

International Civil Aviation Organization



**THE SIXTH MEETING OF AERONAUTICAL
TELECOMMUNICATION NETWORK (ATN)
IMPLEMENTATION CO-ORDINATION GROUP
OF APANPIRG (ATNICG/6)**



Seoul, Republic of Korea, 16 - 20 May 2011

Agenda Item 6: Applications

AIDC AND ITS STANDARD

(Presented by Japan)

SUMMARY

At the ATNICG WG/8 meeting, Sept. 2010 in Christchurch New Zealand, the Global ICD for AIDC was presented for review. This paper gives a summary of review on two published documents, related to AIDC, including the Global ICD for AIDC.

References:

[PANS-ATM, DOC 4444] Proposed Amendment to Procedure for Air Traffic Services – Air Traffic Management (PANS-ATM, DOC 4444) OPLINKP/1-WP/33 Appendix I to the Report, 2005

[DOC 9694] Manual of Air Traffic Services Data Link Applications

[DOC 9694-1996-AIDC] ICAO Manual of ATS Data Link Applications Part VI (Draft), Report to ADSP/4

[DOC 9694-2005-AIDC] ICAO Manual of ATS Data Link Applications Part VI (Amendment Draft) OPLINKP/1-WP/33 Appendix K to the Report

[G-AIDC-ICD (draft)] Global Interface Control Document (ICD) for ATS Inter-facility Data Communications (AIDC) Jan.2010, presented at ATNICG-WG/8 as WP02

1. Introduction

1.1 At the ATNICG WG/8 meeting, Sept. 2010, in Christchurch New Zealand, WP02 was presented by the Secretariat to 'Review newly developed AIDC Implementation Plan and review global AIDC ICD'. The paper presents a review of WP02 as well as the other related document, namely ICAO Manual of Data Link Applications.

2. AIDC and its standard as ATS Data Link Application

2.1 AIDC

The purpose and scope of the AIDC: ATS Inter-facility Data Communication, are discussed briefly here. The AIDC is a part of ATS services and the operational provisions are described in PANS-ATM 4444 and other documents. The AIDC should be considered as an integrated part of ATS services, but somehow each data link application including the AIDC is described as a separate part of ATS services.

2.2 AIDC Implementation Life Cycle

If someone has decided to implement AIDC, what are the things to be done?

The life cycle (from sunrise to sunset) of AIDC implementation could be going through the following stages:

- Planning AIDC implementation
- Developing/Implementing AIDC
- Operating implemented AIDC, and
- Maintaining implemented AIDC

Since the AIDC provides a communication between ATSUs, the AIDC planning activity includes the coordination between these ATSUs. The AIDC provides a one-to-one, peer-to-peer communication, that is, the AIDC is not structured as a network to provide any-to-any communication, therefore, the coordination in the AIDC implementation is a local matter between the concerned ATSUs.

It is needless to say the implemented AIDC may not be fully automated, where there are some portions to be implemented as manual operations or human-machine interfaces involved.

In the following, we discuss only automated AIDC in the stages of developing, operating and maintaining the implemented AIDC.

As described above, the coordination between the two ATSUs concerned and AIDC implementation is local matters as far as the AIDC operations comply with the operational AIDC requirements.

There are some documents developed for standard, including AIDC implementation. Why do we need such standards, even if the implementations are local matters?

For instance, ATSU A and ATSU B have decided to implement the AIDC, the implementation is local matter between them. If ATSU A and ATSU C have decided AIDC implementation as well, again the implementation is local matter between them. ATSU A surely wants to implement the same AIDC as the one implemented between ATSU A and ATSU B, but ATSU C may not be sure that such an AIDC implementation fits to ATSU C side. The implementation process may start from scratch, that it takes time, efforts, and cost. Later on, ATSU B may want to implement an AIDC to ATSU C. Again it starts from scratch. In order to avoid such a case, developing standard is preferable.

2.2.1 AIDC standard for Data Link Application

What are the purposes of standardizations in general, especially for routine activities? Every time some organizational activities are involved, it is necessary to clarify the task of individual unit and coordination between units. In order to provide efficient and effective coordination to eliminate excess communications, standardization helps to accomplish such necessities in

- coordination on planning e.g. for communication services provision
- coordination on outcomes e.g. for communication services provision
- coordination to apply skill/knowledge e.g. for communication services provision
- coordination on process and data to operate, e.g. for communication services provision

Within the context of AIDC implementation, standardizing of

- Things to be planned/coordinated and planning procedure of AIDC implementation within unit and between units (it may not be necessary to have them for planning as a standard)
- Expected Outcomes of implemented AIDC operations, for instance, quality of services
- Applying skill/knowledge, for instance, adopting well established technologies for implemented AIDC operations
- Processes and Interface Data of implemented AIDC operations, for instance, contents and sequencing of AIDC messages

The reason why such a discussion provided here is that there are mixtures of various aspects presented in standardization documents. It is important to identify to what extent we need standardization for the AIDC implementation, whether standardizations on planning, implementing outcomes or only implemented processes as a minimum.

On the other hand, any standards should not prevent implementation from exploring new ways to adopt implementation methods and efficient implementations, that is, any standards have to be kept themselves as minimum for interoperability as necessary and the implementation details should be left to implementers.

There are documents called ICD; Interface Control Document in ICAO context as regional standard documents. What does it mean by 'interface'? What does it mean by 'control'? It is interpreted such that an ICD provides a document as a standard for any implementations to comply with as far as the interface is concerned. Now it is important to identify the interface to be standardized in case of the AIDC.

Since the AIDC is one of communication services, implemented at two ATSU's for ATS related message exchanges, the interface implies communication interface between these two AIDC implementations. Since the term 'interface' is used for facing to the other, it does not include the inner details of the AIDC implementations, that is, the ICD provides what shall be appearing at the interface and how the behaviour of any implemented AIDC shall look like at the interface.

An AIDC ICD standard at least has to specify things crossing the interface between implemented AIDCs. Here it says 'implemented AIDC'. It does not include things during 'planning' and 'developing' stages, only looks at the implemented AIDC as outcomes. These things dealt during 'planning' and 'developing' stages could be important, but the ICD has to include only things to be implemented as results, taking concrete shapes. There are some descriptions of operational aspect of AIDC in the draft ICD. These descriptions should be left to other documents, e.g. PANS-ATM 4444. If there is a need of such descriptions, the ICD has to refer these documents.

Things to be included in the ICD could be;

- (1) Processes and Interface Data of implemented AIDC operations
AIDC message set and format of each AIDC message together its parameters
AIDC message sequences in terms of dialogues related to ATS functions to be supported
- (2) Outcomes of implemented AIDC operations
Requirements on operationally dynamic outcomes, e.g. response time to the AIDC message sent
- (3) Adaptations of technologies for implemented AIDC operations

2.2.2 Study on ICAO Manual Data Link Application-Part VI AIDC

In the attached Appendix 1, a summary of study on ICAO Manual Data Link Application-Part VI AIDC is given. Main result is the description of dialogues using only dialogues and AIDC messages. It gives unambiguous descriptions, which are missing in the original document.

2.3 Study on Global AIDC ICD

In the attached Appendix 2, a summary of study on Global AIDC ICD (draft) is given.

The descriptions in the Global AIDC ICD are compared with the ones in ICAO Manual, in terms of State, Phase, Dialogue and AIDC message.

It also shows the differences between two documents, ICAO Manual and Global AIDC ICD. The 'shall' statements in the document are studied somewhat in detail and it is found various statements to be clarified further.

The impression is that the document needs further clean-up.

3. Recommendation

- 3.1 The members of the meeting are invited to review the discussions provided above.

Appendix-1 Study on ICAO Data Link Application Manual (draft): Part-VI AIDC

References:

- [DOC 9694] Manual of Air Traffic Services Data Link Applications
 [DOC 9694-1996-AIDC] ICAO Manual of ATS Data Link Applications (Draft), Report to ADSP/4
 [DOC 9694-2005-AIDC] ICAO Manual of ATS Data Link Applications (Amendment Draft) OPLINKP/1-WP/33 Appendix K to the Report
 [G-AIDC-ICD (draft)] Global Interface Control Document (ICD) for ATS Inter-facility Data Communications (AIDC) Jan.2010

1. Introduction

This Appendix is to summarize the document [DOC 9694-2005-AIDC] reported as a part of OPLINKP/1 meeting outcomes. There are several documents describing AIDC operations, e.g. [DOC 9694-2005-AIDC], [G-AIDC-ICD]. There are substantial differences among these documents, for instance, terms used and AIDC messages adopted. Moreover the descriptions in these documents are changed/updated continuously, that it is hard to keep tracking these changes and to understand the meanings of these changes. In order to sort out these differences among the documents, the document [DOC 9694] is selected to identify the essential elements of AIDC operations. Since the document [DOC 9694] is the starting point of the descriptions on AIDC operations, it is considered that the document can be used as the baseline document, although it is necessary to study further if there are any inconsistencies between the document [DOC 9694-2005-AIDC] and the other documents, especially [G-AIDC-ICD (draft)] .

2. AIDC described in [DOC 9694-2005-AIDC]

2.1 Contents in [DOC 9694-2005-AIDC]

The following table shows the Table of Contents of the document [DOC 9694-2005-AIDC].

Ch.	DOC 9694-AIDC		Remarks
1	Application Overview		
		Introduction	
		Operational Concept	
		Coordination States	
		Notification and Coordination of Off-Track Clearances	
		Notification and Coordination of Speed Control	
		Matching AIDC Messages with an ATC Flight Plan	
		Diversions to Amended Destinations	
		Free Test Messages	
		AIDC Application Features	
		Regional Adaption	
	App A	Determining Affected Downstream Units	
	App B	Transition Messages	
2	General Requirements		
		Message Handling	
3	AIDC Functional Capabilities		
		Dialogues	See 2.2 ATS-related Functions below
		Operating Method	
4	Description and Contents of AIDC Messages		
		Introduction	
	App A	AIDC Message Data Glossary	
		AIDC Data Glossary	
	App B	AIDC Variables Range And Resolution	
		AIDC Variables Range and Resolution	
5	Operational AIDC Message Sequences		
		AIDC State Transitions	
		Notify state	See 2.3 States below
		Coordinate state	See 2.3 States below
		Transfer state	See 2.3 States below
		Transfer method (1)	
		Transfer method (2)	
		Dialogue Sequences	See 2.6 Dialogue below
		Message Event Triggers and Valid Responses	
	App A	AIDC State Transition Diagrams	See 2.5 State Transition below
	App B	Rules for AIDC dialogues and the associated AIDC messages	See 2.6 Dialogue below
	App C	Sample Flight Threads	

There are six terms used in the document, ATS-related Function, State, Phase, State Transition, Dialogue and AIDC Message. The descriptions on these six terms are summarized in the following sections, from 2.2 to 2.7 respectively.

2.2 ATS-related Functions

The ATS-related Functions listed in two documents are given in the following table.

	ATS-related Functions [DOC 9694-2005-AIDC]Ch.3,3.1	ATS-related Functions [G-AIDC-ICD (draft)]App. D 1.1
1	Notification	Notification
2	Coordination	Coordination
3	Negotiation	
4	Transfer of Control	Transfer of Control
5	General (Text) Information Interchange	General (Text) Information Interchange
6		Surveillance Data Transfer
7		Application Management

Evidently, there are differences between ATS-related Functions listed in these two documents, namely;

- (1) The ‘Negotiation’ function exists in [DOC 9694-2005-AIDC], while the function does not exist in [G-AIDC-ICD (draft)]^{Note}.

Note: In [DOC 9694-2005-AIDC], there is a ‘Negotiation’ (formally ‘Transfer of Executive Condition’ in [DOC 9694-1996-AIDC]) dialogue for exchanging ‘Transfer Condition Proposal’ and ‘Transfer Condition Accept’ messages used in Europe. If the ‘Negotiation’ function denotes the same meaning as ‘Negotiation’ dialogue (see cited above and also later in 2.6 Dialogue), then the ‘Negotiation’ function can be eliminated from the list, as far as the regions except European region are concerned, but if the [G-AIDC-ICD (draft)] document is intended to be global, this function has to be discussed for inclusion. Since the terms used in the [DOC 9694-2005-AIDC] are not consistent (see later discussions), there is a need for terms to be sorted out.

- (2) The ‘Surveillance Data Transfer’ function does not exist in [DOC 9694-2005-AIDC]. Moreover the ‘Surveillance Data Transfer’ function is eliminated from the list in [DOC 9694-2005-AIDC] while the function exists in [DOC 9694-1996-AIDC], that is, the elimination of the function is intentional. Since the ATS-related functions to be supported by AIDC are listed in these two documents, if there is any difference between them, there must be differences between message sets of two documents to support AIDC operations. On the other hand, the ‘Surveillance Data Transfer’ function in [G-AIDC-ICD (draft)] is a function supported by AIDC messages classified as ‘option’ message, instead of ‘core’ message, while there is no core/option classification of AIDC messages in [DOC 9694-2005-AIDC].
- (3) The ‘Application Management’ function does not exist in [DOC 9694-2005-AIDC]. In [G-AIDC-ICD (draft)], the Application Management Messages to support Application Management function include LAM (Logical Acknowledge) and LRM (Logical Rejection) as ‘core’ messages, and other messages (ASM, FAN, and FCN) as ‘option’ messages. The ‘Application Accept’ (equivalent to LAM) and ‘Application Error’ (equivalent to LRM) are included in [DOC 9694-2005-AIDC], while the ‘Application Management’ function is not identified as a function. It is reasonable not to identify the ‘Application Management’ as a function from the operational viewpoint. There still remains an issue of the function supported by ‘option’ messages (ASM, FAN, and FCN).

2.3 (Coordination) States

There are three (Coordination) States

- Notify state
- Coordinate state, and
- Transfer state

Note: The ‘Coordination States’ include three states given here, where one of these states is ‘Coordinate State’.

2.4 (Coordination) Phases

There are six Phases given;

- Pre-Notify
- Negotiating
- Coordinating
- Transferring
- Backward-Coordinating
- Pre-Transferring

It is stated that only relevant States and Phases are given by the diagrams in [DOC 9694-2005-AIDC].

Note: The term ‘Coordination Phases’ is not same as the term ‘Phases’ of flight used in [G-AIDC-ICD (draft)].

These (Coordination) States and (Coordination) Phases are compared to the Flight States in [G-AIDC-ICD (draft)] (see Table below). In [DOC 9694-2005-AIDC], it is indicated that (Coordination) States and (Coordination) Phases are different, while there is only one category (Flight) ‘State’ in [G-AIDC-ICD (draft)]. Except ‘Pre-Notify’, all (Coordination) Phases are named with -ing like, in ‘Negotiating’. Differentiating Phase from State may be that Phase is in transient toward States, while State is at completion of an ATS-related function. There seems no benefit of such a differentiation since it adds complications for understanding and implementing AIDC, for instance, the ‘Negotiating’ phase occurs before completing Coordinate, while the ‘Negotiation’ dialogue occurs after Coordinate completed, as shown above.

It is puzzling that the ‘negotiating’ ATS-related function is missing in [G-AIDC-ICD (draft)] as shown above, but there are ‘Negotiating’, ‘Re-Negotiating’ and Backward- Re-Negotiating States in [G-AIDC-ICD (draft)].

There are similarities and slight differences between States/Phases names in two documents, while there are different States/Phases names, i.e. Re-Negotiating and Pre-Transferring. Also there is a difference in meanings of States/Phases although name is same. For instance, the terms ‘Negotiating’ and ‘Coordinating’ as State/Phase are used in both documents, but the meanings of such terms are different and the State Transitions are different.

The most significant difference conceptually is that States/Phases in [DOC 9694-2005-AIDC] are organized around Coordination, focused to the Dialogues between ATSU, while States in [G-AIDC-ICD (draft)] are organized around Flight. The Dialogue plays an important role in [DOC 9694-2005-AIDC].

	Phases (in[DOC 9694-2005-AIDC])	States (in[DOC 9694-2005-AIDC])	Flight States(in [G-AIDC-ICD (draft)])
1	Pre-Notify		Pre-Notifying
2		Notify	Notifying
3	Negotiating		Negotiating
4	Coordinating		Coordinating
5		Coordinate	Coordinated
6			Re-Negotiating
7	Transferring		Transferring
8		Transfer	Transferred
9			Backward- Re-Negotiating
10	Backward-Coordinating		
11	Pre-Transferring		

Flight States [G-AIDC-ICD(draft)] Appendix D – Implementation Guidance Material Table D-1

	Flight State	Description
1	Pre-Notifying	Flight plan information may have been received. Any previously received notification and coordination information for the given flight cancelled by a MAC is no longer relevant. The aircraft's progress is being monitored by one or more non-controlling ATSU, in addition to the controlling ATSU.
2	Notifying	
3	Negotiating	Coordination data is being exchange between the controlling ATSU and the receiving ATSU as part of the initial coordination dialogue.
4	Coordinating	Abbreviated coordination data has been sent to the receiving ATSU.
5	Coordinated	Coordination of the boundary crossing conditions is completed.
6	Re-Negotiating	Coordination data is being exchange between the controlling ATSU and the receiving ATSU as part of a later coordination dialogue.
7	Transferring	Air traffic control responsibility for the aircraft is in the process of being transferred to the receiving ATSU.
8	Transferred	Air traffic control responsibility for the aircraft has been transferred to the receiving ATSU.
9	Backward- Re-Negotiating	The aircraft is now under the control of the receiving ATSU, but still near the boundary. Changes are being proposed to the coordination conditions while the aircraft is still in the vicinity of the boundary

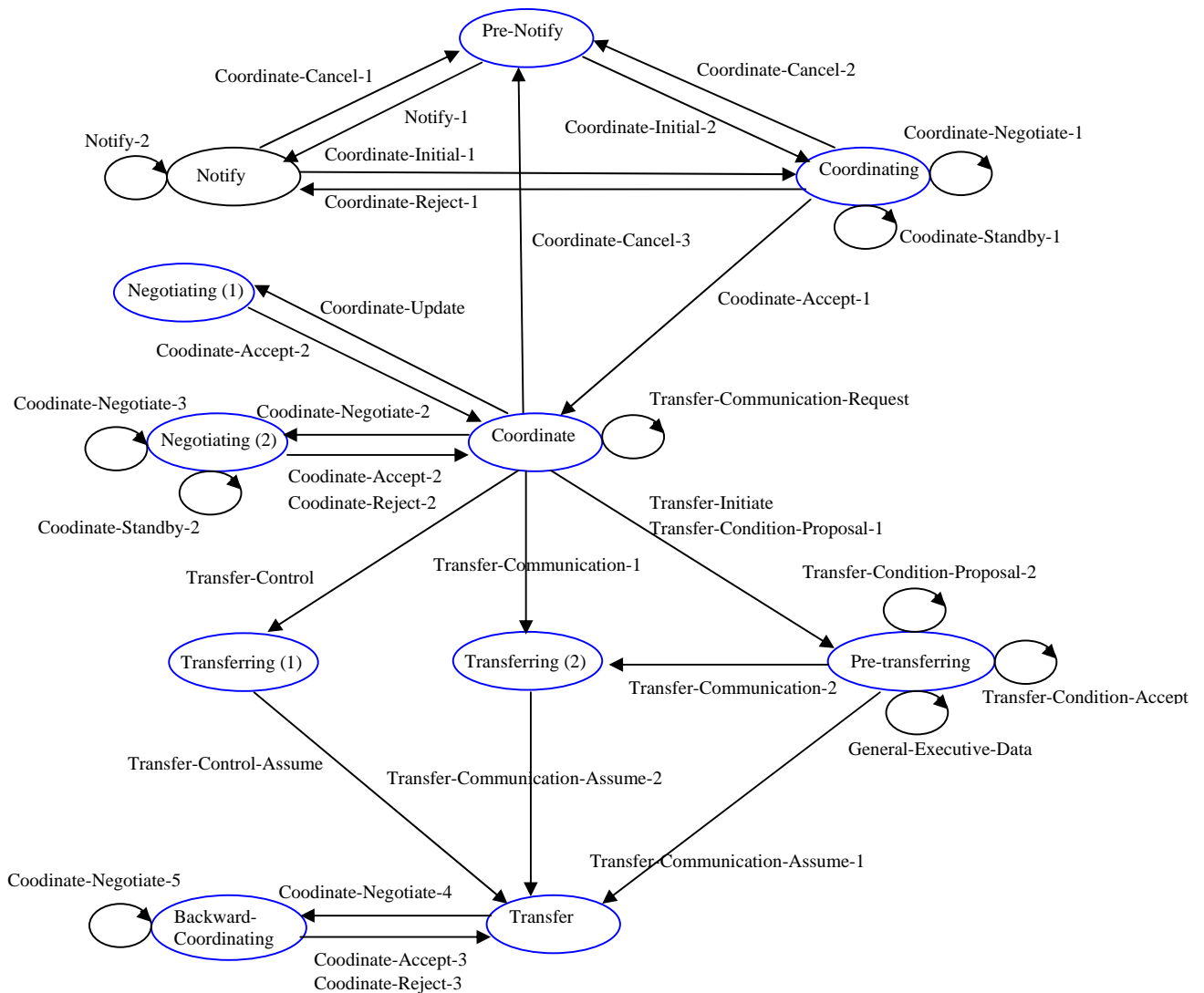
2.5 State Transitions

There are State Transitions given in form of diagrams, (Appendix A to the Chapter5), describing that .

- Coordination states^{Note} are shown as solid-lined ellipses
- Coordination phases^{Note} are shown as dash-lined ellipses
- Dashed lines show the path to the adjacent coordination states^{Note}
- Solid lines represent the state transition triggered by the associated AIDC message

Note: the term ‘Coordination States’ are not same as ‘Coordinate State’. The ‘Coordination States’ include the Notify, Coordinate, and Transfer states.

The details of State Transition will be studied further together with AIDC messages.



The diagram is a modification of 'Figure VI-5.6 Complete State Transition Diagram' in [DOC 9694-2005-AIDC]. The Coordination States and Coordination Phases are described without distinction.

The modifications are:

- (1) Naming each occurrence of same AIDC message by different one; e.g. Coordinate-Cancel-1, Coordinate-Cancel-2 and Coordinate-Cancel-3.
- (2) Naming each occurrence of same Coordination Phase name by different one, e.g. Negotiating (1) and Negotiating (2).
- (3) Adding 'Notify-2' message (missing in the original document).

2.6 Dialogues

There is another term 'Dialogue' used in Table VI-5-1 AIDC dialogue sequence of the document [DOC 9694-2005-AIDC].

	Dialogue [DOC 9694-2005-AIDC]	Associated AIDC messages
1	Initial notification	Notify
2	Notification	Notify
3	Notification cancellation	Coordinate Cancel
4	Initial coordination	Coordinate Initial Coordinate Standby Coordinate Accept Coordinate Negotiate Coordinate Reject
5	Re-coordination (1)	Coordinate Update Coordinate Accept
6	Re-coordination (2)	Coordinate Negotiate Coordinate Standby Coordinate Accept Coordinate Reject
7	Coordination cancellation	Coordinate Cancel
8	Negotiation	Transfer Conditions Proposal Transfer Conditions Accept
9	Transfer of control	Transfer Control Transfer Control Assume
10	Transfer of communications	Transfer Communication Transfer Communication Assume
11	Free text	Free Text General Free Text Emergency
12	Point-out	General Point
13	Executive information	Transfer Initiate

All AIDC messages, except Transfer Communication Request, Application Accept, and Application Error are in the Associated AIDC Message column of Table VI-5-1.

As described above, the Application Accept, and Application Error messages are not considered as a part of any Dialogue, that there would be no problem eliminating these messages from the Table.

There is a note on Transfer Communication Request message in [DOC 9694-2005-AIDC] as follows;

The receipt of a Transfer Communication Request message from the R-ATSU does not trigger the transition to the Pre-transferring phase. However it does trigger the transmission of a Transfer Initiate message which does initiate the transition to the transfer state.

The Transfer Communication Request message may be included in the 'Executive information' dialogue (row 13) in the Table.

The dialogues given in [G-AIDC-ICD (draft)] are compared to the dialogues in [DOC 9694-AIDC].

	Phases of Flight		Information received [G-AIDC-ICD (draft)]App. D,5.	Corresponding Dialogue in [DOC 9694-AIDC]
1	Notification Phase	1.1 ⁺	Notification Dialogue.	Notification Dialogue
		1.2	Re-Route Notification.	
		1.3	Route to Destination.	
		1.4	Notification Cancellation.	Notification Cancellation Dialogue
2	Coordination Phase	2.1 ⁺	Initial Coordination Dialogue.	Initial Coordination Dialogue.
		2.2	Abbreviated Initial Coordination Dialogue.	
		2.3 ⁺	Re-Negotiation Dialogue.	⁺⁺ Re-coordination (1) & (2) Dialogues
		2.4	Active CDN.	
		2.5	Cleared Flight Profile Update.	
		2.6	Coordination Cancellation.	Coordination Cancellation. Dialogue
		2.7	Coordination and the ACI.	
3	Transfer of Control Phase	3.1 ⁺	Transfer Dialogue.	⁺⁺ Transfer of control & Transfer of communications Dialogues
		3.2	Transfer of Control and the ACI.	

Note: In [G-AIDC-ICD (draft)] App. D, '5. Phases of Flight', three phases are described. In each phase, listed are 'information ATSU received' including five Dialogue names as marked⁺. The mark⁺⁺ indicates the similar dialogues. .

Remarks:

Since there are significant differences between two global documents, it is hard to establish a base line for implementation of the AIDC operations.

These differences should not be considered as regional adoption, since both documents are global in nature. The differences may come from the convenient descriptions as guidance, but the conceptual descriptions, such as ATS-related functions to be supported and Dialogues for AIDC message exchanges, should not be different as found above.

2.7 AIDC Message

There are AIDC messages described in both documents. The details will be discussed after Dialogue Sequences are studied.

3. Sequence of Dialogues and AIDC Message Sequence within each Dialogue

There are nine Dialogues identified in Table VI-5-1 AIDC dialogue sequence [DOC 9694-2005-AIDC] and Tables VI-5-2 through VI-5-14 show 'dialogue sequence' of nine dialogues. What each Table VI-5-2 to VI-5-14 actually shows is the AIDC message sequence of each dialogue, not the dialogue sequence as a whole. It is desirable to formulate Dialogues in such a way that whole AIDC is described using only Dialogues and possibly AIDC Messages defined in the Sequence of Dialogues.

3.1 Sequence of Dialogues

Note1: x in <x> form is a dialogue, y in <<y>> form is an AIDC message.

Note2: The message in front of a dialogue is a pre-fix of the dialogue and the message at the end is the post-fix of the dialogue. If the post-fix message of Dialogue A is same as the pre-fix message of Dialogue B, then Dialogue A can be followed by Dialogue B, not valid otherwise. If there is no prefix message at the front of dialogue, the dialogue can be initiated without any context. These prefix and post-fix messages are used as an initiator or terminator (connector) of dialogues, not a part of dialogue itself.

Note3: The underlined dialogues are the same dialogues described in [DOC 9694-2005-AIDC].

Note3: The mark * indicates the occurrence zero or more times, while the mark @ indicates the occurrence zero or once.

Dialogue-Sequence ::= <notification-Dialogue ><coordination-Dialogue ><transfer- Dialogue >

Remark: The whole dialogue starts at <notification-Dialogue > followed by <coordination-Dialogue >, and <transfer-Dialogue > in turn.

Notification Dialogue

<notification-Dialogue> ::= <notification-Dialogue-1>|
 <<Coordinate-Cancel-1>><notification-Dialogue-1>|
 <<Coordinate-Cancel-2>><notification-Dialogue-1>|
 <<Coordinate-Cancel-3>><notification-Dialogue-1>|
 <<Coordinate-Reject-1>><notification-Dialogue-2>

Remarks:

The <notification-Dialogue> starts

- (1) without prefix, followed by the <notification-Dialogue-1>
- (2) following after one of Coordinate-Cancel messages, then followed by the <notification-Dialogue-1> to repeat the <notification-Dialogue-1>, where there are three cases;
 - <<Coordinate-Cancel-1>> from [Notify] to{Pre-Notify}
 - <<Coordinate-Cancel-2>> from {Coordinating} to{Pre-Notify}
 - <<Coordinate-Cancel-3>> from [Coordinate] to{Pre-Notify}

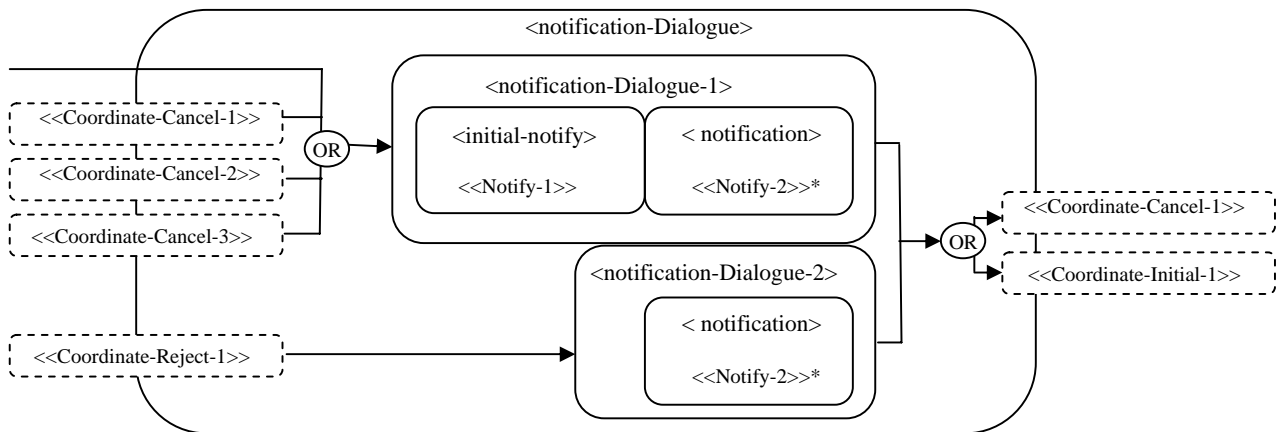
or

- (3) following after the <<Coordinate-Reject-1>>, then followed by <notification-Dialogue-2>, where <notification-Dialogue-2> is <notification>, i.e. <<Notify-2>>*

The <notification-Dialogue> terminates by either <<Coordinate-Cancel-1>> or <<Coordinate-Initial-1>> message.

<notification-Dialogue-1> ::= [<<Coordinate-Cancel-1>>|<<Coordinate-Cancel-2>>|<<Coordinate-Cancel-3>>]@
 <initial_notify><notification> [<<Coordinate-Cancel-1>>|<<Coordinate-Initial-1>>]
 <initial_notify> ::= <<Notify-1>>
 <notification> ::= <<Notify-2>>*

<notification-Dialogue-2> ::= <<Coordinate-Reject-1>><notification>
 [<<Coordinate-Cancel-1>>|<<Coordinate-Initial-1>>]



Coordination Dialogue

<coordination-Dialogue >::=[<<Coordinate-Initial-1>>|<<coordination-Initial-2>>]<coordination-Dialogue-1>

Remark: The coordination-Dialogue starts at either <<Coordinate-Initiate-1>> message, or <<Coordinate-Initiate-2>> message followed by <coordination-Dialogue-1> (see below)

<coordination-Dialogue-1>::= <initial-coordination><coordination-Dialogue-2>
 [<<Coordinate-Reject-1>>|<<Coordinate-Candel-2>>|<<Coordinate-Accept>><coordination-Dialogue-3>]

Remark: The coordination-Dialogue-1 starts at either

(1) <<Coordinate-Initial-1>> message or

(2) <<Coordinate-Initial-2>>message

and it is followed by

(1) <<Coordinate-Reject-1>> to repeat notification-Dialogue-2,

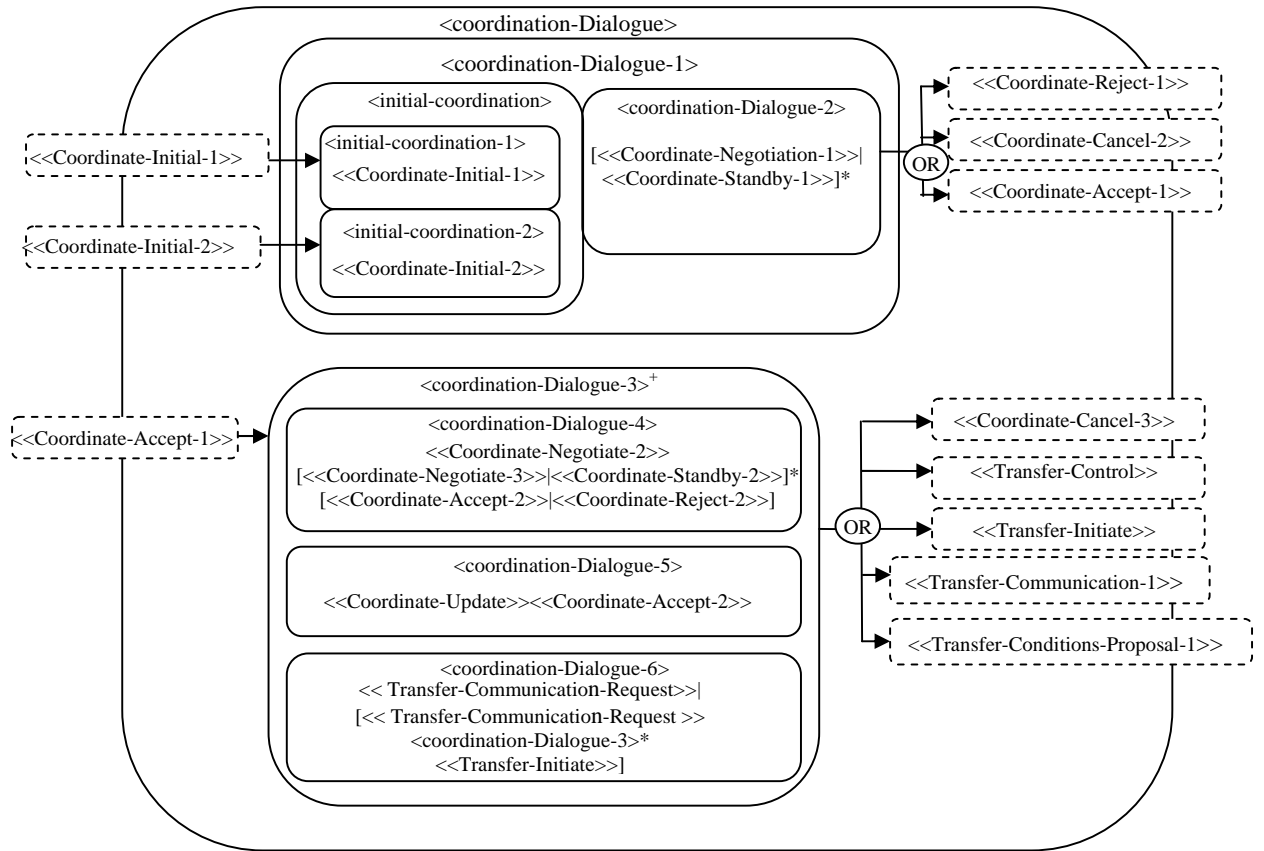
(2) <<Coordinate-Candel-2>> to repeat notification-Dialogue-1,or

(3) <<Coordinate-Accept>> to proceed to <coordination-Dialogue- 2> for completing of Coordination Dialogue.

<initial-coordination> ::= [<<Coordinate-Initial-1>>< initial-coordination-1>|
 <<Coordinate-Initial-2>>< initial-coordination-2>>]

<coordination-Dialogue- 2>::=[<<Coordinate-Negotiation-1>>|<<Coordinate-Standby-1>>]*

The mark * indicates the <coordination-Dialogue- 3> can be repeated zero or more times.



<coordination-Dialogue- 3>::=<<Coordinate-Accept>>[<coordination-Dialogue -4>|<coordination-Dialogue -5>|
 <coordination-Dialogue -6>]⁺ [<<Coordinate-Cancel-3>>|<<Transfer-Control>>|<<Transfer-
 Initiate>>|<<Transfer-Communication>>| <<Transfer-Conditions-Proposal>>]

Remark: The coordination-Dialogue-3 starts by <<Coordinate-Accept-1>> message, and is followed by

- (1) <<Coordinate-Cancel-3>> message to repeat notification-Dialogue-1,
- (2) <<Transfer-Control>>, <<Transfer-Initiate>>, <<Transfer-Communication>>, or
 <<Transfer-Conditions-Proposal>> message to proceed to Transfer Dialogue.

Remark: The mark + indicates the [<coordination-Dialogue -4>|<coordination-Dialogue -5>| <coordination-
 Dialogue -6>] can be repeated one or more times.

In order to draw diagram easier, the connector <<Coordinate-Accept-1>> is described as an inter-
 dialogue, instead both <coordination-Dialogue-2> and <coordination-Dialogue-3> are within the
 <coordination-Dialogue>.

<coordination-Dialogue-4>::=<<Coordinate-Negotiate-2>>[<<Coordinate-Negotiate-3>>|<<Coordinate-Standby-
 2>>]^{*}[<<Coordinate-Accept-2>>|<<Coordinate-Reject-2>>]

<coordination-Dialogue-5>::=<<Coordinate-Update>>|<<Coordinate-Accept-2>>

<coordination-Dialogue-6>::=<< Transfer-Communication-Request >>[<< Transfer-Communication-Request
 >>|<coordination-Dialogue- 3>]^{*}<<Transfer-Initiate>>]

Remark: In the <coordination-Dialogue-6> dialogue, the << Transfer-Communication-Request >> message can be
 repeated many times, but the message has to be followed by the <<Transfer-Initiate>>, if there is any <<
 Transfer-Communication-Request >> message previously in the <coordination-Dialogue-6>. In order to
 capture that meaning, the << Transfer-Communication-Request>> message may be sent repeatedly or the

message is followed by the <<Transfer-Initiate>> message to leave the <coordination-Dialogue> after some repeating <coordination-Dialogue-6>.

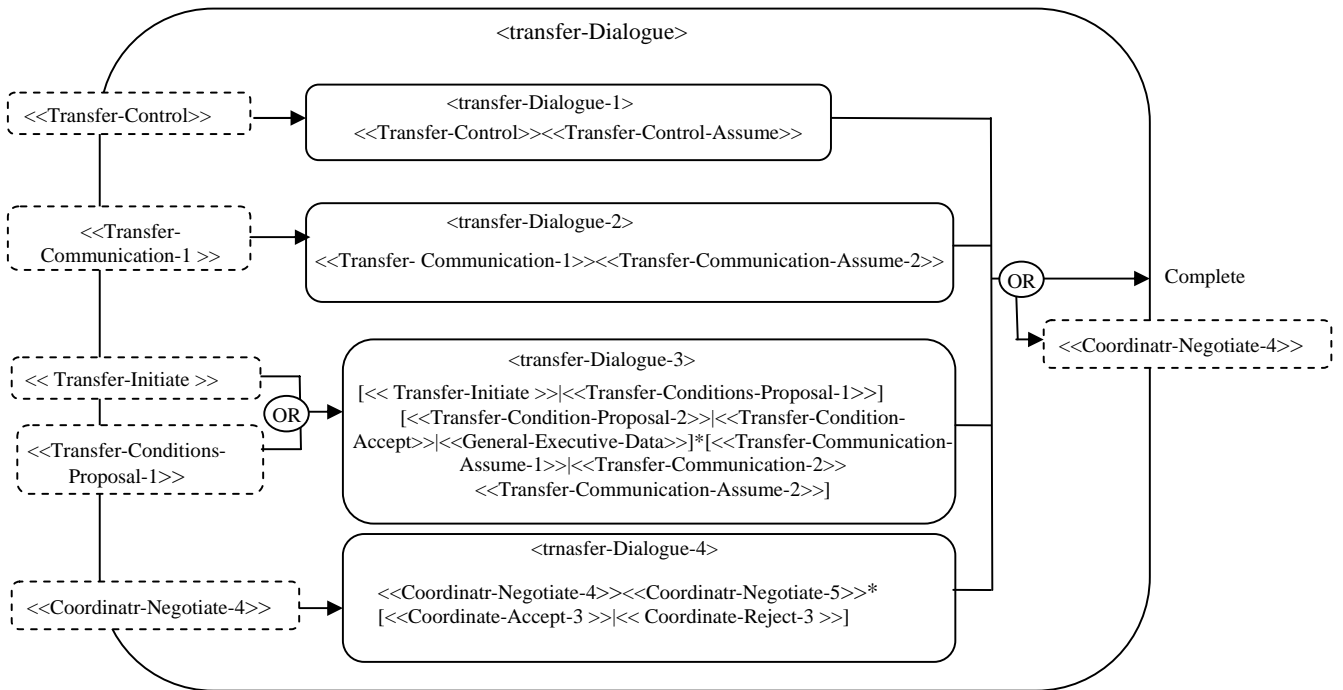
The <coordination-Dialogue- 7> dialogue is a terminating dialogue within <coordination-Dialogue> to keep descriptions consistent.

Transfer Dialogue

```

<transfer-Dialogue> ::= [<transfer-Dialogue-1>|<transfer-Dialogue-2>|<transfer-Dialogue-3>]<transfer-Dialogue-4>*
<transfer-Dialogue-1> ::= <<Transfer- Communication-1>><<Transfer-Communication-Assume-2>>
<transfer-Dialogue-2> ::= <<Transfer- Communication-1>><<Transfer-Communication-Assume-2>>
<transfer-Dialogue-3> ::= [<< Transfer-Initiate >>|<<Transfer-Conditions-Proposal-1>>][<<Transfer-Condition-Proposal-2>>| <<Transfer-Condition-Accept>>|<<General-Executive-Data>>]*[<<Transfer-Communication-Assume-1>>| <<Transfer-Communication-2>>|<<Transfer-Communication-Assume-2>>]
<transfer-Dialogue-4> ::= <<Coordinatr-Negotiate-4>><<Coordinatr-Negotiate-5>>*
[<<Coordinate-Accept-3 >>|<< Coordinate-Reject-3 >>]

```



Appendix-2 Study and Comments on Global AIDC ICD draft

References:

- [DOC 9694] Manual of Air Traffic Services Data Link Applications
- [DOC 9694-1996-AIDC] ICAO Manual of ATS Data Link Applications (Draft), Report to ADSP/4
- [DOC 9694-2005-AIDC] ICAO Manual of ATS Data Link Applications (Amendment Draft) OPLINKP/1-WP/33 Appendix K to the Report
- [G-AIDC-ICD (draft)] Global Interface Control Document (ICD) for ATS Inter-facility Data Communications (AIDC) Jan.2010

1. Introduction

This Appendix is to summarize a study on the document [G-AIDC-ICD (draft)].

2.Summary of AIDC described in [G-AIDC-ICD(draft)]

2.1 Flight States

The following table shows the flight states in the document [G-AIDC-ICD(draft)].

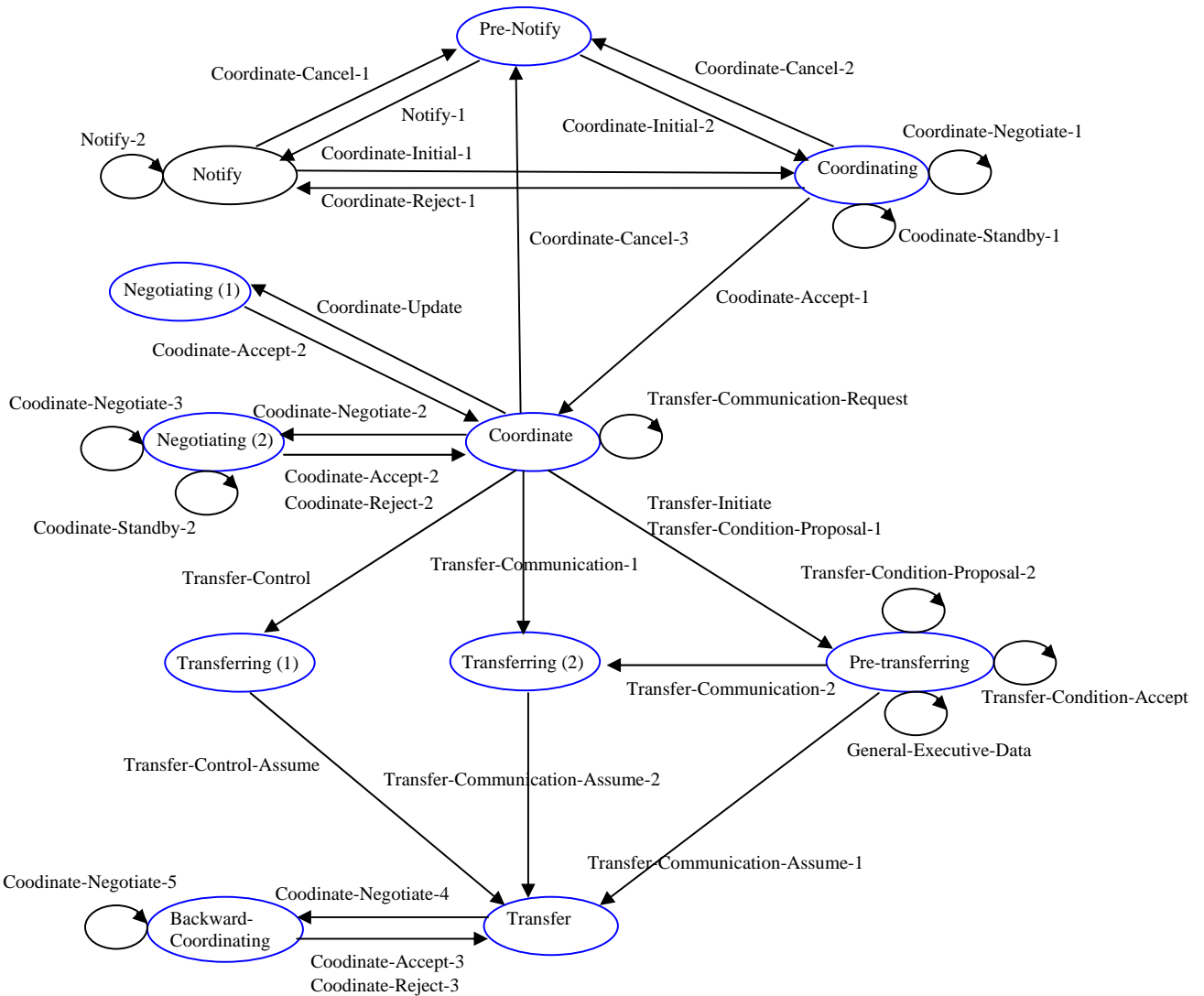
Flight States [G-AIDC-ICD(draft)] Appendix D – Implementation Guidance Material Table D-1)

	Flight State	Description
1	Pre-Notifying	Flight plan information may have been received. Any previously received notification and coordination information for the given flight cancelled by a MAC is no longer relevant. The aircraft's progress is being monitored by one or more non-controlling ATSUs, in addition to the controlling ATSU.
2	Notifying	
3	Negotiating	Coordination data is being exchange between the controlling ATSU and the receiving ATSU as part of the initial coordination dialogue.
4	Coordinating	Abbreviated coordination data has been sent to the receiving ATSU.
5	Coordinated	Coordination of the boundary crossing conditions is completed.
6	Re-Negotiating	Coordination data is being exchange between the controlling ATSU and the receiving ATSU as part of a later coordination dialogue.
7	Transferring	Air traffic control responsibility for the aircraft is in the process of being transferred to the receiving ATSU.
8	Transferred	Air traffic control responsibility for the aircraft has been transferred to the receiving ATSU.
9	Backward- Re-Negotiating	The aircraft is now under the control of the receiving ATSU, but still near the boundary. Changes are being proposed to the coordination conditions while the aircraft is still in the vicinity of the boundary

2.2 State Transitions

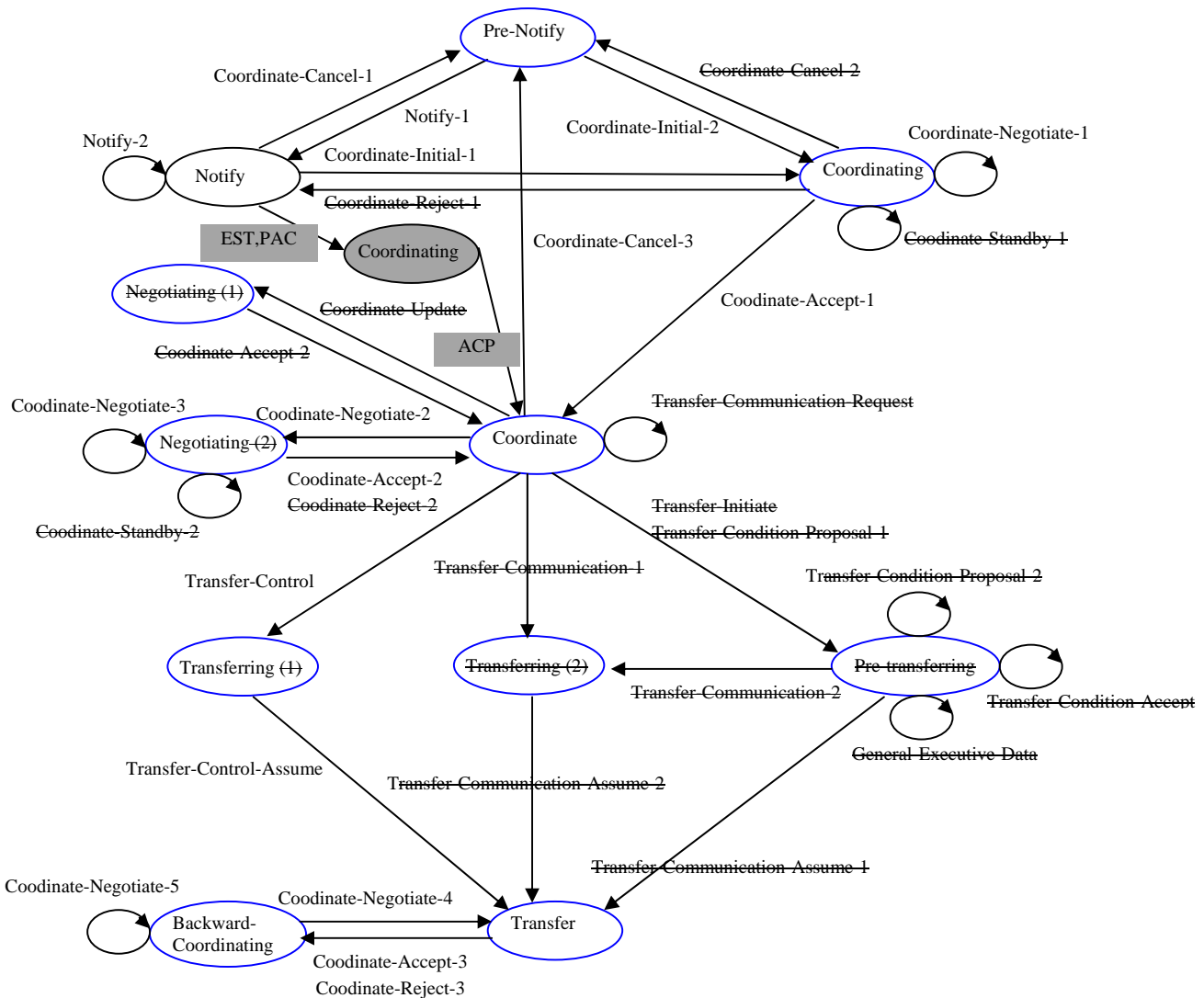
In order to compare the State Transition in [G-AIDC-ICD (draft)] with the State Transition in [DOC 9694-2005-AIDC], the latter is given in section 2.2.1 with slight modifications, uniquely numbered States and AIDC messages where multiple occurrences are depicted.

2.2.1 State Transitions [DOC 9694-2005-AIDC]



2.2.2 State and State Transition in [G-AIDC-ICD (draft)]

In [G-AIDC-ICD (draft)], there are two state transition diagrams; Figure D-1, and Figure D-2 (a state transition from Pre-Notifying to Negotiating by CPL is in Figure D-2, that is, a state transition from Pre-Notify to Coordinating by Coordinate-Initial-2 is in the diagram below). Since Figure D-2 is not referred in the text of [G-AIDC-ICD (draft)], Figure D-1 is used for study.



The State Transition diagram is compared with the State Transition diagram given in [DOC 9694-2005-AIDC]. There are some eliminated States and State Transitions, while one State and associated State Transition are added in [G-AIDC-ICD (draft)].

States in [DOC 9694-2005-AIDC] and [G-AIDC-ICD (draft)] compared

	State/Phase (in[DOC 9694-2005-AIDC])	Flight States(in [G-AIDC-ICD (draft)])	Remarks on [G-AIDC-ICD (draft)]
1	Pre-Notify	Pre-Notifying	Name of State is changed.
2	Notify	Notifying	Name of State is changed.
3	Coordinating	Negotiating	Coordinate-Standby-1 message is not used. Coordinate-Cancel-2 message is not used to transit toward Pre-Notifying state.
4	none	Coordinating	EST, PAC messages are used for a transition from Notifying to Coordinating and ACP message (missing in Figure D-1, but described in the text) is used for a transition from Coordinating to Coordinated. Note the names of state are different in two documents.
5	Negotiating(1)	none	Coordinate-Update message is not used
6	Negotiating(2)	Re-Negotiating	There is no Coordinate-Standby-1message is used.
7	Coordinate	Coordinated	
8	Transferring(1)	Transferring	Only one Transferring State in [G-AIDC-ICD (draft)]
9	Transferring(2)	none	
10	Transfer	Transferred	
11	Backward-Coordinating	Backward- Re-Negotiating	Naming of State is changed.
12	Pre-Transferring	none	

It is not clear how such differences might impact the ICD as a standard.

Also a comparison is made between two documents on AIDC messages used for State Transitions.

Compared AIDC Messages for State Transition used in [DOC 9694-2005-AIDC] with in [G-AIDC-ICD (draft)]

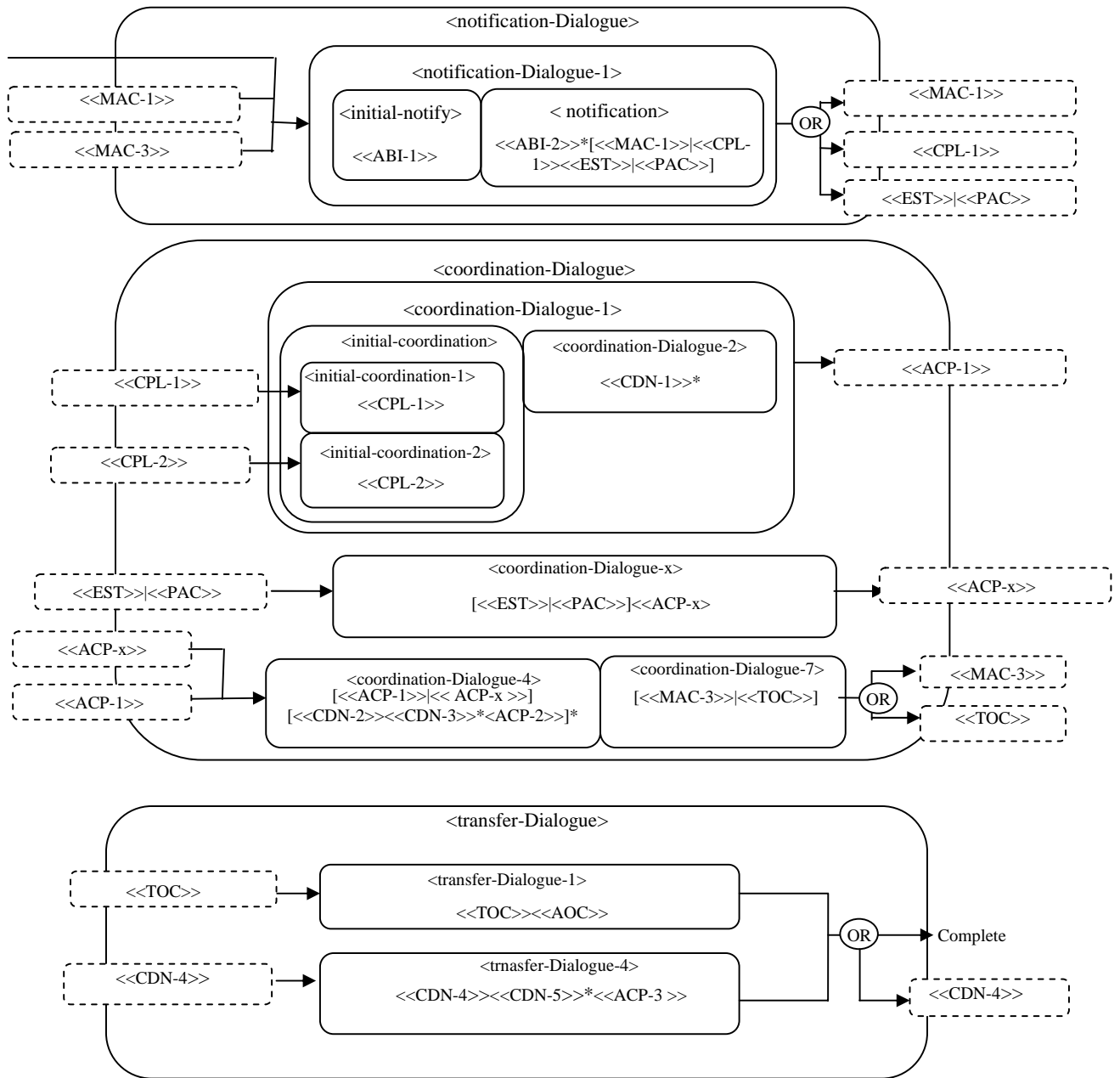
	[DOC 9694-2005-AIDC]	[G-AIDC-ICD (draft)]	Remarks
1	Notify-1	ABI-1	
2	Notify-2	ABI-2	
3	Coordinate-Cancel-1	MAC-1	
4	Coordinate-Initial-1	CPL-1	
5	Coordinate-Reject-1	none	
6	Coordinate-Initial-2	There is no equivalent in Figure D-1	CPL is used in Figure D-2
7	Coordinate-Cancel-2	none	
8	Coordinate-Negotiate-1	CDN-1	
9	Coordinate-Stanby-1	none	
10	Coordinate-Accept-1	ACP-1	
11	Coordinate-Update	none	
12	Coordinate-Accept-2	none	
13	Transfer-Communication-Request	none	
14	Coordinate-Negotiate-2	CDN-2	
15	Coordinate-Negotiate-3	CDN-3	
16	Coordinate-Stanby-2	none	
17	Coordinate-Accept-2	ACP-2	
18	Coordinate-Reject-2	REJ-2	
19	Coordinate-Cancel-3	MAC-3	
20	Transfer-Control	TOC	
21	Transfer-Control-Assume	AOC	
22	Transfer-Initiate	none	
23	Transfer-Condition-Proposal-1	none	
24	Transfer-Condition-Proposal-2	none	
25	Transfer-Condition-Accept	none	
26	General-Executive-Data	none	
27	Transfer-Communication-1	none	
28	Transfer-Communication-2	none	
29	Transfer-Communication-Assume-1	none	
30	Transfer-Communication-Assume-2	none	
31	Coordinate-Negotiate-4	CDN-4	
32	Coordinate-Negotiate-4	CDN-4	
33	Coordinate-Accept-3	ACP-3	
34	Coordinate-Reject-3	REJ-3	

As shown above, there are considerable differences between two documents, on States and AIDC messages used for State Transitions. This document is not intended to discuss the impacts of these differences on the ICD.

3. Sequence of Dialogues and AIDC Message Sequence within each Dialogue [G-AIDC-ICD (draft)]

Here the Sequence of Dialogues and the AIDC Message Sequence within each Dialogue [G-AIDC-ICD (draft)] are shown as a diagram, replacing the [DOC 9694-2005-AIDC] AIDC messages by the [G-AIDC-ICD (draft)] AIDC messages.

	[DOC 9694-2005-AIDC]	[G-AIDC-ICD (draft)]
1	Notify-1	ABI-1
2	Notify-2	ABI-2
3	Coordinate-Cancel-1	MAC-1
4	Coordinate-Initial-1	CPL-1
5	Coordinate-Negotiate-1	CDN-1
6	Coordinate-Accept-1	ACP-1
7	Coordinate-Negotiate-2	CDN-2
8	Coordinate-Negotiate-3	CDN-3
9	Coordinate-Accept-2	ACP-2
10	Coordinate-Reject-2	REJ-2
11	Coordinate-Cancel-3	MAC-3
12	Transfer-Control	TOC
13	Transfer-Control-Assume	AOC
14	Coordinate-Negotiate-4	CDN-4
15	Coordinate-Negotiate-4	CDN-4
16	Coordinate-Accept-3	ACP-3
17	Coordinate-Reject-3	REJ-3



4. Document Structure [G-AIDC-ICD (draft)]

Here the Table of Contents [G-AIDC-ICD (draft)] is given in the following table.

Table of Contents [G-AIDC-ICD (draft)]

Part	Chapter	Section	Title	
I			Purpose, Scope and Units of Measurement	
		1	Purpose	
		2	Scope	
		3	Policy	
		4	Units of Measurement	
			<i>Block level information</i>	
			<i>Speed and Mach Number Technique information</i>	
			<i>Offset and weather deviation information</i>	
			<i>Functional addresses</i>	
		5	Restriction Formats	
			<i>Level and speed restriction</i>	
			<i>Time restriction</i>	
			<i>Coordination and the further route of flight</i>	
			<i>Field 3 Requirements</i>	
	6	Boundary Positions in Messages		
II			Communications and Support Mechanisms	
		1	Introduction	
		2	Message Header, Timers and ATSU Indicators	
			Message Headers	
			Timers	
		3	Engineering considerations	
			<i>Performance Criteria</i>	
			<i>Response Time</i>	
			<i>Availability / Reliability</i>	
			<i>Capacity and Growth</i>	
			<i>Table 1. Expected Message Rates and Sizes</i>	
		4	Recording of AIDC Data	
		5	Associated Automation Functionality	
			<i>The supporting automation shall: a,b,c,d</i>	
		6	<i>Failure and Recovery Solutions</i>	
		7	<i>Data Requirements</i>	
			<i>Table 2. Summary of Data Definitions Needed to Support the Interface</i>	
		8	<i>Security Considerations</i>	
			<i>Privacy</i>	
			<i>Access Control</i>	
		9	<i>Test Considerations</i>	
		App-A	ATS Coordination Messages	
			1	Introduction
			2	Message Group
				<i>Notification messages (ABI)</i>
				<i>Coordination messages (CPL) (EST) (PAC) (MAC) (CDN/MOD) (ACP)</i>
			<i>Transfer of control messages (TOC) (AOC)</i>	
			<i>General information messages (EMG) (MIS) (TDM) (NAT)</i>	
			<i>NAT Structured Text Format</i>	
			<i>Application Management Messages (LAM) (LRM) (ASM) (FAN) (FCN)</i>	
			<i>Surveillance Data Transfer Service Messages (TRU) (ADS)</i>	
			<i>Radar Handover Messages (RTI)</i>	
	App-B		Error Codes(65)	
	App-C		ATM Application Naming Conventions	
	App-D		Implementation Guidance Material	
		1	Introduction	
		2	Preliminaries	
		3	Response Messages	
		4	Application Management	
		5	Phases of Flight	
		6	Flight State Transition	
		7	Message Sequencing	
		8	Other Messages	
		9	Examples	

5. Identifying the Normative Description in the Document

5.1 Shall Statements in the Document

In a standard like the AIDC ICD, it is important to indicate what is the normative of the standard. The normative description shall be stated using ‘shall’. If it is not a normative, then ‘may’ or ‘can’ be used.

In [G-AIDC-ICD (draft)], there are 101 shall statements. Among them, 34 of them are in Appendix D. The Appendix D is titled ‘Implementation Guidance Material’. Since normally implementation guidance materials shall not be a part of standard, it implies that the descriptions in the Appendix D shall not be a part of standard.

If a normative statement is given using a shall, it is important to ensure that such a shall statement gives an unambiguous and concrete implemented products description, whatever the ways to implement such products, so that anyone including implementers can clearly judge whether such products are complied with the shall statement or not.

In another word, the ICD shall describe normative statements for unambiguous and concrete implementation descriptions without restricting ways to implement the products.

The following table shows all shall statements in [G-AIDC-ICD (draft)] except in Appendix D.

Normative Descriptions (‘shall’ statement sentences) in [G-AIDC-ICD (draft)]

No		Line	Text
1	I/3 Policy/3.1	1	The application of AIDC shall be based on a step-by-step data distribution scheme
2	3.3	1	The capability to revert to manual coordination shall be retained
3	3.4	1	Flight plans shall continue to be filed in accordance with existing procedures
4	4 Unit of Measurement/4.2	1	Data conventions shall be in accordance with PANS-ATM Appendix 3
5	4.3	2	Where a vertical range of levels is used, it shall be specified as a lower level followed by the upper level.
6	4.6	2	The boundary estimate may contain additional clearance information describing a Mach Number that has been assigned to an aircraft. This information shall contain a single character providing advice as to
7	4.10	2	The boundary estimate may contain additional clearance information describing an offset or weather deviation that has been issued to an aircraft. This information shall contain:
8	4.13	1	When an aircraft is offsetting or deviating, the coordination point shall be the coordination point based on the nominal route rather than the offset route.
9	4.14	1	When an aircraft is offsetting or deviating, the coordination point shall be the coordination point based on the nominal route rather than the offset route.
10	5 Restriction Formats/5.1	1	Use of restrictions is not mandatory. If they are used, the following convention shall be used.
11	5.10	1	The use of time restrictions shall be bilaterally agreed between ATS providers.
12	5.11	1	Field 15 shall include subfields 15a, 15b and 15c.
13	5.11	1	It shall describe the cleared route, beginning with the last route point preceding the coordination point.
14	5.11	3	it shall contain the first route point in the adjacent ATSU’s airspace.
15	5.11	5	the truncation indicator shall appear after the last known cleared route point.
16	5.12	1	All messages shall use Field 3a only.
17	6Boundary Position in Messages/6.1	2	the previous route point shall be substituted as the boundary position
18	II Communication and Support Mechanism/1 Introduction/1.4	1	The IA-5 character set shall be used for all application message content.
19	1.4 a)	1	Open parenthesis “(”and close parenthesis “)” shall be used only to
20	1.4 b)	1	A single hyphen “-” shall be used only
21	1.4 b)	1	shall not be used within
22	2 Messages,..../2.1	3	FF shall normally be used for
23	2.6	5	the message/data identification parameter shall not be used.
24	2.7	7	the message/data identification parameter shall not be used.
25	2.9	4	carriage returns shall be excluded from the CRC
26	2.11	3	The default value for this timer nominally shall be three minutes.
27	2.11	4	the initiating processor shall retransmit the message/data unit a
28	2.11	6	The accountability timer shall be cancelled
29	2.12	2	Reuse timer A shall be set for
30	2.12	3	reuse timer A shall be from 1 to 30 minutes
31	2.12	4	for reuse timer A shall be 5 minutes, or
32	2.12	5	Reuse timer B shall be set for
33	2.12	6	for reuse timer B shall be 2 to 90 minutes,
34	2.12	7	reuse timer B shall be 10 minutes,
35	3 Response Time/3.6	3	until an LAM (or LRM) is received shall be under 60 seconds at least 99% of the time under normal operations

36	3.7	3	Communication across the interface shall be less than 6 seconds
37	3.9	2	an analysis of the traffic expected between the centers shall be performed
38	3.11	1	for the interfaces shall be capable of asynchronously exchanging the
39	4 Recording of AIDC Data/4.1	1	The contents and time stamps of all AIDC messages shall be recorded
40	4.2	1	Facilities shall be available for
41	5 Associated Automation F/5.1	2	The supporting automation shall a,b,c,d
42	6 Failure and Recovery/6.1	2	Each participating system shall have the following a,b,c
43	6.1 c	1	The recovery process shall not automatically
44	8 Security/8.3	1	Each system shall authenticate that messages received
45	8.4	1	Each system participating in the interface shall implement eligibility checks
46	9 Test/9.1	2	The following set of tests shall be completed: a,b,c
47	App A/1 Introduction/1.roup/1	4	All ATS data shall be enclosed between parentheses
48	1.1	5	Only one ATS message shall be included within a transmission
49	2 Message Group/2.2	2	(ABI) shall be transmitted at a bilaterally agreed time or position
50	2.2	3	Changes to a previously transmitted ABI shall be communicated by means of
51	2.2		(ABI)Field 22 shall contain as a minimum the following fields
52	2.2		(ABI)18 Other information. Note that this field shall contain information
53	2.4	3	An ACP message shall be transmitted
54	2.5(PAC)		18 Other information. Note that this field shall contain information
55	2.13(EMG)	4	a functional address shall be used
56	2.14(MIS)	5	a functional address shall be used
57	2.18(2.17-2.23 NAT)		No control character shall be inserted
58	2.27(FAN)	3	the CPDLC application version number shall be transmitted as
59-	App D – Implementation Guidance Materials/2.2		Every message transmitted shall contain an AFTN header,

5.2 Discussions on normative statements.

- (1) A general and important comment is that the ICD does not clearly distinguish between normative and informative(not normative). If all descriptions within the document except guidance materials are considered to be normative, then there is a problem to identify the normative statements, since there are many shalls in the guidance materials and some statements other than guidance materials are ambiguous and unclear statements.

In the following descriptions, such statements are studied in detail.

- (2) No.1 shall in the ‘Policy’ chapter in Part I.

The shall statement is as follows;

The application of AIDC shall be based on a step-by-step data distribution scheme

There are two questions on this shall statement.

- a) Shall or can any statements related to ‘policy’ be in the ICD?

It is desirable to have a policy for implementation, but it is not clear how a policy plays any role in the standard, especially at the Interface in case of AIDC ICD. Whatever the policy might be, any standards shall give descriptions on the implementations, e.g. some implemented outcomes based on the policy if there are any, not on the policy for implementations.

b) Assuming that shall statement is accepted as a part of ICD, how the application of implemented AIDC can be judged whether it comply with the statement or not, in such a way that it is based on a step-by-step data distribution scheme? There are further questions on this shall statement.

b-1) What is meant by ‘a step-by-step data distribution scheme’? It says ‘a scheme’, not ‘the scheme’. Does it say that any scheme is acceptable as a part of standard?

b-2) Assuming the statement is accepted, what is the implication of the statement to the implementation at the AIDC interface?

Since there is no answer to such questions, there is no way to implement, hence comply with anything stated in the sentence.

- (3) No.2 shall in the ‘Policy’ chapter in Part I

The shall statement is as follows;

The capability to revert to manual coordination shall be retained

Again there is a question to ask;

- a) What is the precise capability as a part of ICD?

It is not appropriate to use the term ‘capability’ without clearly stating the meanings of the term.

Is there any AIDC message to be sent when the automated procedure reverts to manual coordination? If there is one, it should be shown that the capability is to be implemented using the AIDC message.

- (4) No.3 shall in the 'Policy' chapter in Part I

The shall statement is as follows;

Flight plans shall continue to be filed in accordance with existing procedures

Shall the capability to continuously file the flight plan be a part of AIDC standard? Since there is an AIDC message CPL to update Flight plan, it is sufficient to provide a description of CPL in the AIDC message list. The statement on 'continuous filing' is not necessary. The statement is related to the AIDC operation how it is used. Is it adequate to include such operational descriptions in the ICD?

- (5) No.4 to no.9 shall in the 'Policy' chapter in Part I

They are related to the Unit of Measurement. It is appropriate to use shalls, but it is not clear that they cover all cases.

- (6) No.10 shall in the 'Policy' chapter in Part I

The shall statement is as follows;

Use of restrictions is not mandatory. If they are used, the following convention shall be used.

It says that 'use of restrictions is not mandatory', but it shall be used the following convention, if they are used. It is understandable to use a shall, but use of restrictions is not mandatory, hence it shall not use the word 'shall' for 'use of restrictions'.

No.11 to no. 16 shall in the 'Policy' chapter in Part I are related to 'use of restrictions', hence it shall not use the word 'shall' for 'use of restrictions' by same reason.

- (7) No.11 shall in the 'Policy' chapter in Part I

The use of time restrictions shall be bilaterally agreed between ATS providers.

Usually the bilateral agreement itself is not considered as a part of standard. Shall the bilateral agreement on non-mandatory e.g. 'use of restrictions' be a part of standard described by using shall?

- (8) No.22 shall in Part II

FF shall normally be used for

It says 'shall normally'. If the usage of FF is mandatory, why does it use the word 'normally'? It shall be simply, 'FF shall be used for'. If there are any exceptions to use FF, then it is not going to be a shall.

- (9) In the [G-AIDC-ICD(draft)]Part II , it is assumed that the AFTN communication network is used as the communication infrastructure.

2.1 The AFTN IA-5 Message Header, including the use of the Optional Data Field defined in ICAO Annex 10, Vol II and herein, will be employed for the exchange of all ATS data. The AFTN priority indicator FF shall normally be used for all data exchanges.

The expressions '*The AFTN IA-5 Message Header will be employed*' and '*The AFTN priority indicator FF shall normally be used*' are not an appropriate wording for the ICD, since the wording 'will be employed' does not help for implementation.

Moreover it is indicated in section 2.2 that;

Option 1 has already been allocated for additional addressing use, and will be found in ICAO Annex 10, Vol II in due course. Option numbers 2 and 3 have been defined for computer applications to convey message/data unit identification and message/data unit reference information, respectively, and are adopted in this ICD.

The expression gives the uncertainty in the descriptions of the document, whether they are truly reliable or not. The expressions indicate that the ODF is not officially included currently in the ICAO Annex 10, Vol II, and in the past at the ATNP-3 meeting , the adoption of the ODF was rejected because of the extensive update was not necessary for the AFTN. Moreover there are following descriptions in the Introduction in Part II;

1.2 Existing wide-area networks (e.g. X.25 packet-switched network) may be used if the speed, capacity, and security characteristics are verified as adequate to support the interface.

1.3 In cases where speed, capacity, and/or security require it, a direct line interface may be used between facilities.

There are alternatives for some portions of the ICD descriptions. Since (a) the actual implementation of the AIDC over the AFTN network and (b) the ODF adoption for the implementation can be considered at the last stage of implementation, the discussions and consideration on (a) and (b) above are left open in the document.

(10) No.26 to no.37 shall in Part II

No. 26-37 shall be related to timer and time performance. There are specific values given in these statements. These values have to be examined further.

For instance, no. 36, it says;

Communication across the interface shall be less than 6 seconds

Logically speaking, there is not delay of communication across the interface. There is a delay between physical interfaces of implemented AIDC. It is not clear which part of communication shall take less than 6 seconds. Moreover, it is not possible to detect how many seconds any communication taking place if it is one-way transmission of AIDC message, especially using the store-and-forward scheme, like the AFTN, since there is no way to know the time when an AIDC message sent reaches to the other side. Also there is no way to guarantee the time requirement mentioned, by using the store-and-forward scheme. Besides, it is questionable to require the communication, whatever it is, to be less than 6 seconds always.

No. 37, it says,

an analysis of the traffic expected between the centers shall be performed

It is desirable to conduct the traffic analysis between two centers. Is it related to the ICD or something related to the exchanges of AIDC messages?

Other shall be left for further studies. It is obvious that there are many questions remained to be clarified.