ICAO APAC Webinars – Safety and Air Navigation Services

AIDC Implementation *Benefits and Lessons Learnt*

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Moderator

Co-chair APA AIDC Implementation Task Force

Objectives of this Webinar

- To improve the understanding of AIDC
  - Provide impetus for implementation of AIDC in AsiaPac
  - For the information of all stakeholders including who would not normally be able to attend ICAO's regular meetings and events.

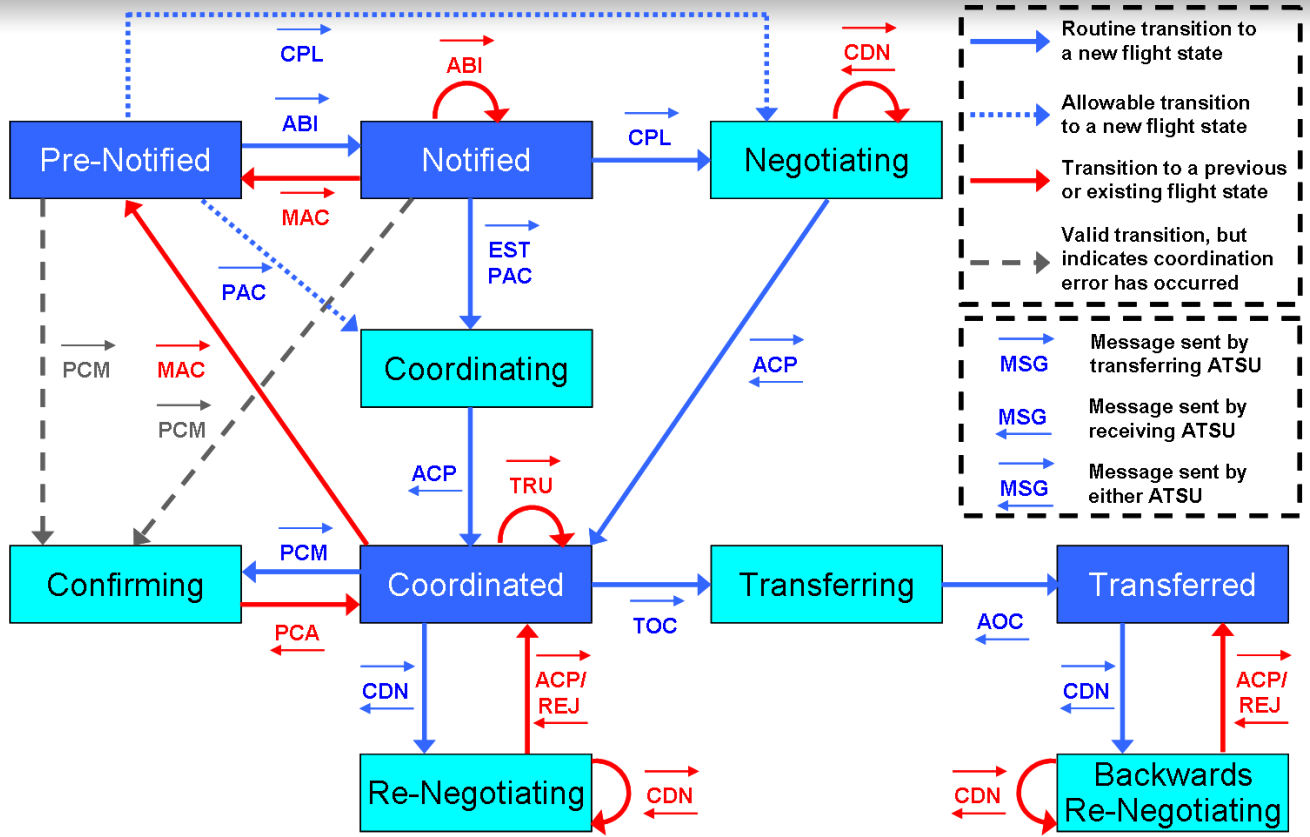
Agenda

- A brief introduction to AIDC
- Benefits of AIDC
- APAC AIDC Implementation Task Force
- AIDC Implementation Issues
- Overcoming challenges together in AIDC implementation
- Status of AIDC implementation in APAC region
  (focus area South China Sea and Bay of Bengal)
- Conclusion
- Q&A session

- Moderator: Mr Kwek Chin Lin
- Speaker: Mr Anurag Sharma
- Speaker: Mr Joe Chua
- Speaker: Mr Arian Nurahman

A brief introduction to AIDC

- ATS Inter-Facility Data-Communication
  - an effective tool to reduce manual intervention and ground-ground coordination errors
  - A data link application that provides the capability to exchange data between air traffic service units during the notification, coordination and transfer of flight between flight information regions.



Graphics courtesy of Adam Watkins

Benefits of implementing AIDC

- An automated system that facilitates routine coordination by providing a reliable and timely data exchange between ATSUs in which accurate information can be derived directly from the system, reducing controller's workload and human errors.
- An important means to minimize large height deviation

Safety benefits

- Reduction of coordination errors
  - Coordination data should be extracted automatically from flight data processing system
  - Coordination should occur automatically
- Controller workload is reduced
  - Less reliance on voice coordination
  - More time to complete other task
- Increased efficiency

APANPIRG/24 CONCLUSION 24/16

Recognizing that States implementing AIDC messaging may be doing so without previous knowledge or experience, and significant safety, ATC capacity and workload benefits arise from implementation of an appropriately selected initial suite of AIDC messages;

States should:

a) engage as soon as possible in AIDC trials to develop knowledge and address any related ATM or communications system issues;

b) implement operational AIDC messaging as a matter of priority, in accordance with APANPIRG Conclusion 19/191 ; and

c) implement as far as practicable, the following AIDC messages:

Advanced Boundary Information (ABI), Coordinate Estimate (EST), Acceptance (ACP), Transfer of Control (TOC) and Assumption of Control (AOC).

APANPIRG/24 CONCLUSION 24/27

Considering that **ATS Inter-facility Data Communications (AIDC) is an important means of minimizing Large Height Deviations (LHD**), Asia/Pacific States should support the expedition of AIDC through collaborative projects at the following significant LHD interface areas:

a) **Indonesia**: between Jakarta and Chennai/Ujung Pandang/Brisbane/Melbourne FIRs;
b) **India**: between Chennai and Kuala Lumpur FIRs;
c) **Philippines**: between Manila and Fukuoka/Taipei/Hong Kong/Ho Chi Minh/Singapore/Kota Kinabalu/ Ujung Pandang FIRs; and
d) **China**: between – i. Urumqi and Lahore FIRs; and ii. Beijing and Ulaan Baatar FIRs

APAC AIDC IMPLEMENTATION TASK FORCE

TF/1 TO TF/6 - 2015 – 2020

The Asia/Pacific ATS Inter-Facility Data-Link Communication (AIDC) Implementation Task Force (APA/TF) shall be responsible for overseeing the expedition of AIDC implementation in accordance with the Asia/Pacific Seamless ATM Plan within the Asian Region, with a particular focus on the Bay of Bengal (BOB) and South China Sea (SCS) areas.

APA Adhoc Working Group for AIDC Guidance Material 2015-2017

AIDC IGD was published in 2017

AIDC Implementation Issues

- Administrative Issues
- Technical Issues
- Procedural/Operational Issues

AIDC Administrative Issues

- Letter of Agreement
- Bilateral issues between the ATSUs
- Inadequate exchange of information

Technical Issues

- ATM Systems
- Communication Links
- AIDC Versions
- Syntactical Errors
- Training

Procedural / Operational Issues

- Airspace Design & Procedures
- AIDC Messages
- Training

Mitigation for Implementation Issues

- Appropriate and workable LOA
- Graded (Phased) Implementation approach
- Vendor Contract Management for suitable resolution of ATM System issues
- Unhindered bilateral cooperation and communication for gap analysis and resolution of issues.
- Adoption of AIDC Implementation and Guidance Document (AIDC IGD)
- Efficient Communication Network.
- Adequate training for technical and operational staff.

Issues & Mitigations

- Adaptation of data in FDPS e.g. Modification of COP, Route Truncation Compatibility with pairing ATSU, CDN messages
- Application Software issues resolution for ATM Systems e.g. Auto ACP messages in response to EST messages.
- Optimization of AMSS to reduce latency issues.
- Time synchronization for all interconnected systems

AIDC IGD

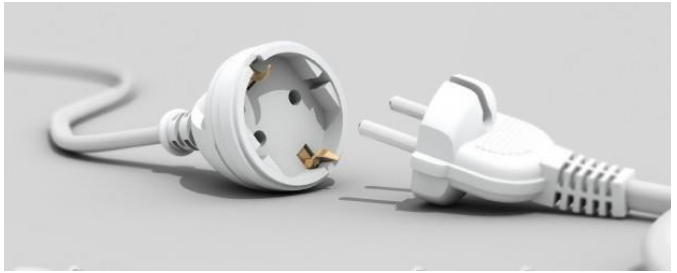
- Objective: to provide guidance, complementing relevant ICAO standards, on AIDC implementation within the APAC region.
- Document Coverage:
  - AIDC Message sets to facilitate Implementation
  - AIDC Implementation Considerations
  - Pre-implementation Checklist
  - Handling Implementation Issues
  - HMI Considerations
  - Harmonization Framework (LOA/Procedures/Routes/Version/Message Set/ Communication Network)
  - Performance Monitoring and Validation (Success Rate Determination)
  - AIDC Training to enhance awareness and skill sets

Overcoming challenges together

- States are encouraged from the start of the TF to provide identified issues, including closed issues, by updating them in **AIDC Issues Form**, which is then shared amongst States
- The objective to provide states implementing AIDC a quick reference and avoid repeating the similar mistakes. This sharing of information assisted States and accelerated the implementation of AIDC

AIDC Issues Form

- The issues were originally categorized into 9 fault categories, later simplified into 4:
  - Communication Link
  - ATM System
  - AIDC Message
  - Airspace Design / Procedures
  - Others
- Some examples are indicated in the following slides



Some common AIDC Issues

No.	Fault Category	Fault Description	Cause
i.	**ATM Automation system**	Rejection of AIDC messages by receiving system due to Error message 61, Cyclic Redundancy Check (CRC) Error.	Error is likely because sending ATM automation system is generating extra undesirable spaces
ii.	**ATM Automation /AFTN system**	Coordination protocol dialogue timeout	Likely non-synchronization of time in the pairing ATM automation/AFTN systems
iii.	**Communication Network**	a) Latency in communication network (AFTN link), resulting in message time-out errors b) Message timeout errors due to possible re-routing of messages in case of failure of direct AFTN link.	If due to network latency, no automatic system response is received by the sender system in a fixed time, then the sender system generates a LTO (time out response).

No.	Fault Category	Fault Description	Cause
iv.	**Airspace Design/ Procedures**	a) ABI messages of some of the aircrafts are not correlated with Flight plan available in ATM automation system	a) Rejection of ABI messages exchanged between system due to route error and mismatch in coordination timing. ATM automation system may reject the incoming ABI message because of unrecognized route portion (depends on how common airways are defined in the pairing systems Some airways may be defined up to a certain extent in next FIR, while others may be defined only up to the FIR boundary)

No.	Fault Category	Fault Description	Cause
v.	**AIDC message format**	AIDC messages in pre-2012 format	
vi.	**AIDC message format**	Some ATM automation systems rejected latitude/longitude represented upto seconds (041627N0733138E).	As per AIDC-ICD seconds is not part of the standard LAT/LONG format
vii.	**AIDC message format /training**	Incorrect route truncation. Truncated routes are not getting accepted by receiving ATSU.	ICAO route truncation indicator is not supported by many receiving ATSUs. The Asia/Pacific ICD clearly states the rules required for truncating a route after the last known significant route point.

No.	Fault Category	Fault Description	Cause
viii.	**AIDC message flow**	Non-receipt of ACP messages within designated time span results in unnecessary LRM messages	In some of the ATM automation systems, there is no provision of automatic acceptance of EST messages and messages are accepted manually at receiving ATSU.
ix.	**AIDC message flow**	Even after sending a rejection (REJ) or counter coordination message (CDN) by receiving ATSU, the transmitting ATSU continues to send the CDN message	Unnecessary/ multiple generation of automatic CDN messages by transmitting ATSU, without waiting for an acknowledgement, might be due to system getting into some loop or may be due to some other system problem

Summary of AIDC Issues Reported

- Communication Infrastructure and Interfacing Equipage:
  - 6 cases of latency occurred among ACCs in India and with its adjacent ACC. These issues are still Open, and being taken up by communications provider.
  - 2 cases reported by Singapore; message time out parameter set too short whereby ACP messages from downstream ATSU were not processed, and link outage. The status of these issues is Closed.
  - 1 case occurred between Ujung Pandang ACC and Brisbane ACC. It happened occasionally; the transmission has a transit time more than 180 seconds; Closed by communications provider.

Summary of AIDC Issues Reported

- ATM system parameters and Application Software:
  - 6 cases reported by Australia (Brisbane ACC and Melbourne ACC). The status is still recorded as Open, since 2016.
  - Issues reported by India:
    - Error message 61 (CRC Error) caused by extra space in the ABI message; Open/need join observation by Delhi ACC and Lahore ACC
    - Aircon2100 not support truncation indicator; Open/need software upgrade.
    - ID on ODF3 is not per ICD; Closed/more information by contributor, if any.
    - Unexpected CDN message sending; Open/more information by contributor, if any.
  - (continued…)

Summary of AIDC Issues Reported

- ATM system parameters and Application Software:
  - Issues reported by Indonesia (Ujung Pandang ACC):
    - No ULAM notification; Closed/by software upgrade.
    - Received ODF3 issues from KK ACC & MNL ACC; Closed/by software upgrade in KK & MNL.
    - Received unexpected EST from BNE ACC; Closed/by modifying dataset in BNE.
    - Received false MAC from BNE ACC; Closed/by modifying dataset in BNE.
    - No response of LAM/LRM. After investigation was done, the cause of the problem was unstable connection in Jakarta AMHS. Closed/by communication provider.
    - ACP reception indicator does not appear in the electronic strip; Open/need software upgrade in UPG.
    - False route in ABI message from MNL ACC; Closed/by software upgrade in KK.
    - REJ message from OAK ACC and KK ACC could not be processed; Open/need software upgrade in UPG.
    - Occasionally sending multiple EST to Manila; Open/occurred during March – May 2020, but no more case since June 2020. It needs more analysis.
  - (continued…)

Summary of AIDC Issues Reported

- ATM system parameters and Application Software:
  - Issues reported by Malaysia (Kuala Lumpur ACC):
    - Received LRM on ABI (item 18/RMK); Closed/more information by contributor, if any.
    - Unexpected CDN message sending; Closed/by modifying dataset in KL.
    - LRM from Chennai against ABI and EST from KL; Open/more information by contributor, if any.
  - Issues reported by Maldives:
    - Conflict SSR code on ABI message with SSR Colombo domestic; Closed/by modifying dataset in Colombo.
    - ODF3 issue; Closed/by software upgrade.
    - Unformatted Lat/Long in the item 15; Closed/by software upgrade.
    - ABI and CPL rejected due ICAO FPL 2012 format; Closed/by software upgrade.
  - (continued…)

Summary of AIDC Issues Reported

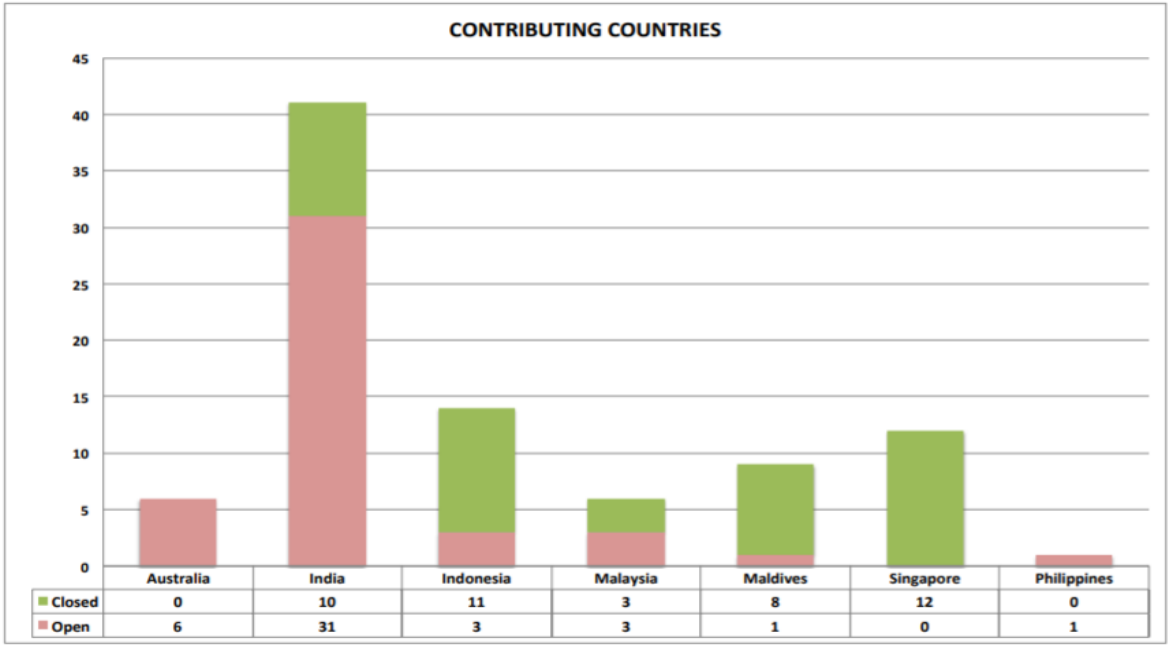
- ATM system parameters and Application Software:
  - Issues reported by Philippines (Manila ACC) received multiple ABI from KK ACC; Open/need further investigation by KK.
  - Issues reported by Singapore:
    - Rejection ABI due to unknown point; Closed/by updating dataset in ATM system.
    - Not reception of EST messages; Closed/more information by contributor, if any.
    - AOC/TOC message transmission constraint; Closed/by modifying dataset in MNL.
    - Invalid EST sent by ATM system; Closed/by modifying dataset.

Summary of AIDC Issues Reported

- Design Procedures, SOP, Operator's Training:
  - India reported:
    - Airspace configuration issue; Closed/more information by contributor, if any.
    - Dynamic sectorization of UTV between Chennai and Trivandrum; Open/ more information by contributor, if any
    - Under trial phase, the acceptance of EST message is in manual mode; Open/more information by contributor, if any.
  - Indonesia reported that Ujung Pandang activated flight data record prior to AIDC EST message transmitted by Manila. This occurrence happened when Ujung and Manila verbally coordinate flight level, which not in accordance with FLAS (Flight Level Allocation Scheme); Closed/by temporary SOP and deliver more training to operator at the related sectors.
  - Malaysia reported that controller in Chennai did not respond to CDN from KL; Open/need to evaluate the application of LOCA and SOP in respective ACCs.
  - Singapore reported that there was the rejected EST message due to invalid flight plan state (coordinated) were queued in erroneous folder; Closed/by creating SOP in the ATC Support Officer to handle this case.

Summary of AIDC Issues reported

Contributing Countries of AIDC Issues Report Chart



	Australia	India	Indonesia	Malaysia	Maldives	Singapore	Philippines
Closed	0	10	11	3	8	12	0
Open	6	31	3	3	1	0	1

Status of AIDC Implementation

- Presenting 2 sets for comparison
- First set is from updates presented at 1st APA TF in 2015
- Second set is from 6th APA TF in Jul 2020
- Yellow denotes trials
- Green denotes operational

States Implementation Progress (2015 APA TF meeting – 1/2)

State	ATSU	Partner ATSU	Activity Schedule			Remarks
			Technical	Trials	Operational	
India	Ahmedabad ACC	Pakistan/Karachi ACC	---	TBA		
	Chennai ACC	Maldives/Male ACC	---	TBA		
		Malaysia/Kuala Lumpur ATCC	Jul 2013	TBA		ABI, ACP, CDN, EST, MAC, REJ
Indonesia	Jakarta ACC	India/Chennai ACC	TBA			ATM system upgrade
		Indonesia/Ujung Pandang ACC	TBA			ATM system upgrade
		Malaysia/Kuala Lumpur ATCC	TBA			ATM system upgrade
		Singapore/Singapore ACC	TBA			ATM system upgrade
		Sri Lanka/Colombo ACC	TBA			ATM system upgrade
	Ujung Pandang ACC	Australia/Brisbane ACC	--	2013	**4Q 2015**	
		Indonesia/Jakarta ACC	TBA			
		Malaysia/Kota Kinabalu ATCC	TBA			
Malaysia	Kota Kinabalu ATCC	Brunei	TBA			
		Indonesia/Ujung Pandang ACC	Apr 2015	4Q 2015	TBA	
		Philippines/Manila ACC	3Q 2015	2Q 2016	TBA	
		Singapore/Singapore ACC	Dec 2014	Dec 2015	TBA	ABI, ACP, EST, AOC, TOC
	Kuala Lumpur ATCC	India/Chennai ACC	Jul 2013	1Q 2016	TBA	
		Indonesia/Jakarta ACC	TBA			
		Singapore/Singapore ACC	Jan 2014	Jan 2016	TBA	
		Thailand/Bangkok ACC	4Q 2015	2Q 2016	TBA	
		Viet Nam/Ho Chi Minh ACC	3Q 2015	1Q 2016	TBA	
	Kuching ATCC	Brunei	TBA			
		Singapore/Singapore ACC	Dec 2014	Feb 2016	TBA	

States Implementation Progress (2015 APA TF meeting – 2/2)

State	ATSU	Partner ATSU	Activity Schedule			Messages
			Technical	Trials	Operational	
Philippines	Manila ACC	Hong Kong, China/Hong Kong ACC	TBA			Planned for 4Q 2016
		Malaysia/Kota Kinabalu ATCC	TBA			Planned for 2Q 2016
		Singapore/Singapore ACC	Dec 2014	Dec 2015	TBA	
		Taibei ACC	TBA			Planned for 2Q 2016
		USA/Oakland ACC	TBA			Planned for 2017
Singapore	Singapore ACC	Indonesia/Jakarta ACC	TBA			
		Malaysia/Kota Kinabalu ATCC	Dec 2014	Dec 2015	TBA	ABI, ACP, EST, AOC, TOC
		Malaysia/Kuala Lumpur ATCC	Dec 2014	Jan 2016	TBA	ABI, ACP, EST, AOC, TOC
		Malaysia/Kuching ATCC	Dec 2014	Feb 2016	TBA	ABI, ACP, EST, AOC, TOC
		Philippines/Manila ACC	Dec 2014	Dec 2015	TBA	ABI, ACP, EST, AOC, TOC
		Viet Nam/Ho Chi Minh ACC	Dec 2013	Feb 2014	24 July 2014	ACP, EST
Sri Lanka	Colombo ACC	Australia/Melbourne ACC	2014	TBA		ABI, EST, FAN, FCN, PAC, TOC
		India/Chennai ACC	2013	TBA		ABI, ACP, CDN, EST,REJ, AOC, TOC
		Indonesia/Jakarta ACC	TBA			
		Maldives	2013	TBA		
Viet Nam	Ho Chi Minh ACC	Cambodia	--	1Q 2015	TBA	
		Lao PDR	--	1Q 2015	TBA	
		Malaysia/Kuala Lumpur ATCC	--	1Q 2015	TBA	
		Singapore/Singapore ACC	Dec 2013	Feb 2014	24 July 2014	ACP, EST

States Implementation Progress (2020 APA TF meeting – 1/3)

State	ATSU	Partner ATSU	Activity Schedule			Remarks
			Technical	Trials	Operational	
India	Ahmedabad ACC	Pakistan/Karachi ACC	---	2Q 2020	TBA	
	Chennai ACC	Maldives/Male ACC	---	Sep 2017	TBA	
		Malaysia/Kuala Lumpur ATCC	Jul 2013	Sep 2016	1 Apr 2020	ABI, ACP, CDN, EST, MAC, REJ
		Myanmar/Yangon ACC	---	2018	TBA	
		Sri Lanka/Colombo ACC	2Q 2020	TBA		
	Kolkata ACC	Myanmar/Yangon ACC	2Q 2020	TBA		
	Mumbai ACC	Maldives/Male ACC	---	---	**2Q 2020**	
Indonesia	Jakarta ACC	India/Chennai ACC	TBA			ATM system upgrade
		Indonesia/Ujung Pandang ACC	TBA			ATM system upgrade
		Malaysia/Kuala Lumpur ATCC	TBA			ATM system upgrade
		Singapore/Singapore ACC	TBA			ATM system upgrade
		Sri Lanka/Colombo ACC	TBA			ATM system upgrade
	Ujung Pandang ACC	Australia/Brisbane ACC	--	2013	Jul 2017	ABI, ACP, EST, AOC, TOC
		Indonesia/Jakarta ACC	TBA			
		Malaysia/Kota Kinabalu ATCC	Aug 2019	1Q 2020	TBA	ABI, ACP, CDN, EST, MAC, PAC, REJ, TOC, AOC
		Philippines/Manila ACC	---	Oct 2019	**3Q 2020**	ACP, EST, AOC, TOC
		PNG/Port Moresby ACC	Jul 2020	TBA		ABI, ACP, EST, AOC, TOC
		USA/Oakland ARTCC	Oct 2018	Dec 2018	**4Q 2020**	ABI, ACP, CDN, EST

States Implementation Progress (2020 APA TF meeting – 2/3)

State	ATSU	Partner ATSU	Activity Schedule			Messages
			Technical	Trials	Operational	
Malaysia	Kota Kinabalu ATCC	Brunei	TBA			Planned for 4Q 2016
		Indonesia/Ujung Pandang ACC	Aug 2019	4Q 2020	TBA	ACP. EST
		Philippines/Manila ACC	May 2019	4Q 2020	TBA	ACP. EST
		Singapore/Singapore ACC	Nov 2019	Oct 2020	TBA	ACP. EST
	Kuala Lumpur ATCC	India/Chennai ACC	Jul 2013	Sep 2016	1 Apr 2020	ABI, ACP, CDN, EST, MAC, REJ
		Indonesia/Jakarta ACC	TBA			
		Singapore/Singapore ACC	Dec 2014	Sep 2018	1 Nov 2019	ACP, EST
		Thailand/Bangkok ACC	Nov 2016	Aug 2019	14 Mar 2020	ACP. EST
		Viet Nam/Ho Chi Minh ACC	4Q 2019	2Q 2020	TBA	
	Kuching ATCC	Brunei	Dec 2014	Dec 2015	TBA	ABI, ACP, EST, AOC, TOC
		Singapore/Singapore ACC	Nov 2019	Jul 2020	4Q 2020	ACP, EST
Philippines	Manila ACC	Hong Kong, China/Hong Kong ACC	Mar 2019	Mar 2019	23 May 2019	ACP, EST
		Indonesia/Ujung Pandang ACC	May 2019	Oct 2019	4Q 2019	ABI, ACP, EST, AOC, TOC
		Malaysia/Kota Kinabalu ATCC	May 2019	Oct 2019	4Q 2019	ABI, ACP, EST, AOC, TOC
		Singapore/Singapore ACC	Dec 2014	Feb 2019	1 Nov 2019	ACP. EST, AOC, TOC
		Taibei ACC	Apr 2019	Jun 2019	5 Dec 2019	ACP, EST, AOC, TOC
		USA/Oakland ACC	TBA			
		Viet Nam/Ho Chi Minh ACC	May 2019	TBA		ABI. ACP, EST, MAC, PAC, AOC, TOC

States Implementation Progress (2020 APA TF meeting – 3/3)

State	ATSU	Partner ATSU	Activity Schedule			Messages
			Technical	Trials	Operational	
Singapore	Singapore ACC	Indonesia/Jakarta ACC	---	1Q 2015	TBA	
		Malaysia/Kota Kinabalu ATCC	Nov 2019	Oct 2020	TBA	ACP. EST
		Malaysia/Kuala Lumpur ATCC	Dec 2014	Sep 2018	1 Nov 2019	ACP. EST
		Malaysia/Kuching ATCC	Nov 2019	Jul 2020	**4Q 2020**	ACP. EST
		Philippines/Manila ACC	Dec 2014	Feb 2019	1 Nov 2019	ACP. EST
		Viet Nam/Ho Chi Minh ACC	Dec 2013	Feb 2014	24 July 2014	ACP. EST
Thailand	Bangkok ACC	Cambodia/Phnom Penh ACC	---	Jun 2020	**3Q 2020**	ABI, ACP, EST, AOC, TOC
		Malaysia/Kuala Lumpur ATCC	Nov 2016	Aug 2019	14 Mar 2020	ACP. EST
		Myanmar/Yangon ACC	---	Jun 2020	**4Q 2020**	ABI, ACP, EST, AOC, TOC
		Lao PDR/Vientiane ACC	---	---	14 July 2020	ABI, ACP, EST, AOC, TOC

Summary of AIDC Implementation Status

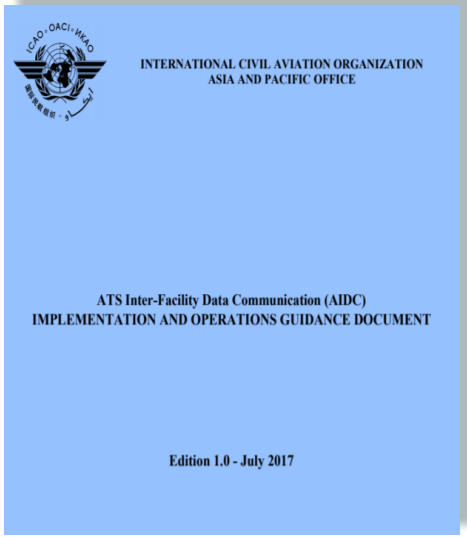
2015 1st AIDC Task Force Meeting	2020 6th AIDC Task Force Meeting
➢ **Operational trials ongoing/planned** • 5 States • 19 ATSU/ACCs	➢ **Operational trials ongoing/planned** • 6 States • 32 ATSU/ACCs
➢ **Implemented AIDC** • 2 States • 2 ATSU/ACCs	➢ **Implemented AIDC** • 6 States • 13 ATSU/ACCs

Deliverables of AIDC TF

- Completion of ATS AIDC Implementation and Operations Guidance Material in 2017

  Download link:
  https://www.icao.int/APAC/Pages/eDocs.aspx
  CNS tab

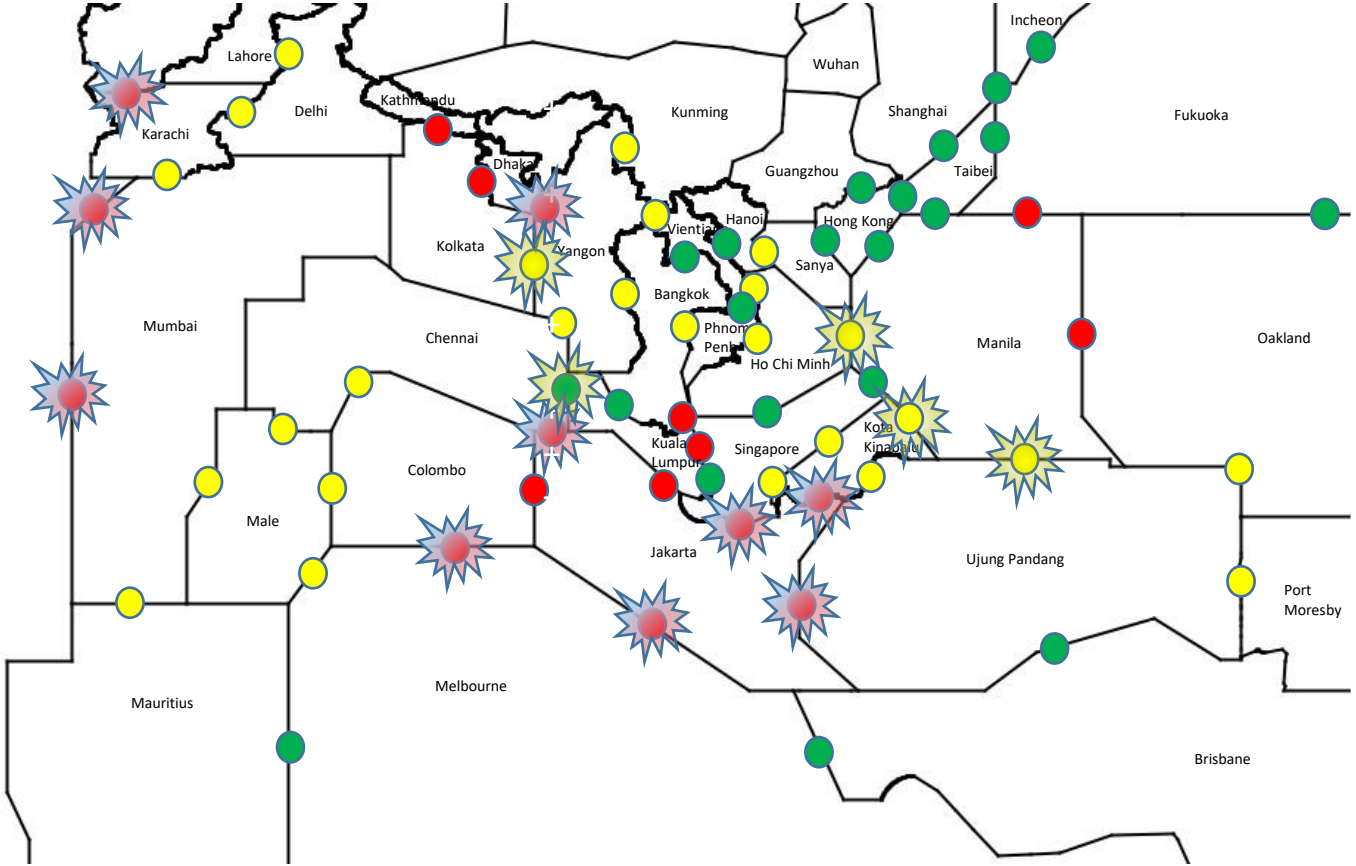
AIDC IGD



- Improved coordination and cooperation between States via the TF for AIDC implementation leading to successful implementation

Deliverables of AIDC TF

- Made significant strides in AIDC implementation in APAC
  - Currently 32 ATSUs conducting trials / planned operational trials by 2020/21 [19 at TF/]
  - 13 ATSUs implemented AIDC [2 at TF/1]
- Contributed to reduction in LHD in Asia-Pac as reported by RASMAG



AIDC Status

- AIDC Implemented
- Trials (Operational/technical)
- Not implemented

Legend

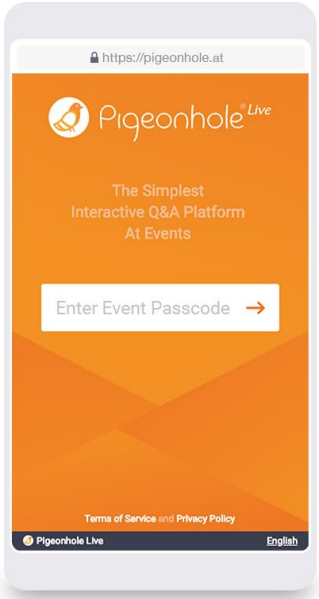
Hotspots *RASMAG/24*

- Hotspots with AIDC or AIDC implementation by 2021
- Hotspots with no plans for AIDC implementation

APA AIDC Implementation Status (Jul 2020)

Q&A SESSION

Q&A session



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