



*Attachment*

# ***JCAB CRA Activities since IPACG FIT-21***

IPACG-35/FIT-22

Sapporo, Japan

November 8, 2011

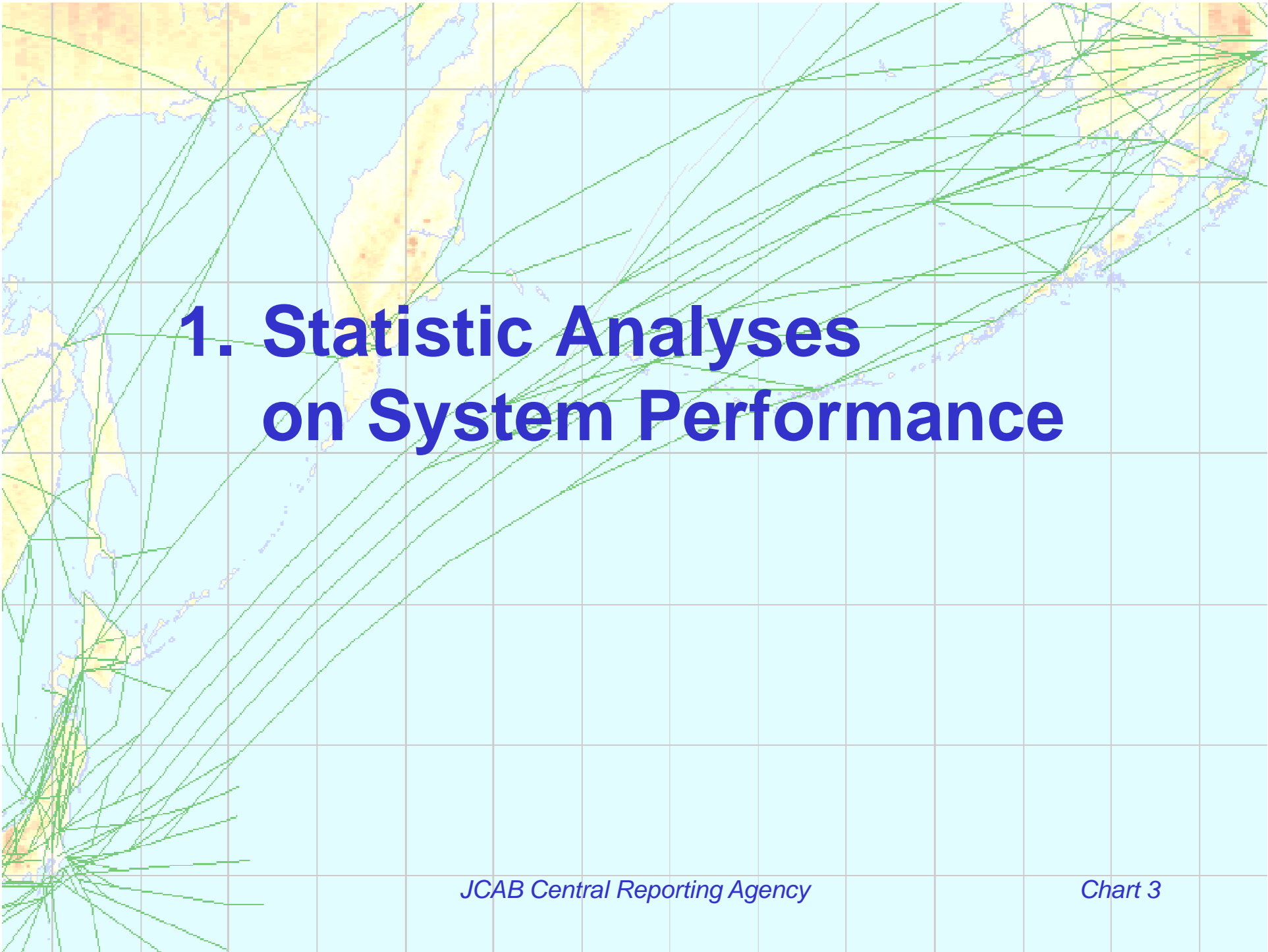


# **JCAB CRA Activities Since IPACG FIT-21**

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**This presentation contains;**

- 1. Statistic Analyses on System Performance**
- 2. Problems Reported since IPACG FIT-21**

A map of the Pacific Ocean region, showing the western coast of North America, Central America, and the eastern coast of South America. The map is overlaid with a grid of latitude and longitude lines. Numerous green lines represent flight paths, originating from various points along the western coast of North America and fanning out across the Pacific towards the eastern coast of South America. The text "1. Statistic Analyses on System Performance" is centered over the map in a large, bold, blue font.

# 1. Statistic Analyses on System Performance



# **CPDLC System Performance**

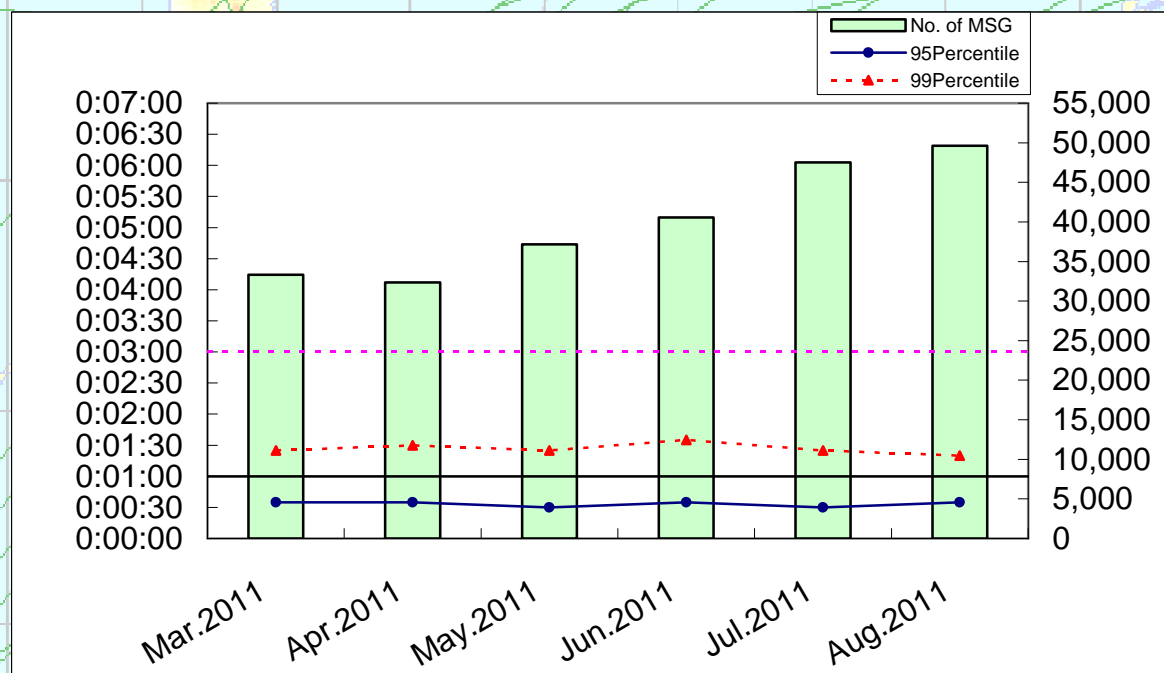
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- ***In this section, we provide CPDLC system performance on:***
  - + CPDLC Downlink Performance
  - + CPDLC Uplink Performance
  - + CPDLC Uplink Message Success Rate
  - + Success Rate of Automatic-Transfer of CPDLC Connections to the Next ATSUs  
(Fukuoka ATM Center - Oakland & Anchorage ARTCCs)

# CPDLC Downlink Performance

(One-way Trip Time:  
Difference of time-stamps between the avionics and ground systems)

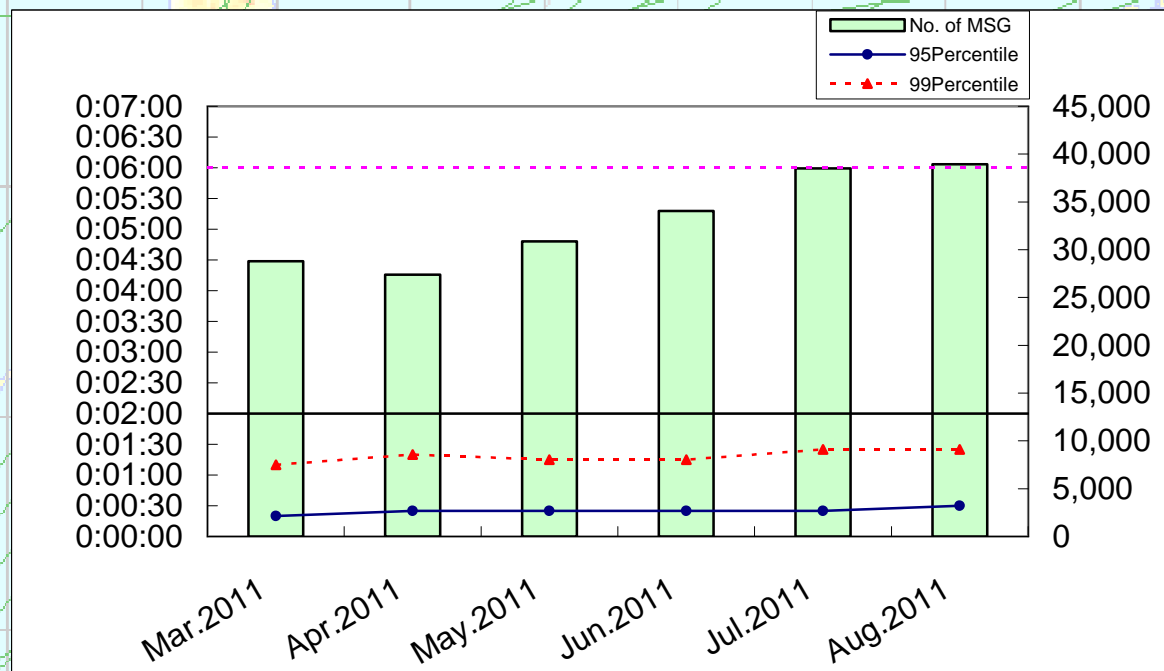
(Fig.) CPDLC Downlink 95 & 99 Percentile



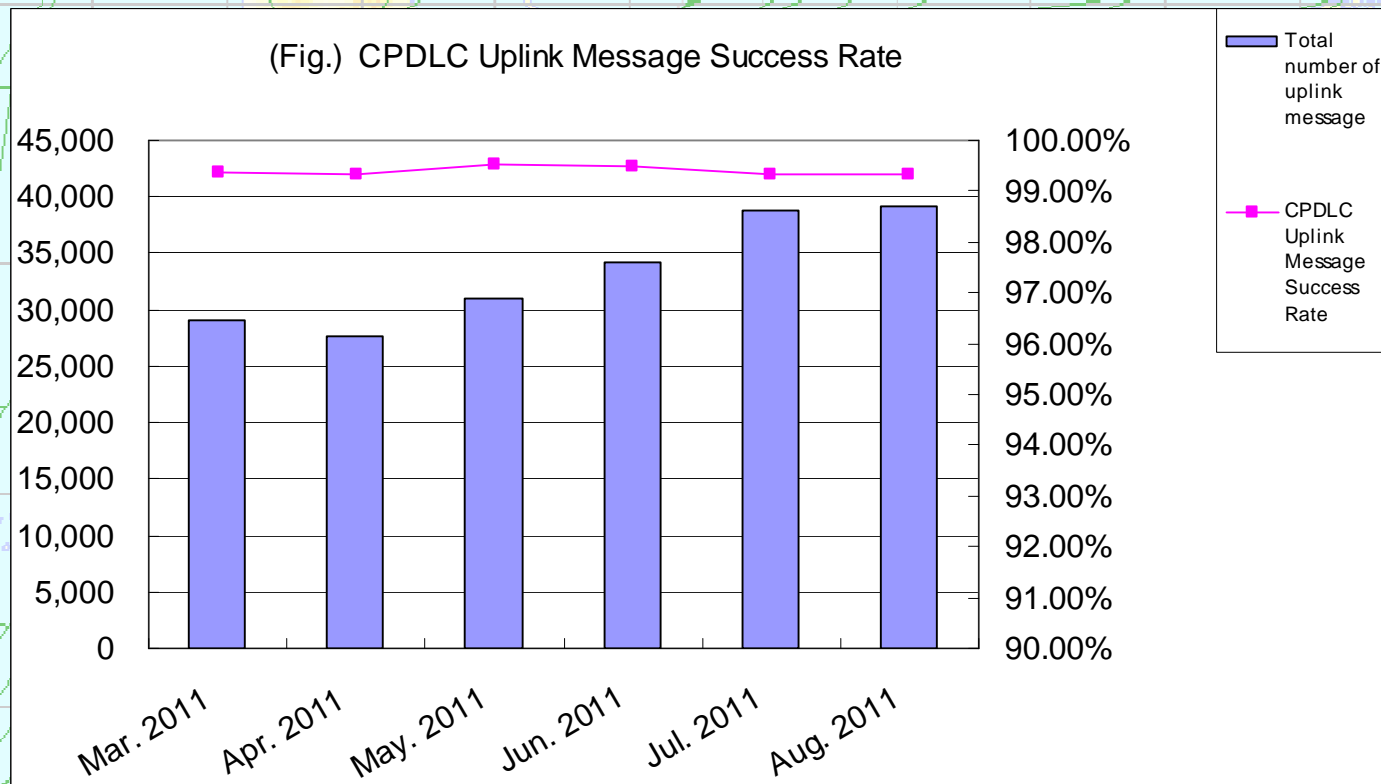
# CPDLC Uplink Performance

(Round Trip Time:  
Transit-delay-time from time-stamp of uplink to receipt time of MAS)

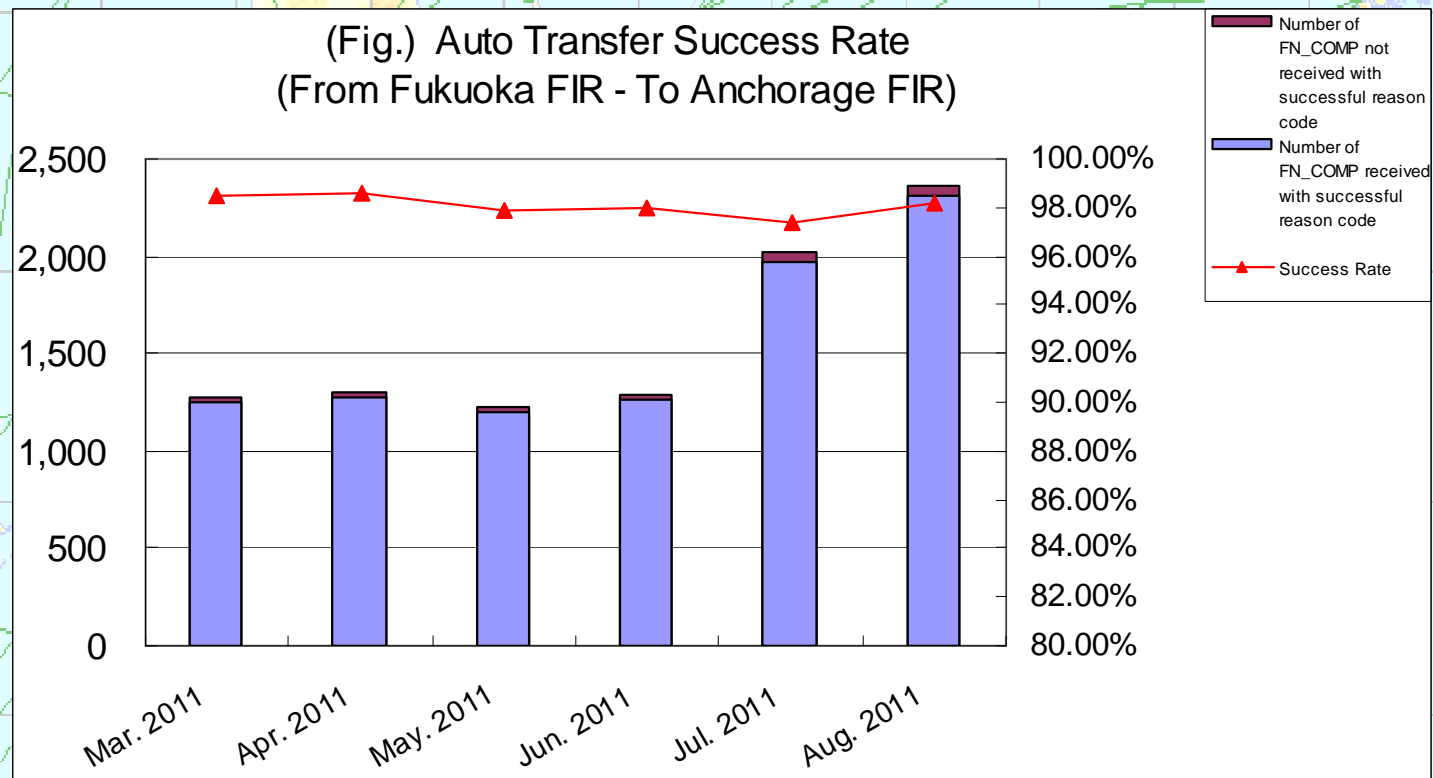
(Fig.) CPDLC Uplink 95 & 99 Percentile



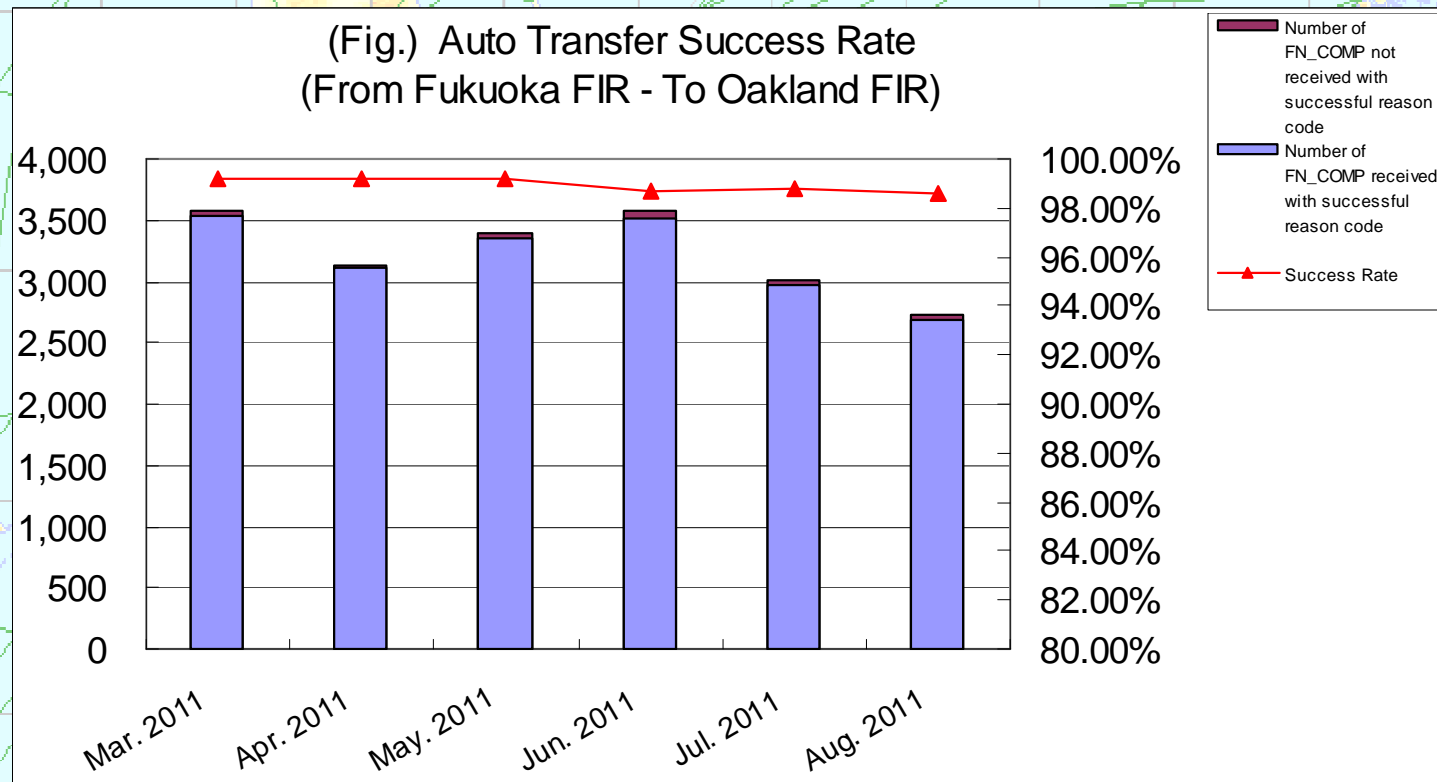
# CPDLC Uplink Message Success Rate



# Success Rate of Automatic-Transfer of Connections (From Fukuoka FIR to Anchorage FIR)



# Success Rate of Automatic-Transfer of Connections (From Fukuoka FIR to Oakland FIR)





## 2. Problem Reports



# **JCAB CRA Activities Since IPACG FIT-21**

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- **Updated Problem Reports**
- **New Problem Reports**
- **Specific reports to be discussed**

# Updated PRs

## Updated problem reports

PR #	Problem Report Title	Air/ Ground	Comments/Notes/Description	Status	Discuss at FIT/22
10560	Timer for the CPDLC "END-OF-SERVICE" up link expired	Air	HFDL for ATC use unavailable in Fukuoka FIR	Open	Y

# New PRs

## New problem reports

PR #	Problem Report Title	Air/ Ground	Comments/Notes/Description	Status	Discuss at FIT/22
10568	Incorrect position display of an ADS airplane	Air/ Ground	One hour delayed ADS report was down linked	Open	Y
10569	Response to a Climb instruction not down linked	Air	MAS to the climb instruction was received	Waiting	N
10570	Incorrect position display of an ADS airplane	Air/ Ground	One hour delayed ADS report was down linked	Open	Y
10571	ADS report with low level FOM	Air	FOM LEVEL = 4	Waiting	N
10572	ADS report with low level FOM	Air	FOM LEVEL = 4	Waiting	N
10573	Unable to Log-on all the way	Air/ Ground	Still under investigation	In progress	N
10574	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10575	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10576	Data transmission delay	Air	Being in No-Comm situation	Open	N
10577	Unable to Log-on	Air/ Ground	No log on data traced	Waiting	N

# New PRs

## New problem reports

PR #	Problem Report Title	Air/ Ground	Comments/Notes/Description	Status	Discuss at FIT/22
10578	Data link transfer failure	Ground	An ATSU end system failed to complete its automatic CODLC transfer procedure	Open	N
10579	Data transmission delay	Air	Being in No-Comm situation	Open	N
10580	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10581	Data link transfer failure	Air	The aircraft was being in a NO-comm state	Open	N
10582	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10583	Continues iteration of LDE and ECR	Air	Triggered by an off-set input	Lesson	Y
10584	Continues iteration of LDE and ECR	Air	Triggered by an off-set input	Lesson	Y
10585	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10586	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10587	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y

# New PRs

## New problem reports

PR #	Problem Report Title	Air/ Ground	Comments/Notes/Description	Status	Discuss at FIT/22
10588	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10589	"UNABLE TO SEND MSG" repeatedly displayed	Air	Data link disrupted on log on attempt	Open	Y
10590	Data link disrupted	Air/ Ground	Still under investigation	In progress	N
10591	Data link transfer failure	Ground	An ATSU end system failed to complete its automatic CODLC transfer procedure	Open	N
10592	Data link transfer failure	Ground	An ATSU end system failed to complete its automatic CODLC transfer procedure	Open	N
10593	ADS/CPDLC up link failure	Air/ Ground	DSP failed to receive MRD notifying SATCOM availability	Open	N
10594	Data link transfer failure	Ground	An ATSU end system failed to complete its automatic CODLC transfer procedure	Open	N
10595	Data link transfer failure	Ground	An ATSU end system failed to complete its automatic CODLC transfer procedure	Open	N
10596	Response to a CONTACT MSG not down linked	Air	MAS to the CONTACT MSG was received	Waiting	N
10597	Response to a CONTACT MSG not down linked	Air	HFDL for ATC use unavailable in Fukuoka FIR	Open	Y

# New PRs

## New problem reports

PR #	Problem Report Title	Air/ Ground	Comments/Notes/Description	Status	Discuss at FIT/22
10598	Continues iteration of LDE and ECR	Air	Triggered by an off-set input	Lesson	Y
10599	Data transmission delay	Air	Being in No-Comm situation	Open	N
10600	Unable to log on	Air/ Ground	Still under investigation	In progress	N
10601	ADS event report not down linked	Air/ Ground	Except periodic reports no ADS reports down linked	Waiting	N
10602	Timer for the CPDLC "EOS" up link expired	Air	HFDL for ATC use unavailable in Fukuoka FIR	Open	Y
10603	Response to a Climb instruction not down linked	Air	MAS to the climb instruction was received	Waiting	N
10604	Data transmission delay	Air	Being in No-Comm situation	Open	N
10605	Data link disrupted	Air	SATCOM being not utilized in the data link communication	Waiting	N
10606	Data link transfer failure	Air/ Ground	An ATSU end system failed to complete its automatic CPDLC transfer procedure	Open	N
10607	Data link disrupted	Air/ Ground	Still under investigation	In progress	N

A background map of East Asia, specifically showing Japan and the surrounding seas. The map is overlaid with a grid of green lines representing flight paths or communication routes. The title 'Specific PRs' is prominently displayed in the upper center.

# Specific PRs

- “UNABLE TO SEND MSG” repeatedly displayed  
(PR10574,PR10575,PR10580,PR10582, PR10585,  
PR10586,PR10587,PR10588,PR10589)
- Continued iteration of Lateral Deviation Event report  
(LDE) and Event Contract Request (ECR)  
(PR10583,PR10584,PR10598)
- HFDDL for ATC in FUKUOKA FIR  
(PR10560,PR10597,PR10602)
- Incorrect position display of an ADS airplane  
(PR10568,PR10570)



# UNABLE TO SEND MSG

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PR Number: 10574,10575,10580,10582, 10585,  
10586,10587,10588,10589

- Immediately after data link logon (within 1 minute), no down link attempt became possible .7 out of 9 PRs, where airplane communicated via VDL.
- Up linked messages were displayed, but no downlink could be possible.
- According to the aircraft manufacturer, similar problem has been reported quite a few times, but neither it nor the FMC/CMU manufacturers have ever been able to replicate the situation in the lab.
- Some airlines reported examples that by recycling the circuit breaker the problem situation resolved.

# Continued iteration of Lateral Deviation Event report (LDE) and Event Contract Request (ECR)

PR Number: 10583,10584,10598

- Immediately after the pilot input an off-set value exceeding the event contracted one, the airplane and the ATSU end system continued iteration of LDE and ECR in short period of time.
- The above situation resulted in such avionics failure as making it impossible for the pilot to down link messages, or causing the inability for ADS response to be down linked.

Next slide→

# Continued iteration of Lateral Deviation Event report (LDE) and Event Contract Request (ECR)

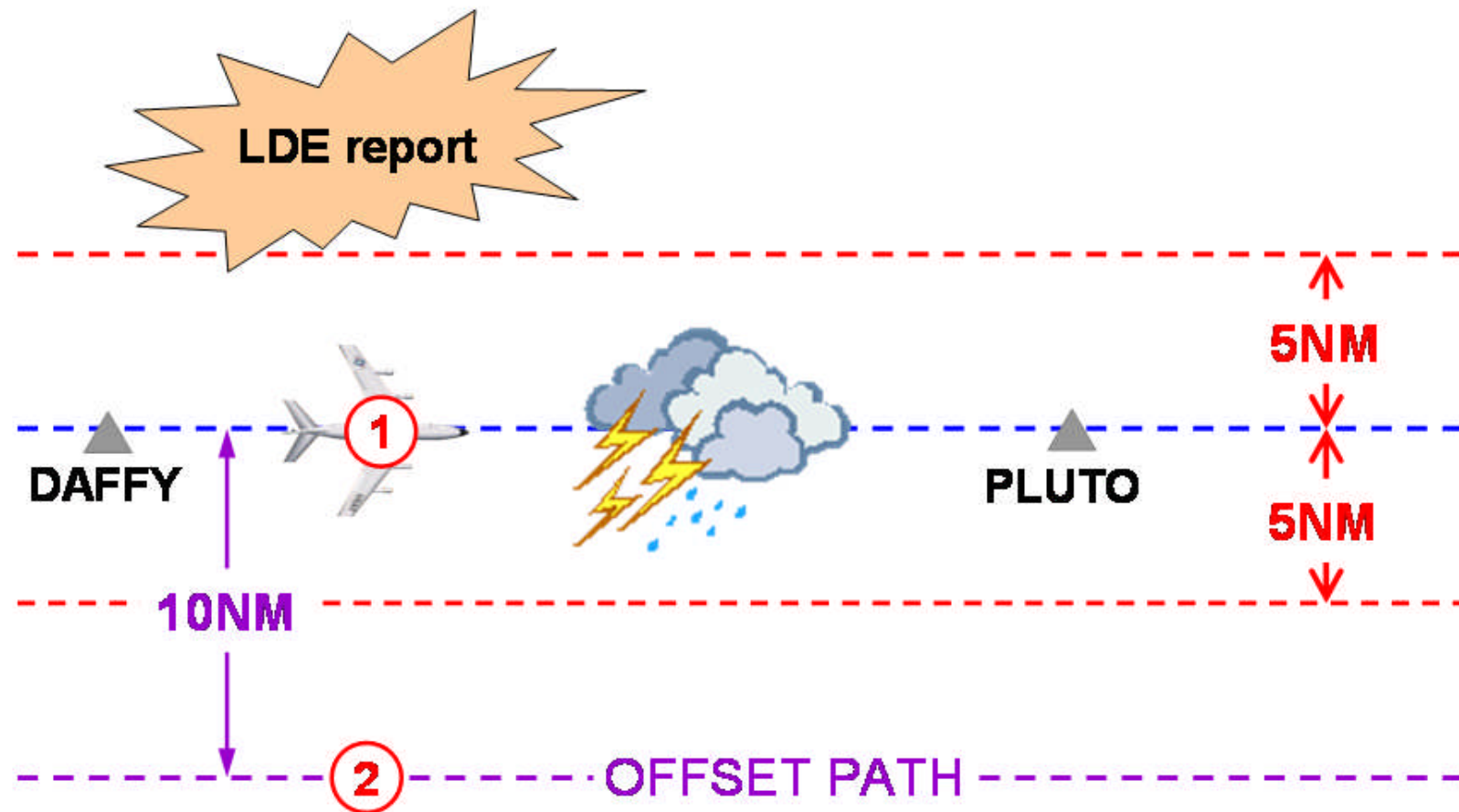


Figure 2 33. Effect of offset on ADS C lateral deviation event report (refer to the GOLD)



# HFDL for ATC in FUKUOKA FIR

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PR Number: 10560,10597,10602

- VHF data link and Satellite data link are utilized for communications between airborne and ground systems, and between air traffic controller and pilot.
- Messages down linked via HFDL are discarded at the data link system connected with the ATSU end system and therefore failed to reach the end system.
- Airplanes used HFDL for ATC resulted in the following 3 PRs:
  - CPDLC DR (Disconnect Request) in response to CPDLC EOS(END OF SERVICE) was not down linked. (PR10560,PR10602)
  - WILCO in response to CONTACT was not down linked. (PR10597)



## Incorrect position display of an ADS airplane

PR Number: 10568,10570

- 1 hour delayed ADS report caused the problem event.
- The ATSU end system examines every ADS report to determine its reported hour before displaying it on the ATC screen, because the ADS report does not have the hour (“hh”) information.
- The ATSU end system received an ADS report with about 1 hour delay and displayed it without any change.

Next slide→

# Incorrect position display of ADS targets

1. At **01:53:04**(UTC) the airplane created an ADS report and attempted to down link it.

ADS report

ADS reported time = **53:04**  
(ADS report lacks hours portion)

**Remained  
in the avionics**

2. At **03:00:00**(UTC) the ADS report was sent to the ATSU end system.

**53:04**

**02:53:04**

**02:50:00 ≤ 02:53:04 ≤ 03:02:00**

(03:00:00 – 10min)

(03:00:00 + 2min)

**Available time**

Current time  
**03:00(UTC)**

Planned  
position

Actually displayed position (Position  
as of 1 hour ago = **01:53 UTC**)

ATC Display

Chart 23

# Questions?

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