subsequent CPDLC uplink is received that has a latency of more than 300 seconds flight deck automation will react in one of two ways: present the message to the flight crew with a warning that the uplink delay has been exceeded (Boeing type implementation), or reject the message, do not display it to the crew, and send a warning message to the originator - “UPLINK DELAYED IN NETWORK AND REJECTED – RESEND OR CONTACT BY VOICE” (Airbus type implementation)

2.3 The 300 second delay value was developed and implemented in North Atlantic airspace for Oceanic use and was adopted by New Zealand in 2018.

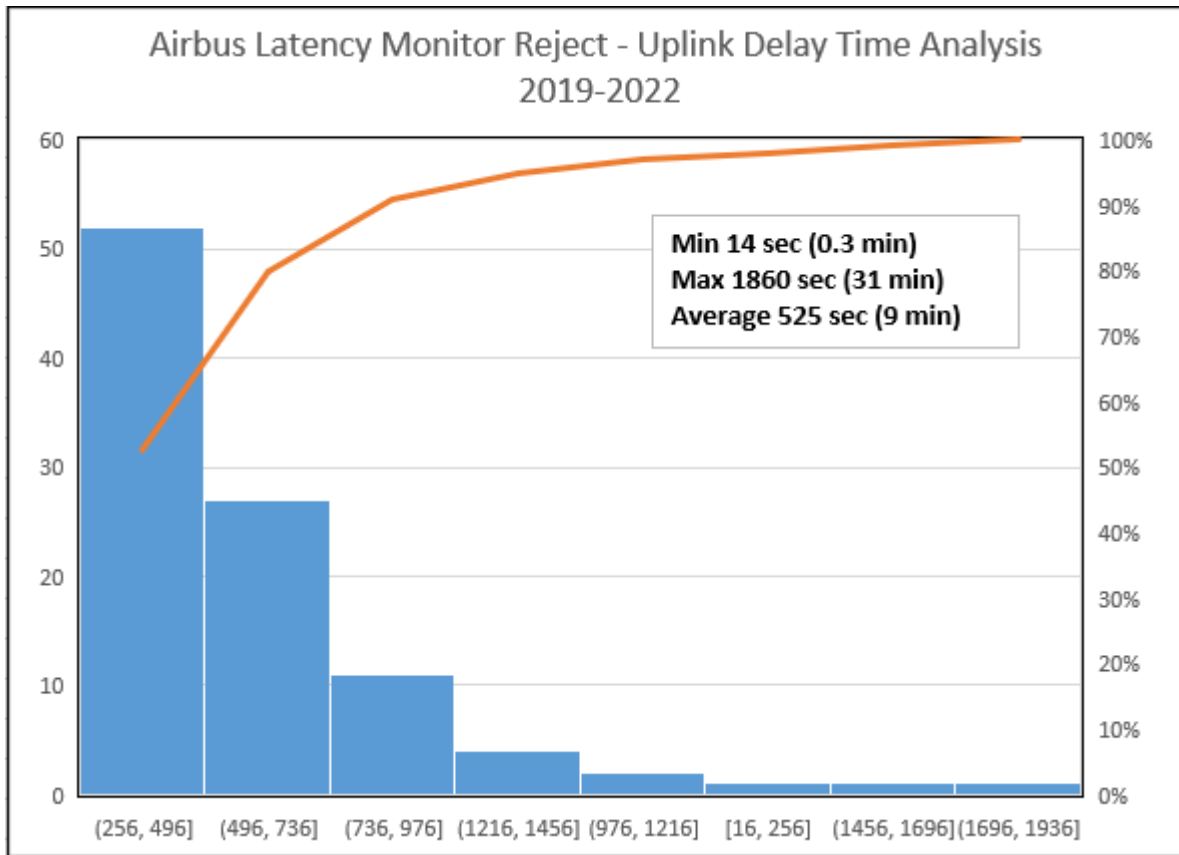
Implementation experience in NZZO

2.4 The 300 second latency value has been used in NZZO for four years. No significant issues have been found since implementation, and we consider our implementation has been successful.

2.5 Airways monitors the latency reject messages received from Airbus aircraft. In the year to June 2022 NZZO sent 106,738 CPDLC messages. 34,975 of these messages (32.8%) were sent to Airbus aircraft. A total of 22,633 set latency monitor uplinks were sent last year. An average of 5% of our FANS1/A traffic is responding as being unable to set the latency monitor. We are seeing an average of two rejects a month from the Airbus fleet.

Month	# Set Latency Monitor	# Monitor not Available	# Rejects
Jul-21	1,908	125	0
Aug-21	1,594	96	0
Sep-21	1,411	83	1
Oct-21	1,537	74	0
Nov-21	1,708	69	0
Dec-21	1,867	62	3
Jan-22	1,709	53	1
Feb-22	1,721	62	3
Mar-22	2,192	100	0
Apr-22	2,319	109	2
May-22	2,384	91	0
Jun-22	2,283	97	10
<b>Total</b>	<b>22633</b>	<b>1021</b>	<b>20</b>
<b>Average</b>	<b>1886</b>	<b>85</b>	<b>2</b>

2.6 An analysis of the uplink latency delays that resulted in a latency reject message are shown in the graph below. Two reject messages have been received that had an uplink latency of less than 300 seconds (one with a latency of 14 seconds, the other 16 seconds). These rejects are caused by a software bug where the uplink is sent across the hour and Airbus have confirmed that this bug will be fixed in their software with the CSB10 release scheduled late 2022 or early 2023.



2.7 Airways classifies each reject message received by the type of failure. Our classification for reject messages received in the previous two years is detailed below. The significant number of rejects seen from an A359 fleet in June 2022 is because HF DL was used to uplink the CPDLC messages. A CRA problem report has been filed for further investigation.

Month	# Rejects	Latency Reject Classification						
		Unknown	Time Source	Inmarsat	Iridium	HF DL no SATCOM	Inmarsat sent HF DL	Unable SATCOM via VDL
Jul-20	0	0	0	0	0	0	0	0
Aug-20	0	0	0	0	0	0	0	0
Sep-20	0	0	0	0	0	0	0	0
Oct-20	2	0	0	1	0	0	1	0
Nov-20	0	0	0	0	0	0	0	0
Dec-20	2	0	0	2	0	0	0	0
Jan-21	6	0	0	5	1	0	0	0
Feb-21	0	0	0	0	0	0	0	0
Mar-21	0	0	0	0	0	0	0	0
Apr-21	0	0	0	0	0	0	0	0
May-21	1	0	0	0	1	0	0	0
Jun-21	1	0	0	0	1	0	0	0
<b>Totals</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>0</b>

Month	# Rejects	Latency Reject Classification						
		Unknown	Time Source	Inmarsat	Iridium	HFDL no SATCOM	Inmarsat sent HFDL	Unable SATCOM via VDL
Jul-21	0	0	0	0	0	0	0	0
Aug-21	0	0	0	0	0	0	0	0
Sep-21	1	0	0	0	0	0	1	0
Oct-21	0	0	0	0	0	0	0	0
Nov-21	0	0	0	0	0	0	0	0
Dec-21	3	0	0	1	0	0	0	2
Jan-22	1	0	0	1	0	0	0	0
Feb-22	3	0	0	2	0	0	1	0
Mar-22	0	0	0	0	0	0	0	0
Apr-22	2	0	0	0	1	0	1	0
May-22	0	0	0	0	0	0	0	0
Jun-22	10	0	0	5	0	0	5	0
<b>Totals</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>2</b>

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate; and
- c) formalize the use of the 300 second latency value in the Asia Pacific region.

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<b>Draft Conclusion FIT-Asia/12-X: CPDLC Latency Monitor value</b>	
<p><b>What:</b> That, recognizing: 1. the need for aircraft to provide an appropriate indication when the age of the time stamp of a received CPDLC message exceeds a defined value (latency timer value), in accordance with ICAO Doc 9869 PBCS Manual safety requirement SR-15; 2. the need for a single, standardized global value.</p> <p>The Asia-Pacific region adopts a latency timer value of 300 seconds for use in oceanic airspace.</p>	<p><b>Expected impact:</b>  <input type="checkbox"/> Political / Global  <input type="checkbox"/> Inter-regional  <input type="checkbox"/> Economic  <input type="checkbox"/> Environmental  <input checked="" type="checkbox"/> Ops/Technical</p>
<p><b>Why:</b> To implement a standardized global value for latency timer in the APAC region, in alignment with the value of 300 seconds specified in the ICAO NAT Region <i>North Atlantic Operations and Airspace Manual</i> (NAT Doc 007).</p>	<p><b>Follow-up:</b> <input type="checkbox"/> Required from States</p>
<p><b>When:</b> 25-Aug-22</p>	<p><b>Status:</b> Draft to be adopted by Subgroup</p>
<p><b>Who:</b> <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: Aircraft operators</p>	