INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PACIFIC
INTERFACE CONTROL DOCUMENT
FOR AERONAUTICAL TELECOMMUNICATION NETWORK
GROUND-GROUND ROUTER

Second Edition – April 2005

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The Aeronautical Telecommunication Network (ATN) is a global inter-network that provides digital communications to satisfy the increasing telecommunication demands of air traffic service communication, aeronautical operational control, aeronautical administrative communication, and aeronautical passenger communication.

The ATN is composed of a network infrastructure and applications that provide the global communication for ground-ground (G/G) and air-ground services. The ATN network infrastructure includes ATN backbone communication links, ATN routers, and end systems. The ATN applications include among others context management (CM), controller-pilot data link communication (CPDLC) and air traffic service message handling service (ATSMHS).

The Asia/Pacific region is implementing an ATN network to support regional and global ATN services. This Interface Control Document (ICD) specifies the interface requirements for the ATN Internet Communication Service (ICS) routed and routeing protocols of the ATN G/G Boundary Intermediate Systems that form nodes of the Asia/Pacific ATN regional backbone network and/or have inter-State connectivity, to ensure interoperability between States. Interface Control Documents (ICDs) for sub-networks are provided in separate documents.

1. Introduction

1.1. Purpose and Scope

This document provides Interface Control Document guidelines for the boundary intermediate systems that form nodes of the Asia/Pacific regional network Backbone and/or have inter-State/organization connectivity within the Asia/Pacific region, to assure interoperability.

The scope of this ICD and its relationship to sub-network ICDs is shown in Figure 1-1. This ICD addresses the upper sub-layer of the network layer of the ATN G/G router using the International Organization for Standardization (ISO) Information Processing Systems Open Systems Interconnection (OSI) Basic Reference Model. These ICD guideline provisions comprise G/G router functional requirements associated with ATN Protocol Requirements Lists (APRLs) relevant to the ATN Internet Communication Service (ICS) routed protocol (ISO/IEC 8473-1 CLNP) and routeing protocol (ISO/IEC 10747 IDRP). This document is based on ICAO Doc. 9705 Edition 2. The paragraph numbers in the APRLs are referred to ICAO Doc. 9705 Edition 3.

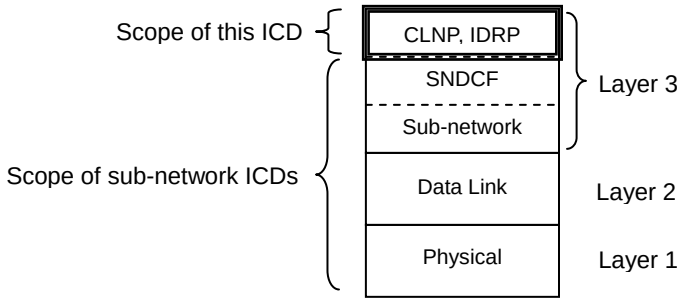

Figure 1-1: BIS Protocol Stack and Scope of this Document

1.2. ATN Documentation Tree and Reference Documents

1.2.1 ATN Documentation Tree

Figure 1-2 shows the ATN documentation tree for the Asia/Pacific ATN documents. This figure provides a hierarchical representation of the relationship between the various ICAO ATN documents and Asia/Pacific regional ATN router ICD. From this documentation tree, the relationship between this ICD and other documents is clearly defined.

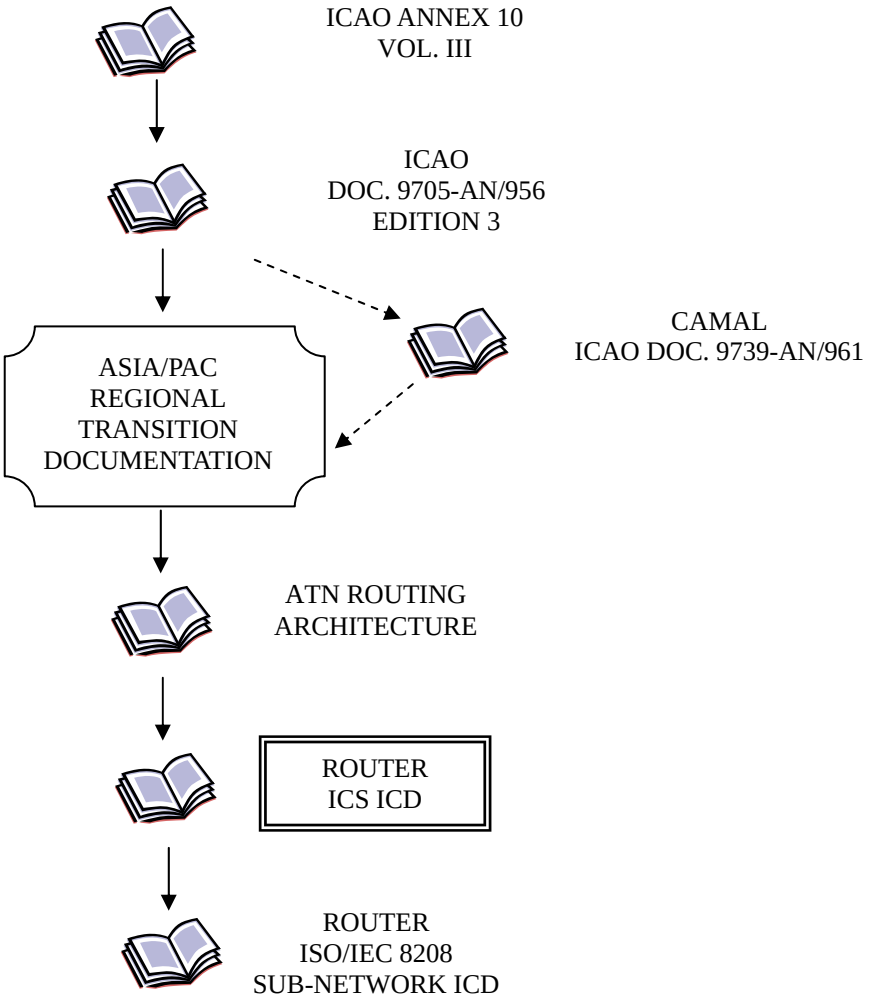

Figure 1-2: ATN Documentation Tree

1.2.2 Documents

1.2.2.1. Applicable Documents

The following documents, with specific editions and/or versions, contain requirements which, through reference in this text, constitute requirements of this document. The requirements for the Asia/Pacific Regional Router ICD for ATN G/G Router are found in the following documents:

1. ICAO Doc. 9705-AN/956 Manual of Technical Provisions for the Aeronautical Telecommunication Network, Edition 3 – 2001, sub-volume V.
2. ISO/IEC 10747: 1994 Information Technology – Telecommunications and Information Exchange between Systems – Protocol for exchange of inter-domain routing information among intermediate systems to support forwarding of ISO 8473 PDUs.
3. ISO/IEC 8473-1: 1994 Information Technology – Protocol for providing the connectionless-mode network service Part 1 – Protocol Specification.
4. Asia/Pacific ATN Addressing Plan.
5. Asia/Pacific ATN IDRP Routing Policy.
6. Table CNS-1B of the Asia/Pacific FASID.

1.2.2.2. Supporting Documents

The following documents are supporting documents applicable to the Asia/Pacific Regional Router ICD for ATN G/G Router. These documents do not form a part of this ICD and are not referenced within the document, however, these documents provide supporting background information for better understanding of this ICD.

1. ICAO Annex 10 – Volumes I and II, Fifth Edition, Incorporating Amendment 70.
2. ISO/IEC TR 9575:1995 Information Technology – Telecommunications and Information Exchange between Systems – OSI Routing Framework.
3. Asia/Pacific ATN Routing Architecture.

1.3. APRL Nomenclature

The APRLs in this document use the following conventions and symbols:

M	[M]andatory - the capability must be supported
MO	Mandatory to implement but optional for use
O	[O]ptional - The capability may optionally be supported
O.<n>	[O]ptional, but support of at least one of the group of options labelled by the numeral <n> is required
X or P	prohibited/precluded - i.e. the capability must not be supported.
OX or OP	Optional to implement but precluded for use
<pred>:	Condition item symbol, including predicate identification
^	Logical negation, applied to a condition item's predicate
<r>	Receive aspects of an item
<s>	Send aspects of an item
Y	[Y]es, indicates that an implementation must support the item
N	[N]o, indicates that there is no requirement for the an implementation

2. Network Layer (Layer 3)

The third sub-layer of the Network Layer includes the connectionless network protocol (CLNP) and inter-domain routeing protocol (IDRP), which respectively comply with ISO/IEC 8473-1 and ISO/IEC 10747, with specific requirements defined by ICAO Doc. 9705.

2.1. Connectionless Network Protocol (CLNP)

The G/G router interprets the CLNP protocol data unit (PDU) header and forwards the PDU to another G/G router without flow control or connection setup. The CLNP protocol functions shall be as specified in ISO/IEC 8473-1 and sections 5.6.2 and 5.6.3 of ICAO Doc. 9705 in accordance with the APRLs in Appendix A.

2.2. Inter-Domain Routing Protocol (IDRP)

The IDRP protocol function shall be specified as in ISO/IEC 10747 in accordance with APRLs in Appendix B.

APPENDIX A - CLNP APRLs

A.0 CLNP APRLs

This appendix provides CLNP APRLs for ATN G/G router. The APRLs define the capabilities and options of the protocol that, at minimum, are required to be implemented for the ATN G/G router for ICAO Asia/Pacific regional ATN.

A.1 Support of ATN-Specific Network Layer Features

Table A-1 provides the requirements for CLNP network layer features.

Table A-1: Support of ATN-specific network layer features

Index	Item	Doc 9705 Ref.	ATN Support	G/G Router Support
ATN CLNP1	Encoding and use of the Security Parameter	5.6.2.2	M	Y
ATN CLNP2	Management of Network Priority	5.6.2.3, 5.2.8.4	M	Y
ATN CLNP4	Echo Request Function	5.6.3.3	O	Y
ATN CLNP5	Congestion Management	5.6.2.4	M	N, O
ATN CLNP6	Echo Response Function	5.6.3.4.1	M	Y
ATN CLNP7	Echo Response parameter setting	5.6.3.4.2, 5.6.3.4.3, 5.6.3.4.4	M	Y

A.2 Major Capabilities

Table C-2 provides the CLNP major capabilities.

Table A-2: Major Capabilities

Item	Capability	ISO/IEC 8473 Reference	Status	ATN Support	G/G Router Support
ES	End System		O.1	O.1	N
IS	Intermediate System		O.1	O.1	Y
FL-r	<r> Full protocol	8473-1: 6	M	M	Y
FL-s	<s> Full protocol	8473-1: 6	M	M	Y
NSS-r	<r> Non-segmenting subset	8473-1: 5.2	M	M	Y
NSS-s	<s> Non segmenting subset	8473-1: 5.2	IS:M ^IS:O	IS:M ^IS:O	Y
IAS-r	<r> Inactive subset	8473-1: 5.2	ES:O	ES:O	N
IAS-s	<s> Inactive subset	8473-1: 5.2	IAS-r:M ^IAS-r:X	IAS-r:M ^IAS-r:X	N
S802	SNDCF for ISO 8802	8473-2: 5.4	O.2	O	Y
SCLL	SNDCF for CL Link Service	8473-4: 5.3.1	O.2	O	N
SCOL	SNDCF for CO Link Service	8473-4: 5.3.2	O.2	O	N
SX25	SNDCF for ISO 8208	8473-3: 5.4	O.2	O	Y
ATN SNDCF	SNDCF for Mobile Sub-networks	Doc. 9705 Ref: Chapter 5.7	N/A	ISMOB:M ISGRD:O ^IS:O	N/A

ISMOB: If ISO/IEC 8473 is used over Mobile Sub-networks, then ISMOB is true, else ISMOB is false.

ISGRD: If ISO/IEC 8473 is used over Ground Sub-networks, then ISGRD is true, else ISGRD is false.

O.1: The supported functions, NPDUs, associated parameters and timers required for Intermediate Systems are provided in the APRLs. C.3 through C.10.

O.2: APRLs for the SNDCF for use with ISO/IEC 8208 sub-networks are provided in B.1 through B.4.

A.3 Ground-Ground Router - Supported Functions

Table A-3 specifies the ATN G/G router supported functions.

Table A-3: G/G Router - Supported Functions

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iPDUC	PDU Composition	6.1	M	M	Y
iPDUD	PDU Decomposition	6.2	M	M	Y
iHFA	Header Format Analysis	6.3	M	M	Y
iPDUL	<s> PDU Lifetime Control	6.4	M	M	Y
iRout	Route PDU	6.5	M	M	Y
iForw	Forward PDU	6.6	M	M	Y
iSegm	Segment PDU	6.7	iDSNS:M	iDSNS:M	N
iReas	Reassemble PDU	6.8	O	O	N
iDisc	Discard PDU	6.9	M	M	Y
iErep	Error Reporting	6.10	M	M	Y
iEdec	<s> Header Error Detection	6.11	M	M	Y
iSecu	<s>Security	6.13 Doc 9705 Ref: 5.6.2.2	O	M	Y
iCRR	<s> Complete Route Recording	6.15	O	OX	N
iPRR	<s> Partial Route Recording	6.15	O	M	Y
iCSR	Complete Source Routing	6.14	O	OX	N
iPSR	Partial Source Routing	6.14	O	OX	N
iPri	<s> Priority	6.17, Doc 9705 Ref: 5.6.3.5	O	M	Y
iQOSM	<s> QOS Maintenance	6.16	O	M	Y
iCong	<s> Congestion Notification	6.18, Doc. 9705 Ref: 5.6.2.4	O	M	Y
iPadd	<s> Padding	6.12	M	M	N, O
iEreq	Echo request	6.19, Doc. 9705 Ref: 5.6.3.3	O	O	Y
iErsp	Echo response	6.20	O	M	Y
iSegS	Create segments smaller than necessary	6.8	O	O	N
iDSNS	Simultaneous support of sub-networks with different SN-User data sizes	6.7	O	O	N

A.4 Supported Security Parameters

Table A-4 specifies the ATN G/G router supported security parameters.

Table A-4: G/G Router Supported Security Parameters

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iSADSSEC	Source Address Specific Security	7.5.3.1	iSecu:O.5	iSecu:O	N
iDADSSEC	Destination Address Specific Security	7.5.3.2	iSecu:O.5	iSecu:O	N
iGUNSEC	Globally Unique Security	Doc. 9705 Ref. 5.6.2.2	iSecu:O.5	iSecu:M	Y

O.5: The Security parameter within a single NPDU specifies a security format code indicating Source Address Specific, Destination Address Specific or Globally Unique Security.

A.5 Ability of Service Maintenance Function

Table A-5 specifies the ATN G/G router quality of service maintenance function.

Table A-5: Quality of Service Maintenance Function

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
IQOSNAVAIL	If requested QOS not available, deliver at different QOS	6.16	iQOSM:M	iQOSM:M	Y
IQOSNOT	Notification of failure to meet requested QOS	6.16	iQOSM:O	iQOSM:O	N
	Which of the following formats of QOS are implemented ?				
ISADDQoS	Source Address Specific QoS	7.5.6.1	iQoSM:O.3	iQOSM:O	N
IDADDQoS	Destination Address Specific QoS	7.5.6.2	iQoSM:O.3	iQOSM:O	N
IGUNQoS	Globally Unique QoS	7.5.6.3	iQoSM:O.3	iQOSM:M	Y
iSvTD	Sequencing versus Transit Delay	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N
iCongE	Congestion Experienced	7.5.6.3	iGUNQoS:O.4	iGUNQoS:M	N, O
iTDvCst	Transit Delay versus Cost	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N
iREPvTD	Residual Error Probability versus Transit Delay	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N
iREPvCst	Residual Error Probality versus Cost	7.5.6.3	iGUNQoS:O.4	iGUNQoS:O.4	N

O.3: The Quality of Service Maintenance parameter within a single NPDU specifies a QoS format code indicating Source Address Specific, Destination Address Specific or Globally Unique QoS.

O.4: If the QoS format code indicates that the Globally Unique QoS maintenance function is employed, then each bit in the associated parameter value may be set to indicate the order of intra and inter domain routing decisions based on QoS. The parameter values which apply to inter-domain routing are provided in Table 4 of ISO/IEC 10747.

A.6 Boundary Intermediate Systems - Supported NPDUs

Table A-6 specifies the ATN G/G router supported NPDUs.

Table A-6: G/G Router - Supported NPDUs

Item	Function	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iDT-t	DT (full protocol) transmit	7.7	M	M	Y
iDT-r	DT (full protocol) receive	7.7	M	M	Y
iDTNS-t	DT (non-segment) transmit	7.7	M	M	Y
iDTNS-r	DT (non-segment) receive	7.7	M	M	Y
IER-t	ER transmit	7.9	M	M	Y
IER-r	ER receive	7.9	M	M	Y
iERQ-t	ERQ transmit	7.10	iEreq:M	iEreq:M	Y
iERQ-r	ERQ receive	7.10	M	M	Y
iERP-t	ERP transmit	7.11	iErsp:M	iErsp:M	Y
iERP-r	ERP receive	7.11	M	M	Y

A.7 Ground-Ground Router - Supported Data PDU (DT PDU) Parameters

Table A-7 describes the ATN G/G router supported DT PDU parameters.

Table A-7: G/G Router - Supported DT PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
idFxPt-s	<s> Fixed Part	7.2	M	M	Y
idFxPt-r	<r> Fixed Part	7.2	M	M	Y
idAddr-s	<s> Addresses	7.3	M	M	Y
idAddr-r	<r> Addresses	7.3	M	M	Y
idSeg-s	<s> Segmentation Part	7.4	M	M	Y
idSeg-r	<r> Segmentation Part	7.4	M	M	Y
idPadd-s	<s> Padding	7.5.2	M	M	Y
idPadd-r	<r> Padding	7.5.2	M	M	Y
idSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	Y
idSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
idCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	-	N
idCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
idPRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
idPRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
idCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
idCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
idPSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
idPSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
idQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
idQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or iCong:M	Y
idPri-s	<s> Priority	7.5.7	M	M	Y
idPri-r	<r> Priority	7.5.7	iPRi:M	iPri:M	Y
idData-s	<s> Data	7.6	M	M	Y
idData-r	<r> Data	7.6	M	M	Y
idUnSup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded and where appropriate an Error Report PDU generated ?	6.19	M	M	Y
idUnSup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.19	M	M	Y

A.8 Ground-Ground Router - Supported Error Report PDU (ER PDU) Parameters

Table A-8 specifies the ATN G/G router supported ER PDU parameters.

Table A-8: G/G Router - Supported ER PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
ieFxPt-s	<s> Fixed Part	7.2	M	M	Y
ieFxPt-r	<r> Fixed Part	7.2	M	M	Y
ieAddr-s	<s> Address	7.3	M	M	Y
ieAddr-r	<r> Address	7.3	M	M	Y
iePadd-s	<s> Padding	7.5.2	M	M	Y
iePadd-r	<r> Padding	7.5.2	M	M	Y
ieSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	Y
ieSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
ieCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	iCRR:M	N
ieCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
iePRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
iePRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
ieCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
ieCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
iePSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
iePSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
ieQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
ieQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or iCong:M	Y
iePri-s	<s> Priority	7.5.7	M	M	Y
iePri-r	<r> Priority	7.5.7	iPri:M	iPri:M	Y
ieDisc-s	<s> Reason for Discard	7.9.5	M	M	Y
ieDisc-r	<r> Reason for Discard	7.9.5	M	M	Y
ieData-s	<s> Data	7.6	M	M	Y
ieData-r	<r> Data	7.6	M	M	Y
ieUnsup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded ?	6.21	M	M	Y
ieUnsup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.21	M	M	Y

A.9 Ground-Ground Router - Supported Echo Request PDU (ERQ PDU) Parameters

Table A-9 specifies the ATN G/G router supported ERQ PDU parameters.

Table A-9: G/G Router - Supported ERQ PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iqFxPt-s	<s> Fixed Part	7.2	M	M	Y
iqFxPt-r	<r> Fixed Part	7.2	M	M	Y
iqAddr-s	<s> Addresses	7.3	M	M	Y
iqAddr-r	<r> Addresses	7.3	M	M	Y
iqSeg-s	<s> Segmentation Part	7.4	M	M	Y
iqSeg-r	<r> Segmentation Part	7.4	M	M	Y
iqPadd-s	<s> Padding	7.5.2	M	M	Y
iqPadd-r	<r> Padding	7.5.2	M	M	N, O
iqSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	N, O
iqSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
iqCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	M	N
iqCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
iqPRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
iqPRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
iqCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
iqCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
iqPSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
iqPSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
iqQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
iqQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or ICong:M	Y
iqPri-s	<s> Priority	7.5.7	M	M	Y
iqPri-r	<r> Priority	7.5.7	iPRi:M	iPri:M	Y
iqData-s	<s> Data	7.6	M	M	Y
iqData-r	<r> Data	7.6	M	M	Y
iqUnSup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded and where appropriate an Error Report PDU generated ?	6.19	M	M	Y
iqUnSup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.19	M	M	Y

A.10 Ground-Ground Router - Supported Echo Reply PDU (ERP PDU) Parameters

Table A-10 specifies the ATN G/G router supported ERP PDU parameters.

Table A-10: G/G Router - Supported ERP PDU Parameters

Item	Parameter	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
ipFxPt-s	<s> Fixed Part	7.2	M	M	Y
ipFxPt-r	<r> Fixed Part	7.2	M	M	Y
ipAddr-s	<s> Addresses	7.3	M	M	Y
ipAddr-r	<r> Addresses	7.3	M	M	Y
ipSeg-s	<s> Segmentation Part	7.4	M	M	Y
ipSeg-r	<r> Segmentation Part	7.4	M	M	Y
ipPadd-s	<s> Padding	7.5.2	M	M	N,O
ipPadd-r	<r> Padding	7.5.2	M	M	N,O
ipSecu-s	<s> Security	7.5.3	iSecu:M	iSecu:M	Y
ipSecu-r	<r> Security	7.5.3	iSecu:M	iSecu:M	Y
ipCRR-s	<s> Complete Route Recording	7.5.5	iCRR:M	M	N
ipCRR-r	<r> Complete Route Recording	7.5.5	iCRR:M	-	N
ipPRR-s	<s> Partial Route Recording	7.5.5	M	M	Y
ipPRR-r	<r> Partial Route Recording	7.5.5	iPRR:M	iPRR:M	Y
ipCSR-s	<s> Complete Source Routing	7.5.4	iCSR:M	-	N
ipCSR-r	<r> Complete Source Routing	7.5.4	iCSR:M	-	N
ipPSR-s	<s> Partial Source Routing	7.5.4	M	M	Y
ipPSR-r	<r> Partial Source Routing	7.5.4	iPSR:M	-	N
ipQOSM-s	<s> QOS Maintenance	7.5.6	M	M	Y
ipQOSM-r	<r> QOS Maintenance	7.5.6	iQOSM or iCong:M	iQOSM or ICong:M	Y
ipPri-s	<s> Priority	7.5.7	M	M	Y
ipPri-r	<r> Priority	7.5.7	iPRi:M	iPri:M	Y
ipData-s	<s> Data	7.6	M	M	Y
ipData-r	<r> Data	7.6	M	M	Y
ipUnsup2	Are received PDUs containing parameters selecting unsupported type 2 functions discarded and where appropriate an Error Report PDU generated ?	6.19	M	M	Y
ipUnsup3	Are parameters selecting unsupported Type 3 functions ignored ?	6.19	M	M	Y

A.11 Ground-Ground Router - Timer and Parameter Values

Table A-11 specifies the ATN G/G router Timer and parameter values.

Table A-11: G/G Router - Timer and Parameter Values

Item	Timer	ISO/IEC 8473-1 Reference	Status	ATN Support	G/G Router Support
iReasTim	Reassembly Timer	6.8	iReas:M	M	Y

APPENDIX B - IDRP APRLS

B.0 IDRP APRLs

This appendix provides IDRP APRLs for ATN G/G routers. The APRLs define the capabilities and options that, at a minimum, are required to be implemented for the ATN G/G router under an Asia/Pacific ATN environment.

B.1 ATN Specific Protocol Requirements

Table B-1 describes the ATN specific protocol requirements.

Table B-1: ATN specific protocol requirements

Index	Item	Doc. 9705 Ref	ATN Support	G/G Router Support
ATNIDRP1	Encoding and use of the Security Path Attribute	5.8.3.2.2, 5.8.3.2.3	M	Y
ATNIDRP2	Does this G/G ROUTER immediately re-advertise routes if the security information contained in the routes's path attribute change?	5.8.3.2.7	M	Y
ATNIDRP3	Support of 'policy based route aggregation'	5.8.3.2.6.2	O	N
ATNIDRP4	Support of 'policy based route information reduction'	5.8.3.2.6.5	O	N
ATNIDRP5	Support of aggregation of routes with identical NLRI using 'true route aggregation'	5.8.3.2.6.3	O.1	N
ATNIDRP6	Support of aggregation of routes with identical NLRI using 'route merging'	5.8.3.2.6.3	O.1	N
ATNIDRP7	Support of aggregation of security path attribute information field	5.8.3.2.6.4	M	N

B.2 IDRP General

Table B-2 describes the IDRP general requirements.

Table B-2: IDRP General Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
BASIC	Are all basic G/G ROUTER functions implemented?	12.1	M	M	Y
MGT	Is this system capable of being managed by the specified management information?	11	M	O	N
VER	Does this G/G ROUTER support Version Negotiation?	7.8	M	M	Y
RTSEP	Does this G/G ROUTER support the ROUTE_SEPARATOR attribute?	7.12.1	M	M	Y
HOPS	Does this G/G ROUTER support the RD_HOP_COUNT attribute?	7.12.13	M	M	Y
PATH	Does this G/G ROUTER support the RD_PATH attribute?	7.12.3	M	M	Y
CAPY	Does this G/G ROUTER support the Capacity Attribute?	7.12.15	M	M	Y
FSM	Does this G/G ROUTER manage ROUTER-ROUTER connections according to the G/G ROUTER FSM description?	7.6.1	M	M	Y
FCTL	Does this G/G ROUTER provide flow control?	7.7.5	M	M	Y
SEQNO	Does this G/G ROUTER provide sequence number support?	7.7.4	M	M	Y
INTG1	Does this G/G ROUTER provide Data Integrity using authentication type 1?	7.7.1	O.1	M	Y
INTG2	Does this G/G ROUTER provide Data Integrity using authentication type 2?	7.7.2	O.1	O	N
INTG3	Does this G/G ROUTER provide Data Integrity using authentication type 3?	7.7.3	O.1	O	N
ERROR	Does this G/G ROUTER handle error handling for IDRP?	7.20	M	M	Y
RIBCHK	Does this G/G ROUTER operate in a "fail-stop" manner with respect to corrupted routing information?	7.10.2	M	M	Y

B.3 IDRP Update Send Process

Table B-3 describes the IDRP update send process requirements.

Table B-3: IDRP Update Send Process Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
INT	Does the G/G ROUTER provide the internal update procedures?	7.17.1	M	M	Y
RTSEL	Does this G/G ROUTER support the MinRouteAdvertisementInterval Timer?	7.17.3.1	M	M	Y
RTORG	Does this G/G ROUTER support the MinRDOriginationInterval Timer?	7.17.3.2	M	M	Y
JITTER	Does this G/G ROUTER provide jitter on its timers?	7.17.3.3	M	M	Y

B.4 IDRP Update Receive Process

Table B-4 describes the IDRP update receive process requirements.

Table B-4: IDRP Update Receive Process Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
INPDU	Does the G/G ROUTER handle inbound PDUs correctly?	7.14	M	M	Y
INCONS	Does this G/G ROUTER detect inconsistent routing information?	7.15.1	M	M	Y

B.5 IDRP Decision Process

Table B-5 describes the IDRP decision process requirements.

Table B-5: IDRP Decision Process Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
TIES	Does this G/G ROUTER break ties between candidate routes correctly?	7.16.2.1	M	M	Y
RIBUPD	Does this G/G ROUTER update the Loc-RIBs correctly?	7.16.2	M	M	Y
AGGRT	Does this G/G ROUTER support route aggregations?	7.18.2.1, 7.18.2.2, 7.18.2.3	O	ATNIDRP3^ATNIDRP5:M	N
LOCK	Does this G/G ROUTER provide interlocks between its Decision Process and the updating of the information in its Adj-RIBs-In?	7.16.4	M	M	Y

B.6 IDRP Receive

Table B-6 describes the IDRP receive requirements.

Table B-6: IDRP Receive Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
RCV	Does the G/G ROUTER process incoming PDUs and respond correctly to error conditions?	7.14, 7.20	M	M	Y
OSIZE	Does this G/G ROUTER accept incoming OPEN PDUs whose size in octets is between MinPDULength and 3000?	6.2, 7.20	M	M	Y
MXPDU	Does the G/G ROUTER accept incoming UPDATE, IDRP ERROR and RIB REFRESH PDUs whose size in octets is between minPDULength and maxPDULength?	6.2, 7.20	M	M	Y

B.7 IDRP CLNS Forwarding

Table B-7 describes the IDRP connectionless network service (CLNS) forwarding requirements.

Table B-7: IDRP CLNS Forwarding

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
PSRCRT	Does the G/G ROUTER correctly handle ISO/IEC 8473 NPDUs that contain a partial source route?	8	M	O	N
DATTS	Does the G/G ROUTER correctly extract the NPDU-derived Distinguishing Attributes from an ISO/IEC 8473 NPDU?	8.2	M	M	Y
MATCH	Does the G/G ROUTER correctly match the NPDU-derived Distinguishing Attributes with the corresponding FIB-Atts?	8.3	M	M	Y
EXTF	Does the G/G ROUTER correctly forward NPDUs with destinations outside its own routing domain?	8.4	M	M	Y
INTF	Does the G/G ROUTER correctly forward NPDUs with destinations inside its own routing domain?	8.1	M	M	Y

B.8 IDRP Optional Transitive Attributes

Table B-8 describes the requirements for IDRP optional transitive attributes.

Table B-8: IDRP Optional Transitive Attributes Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
MEXIT	Does this G/G ROUTER support use of the MULTI-EXIT DISC attribute?	7.12.7	O	O	N, O

B.9 Generating Well-Known Discretionary Attributes

Table B-9 describes the G/G router requirements for generating well-known discretionary attributes.

Table B-9: Generating Well-Known Discretionary Attributes Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
EXTG	Does the G/G ROUTER support generation of the EXT_INFO attribute?	7.12.2	O	O	N
NHRS	Does the G/G ROUTER support generation of the NEXT_HOP attribute in support of route servers?	7.12.4	O	O	N
NHSN	Does the G/G ROUTER support generation of the NEXT_HOP attribute to advertise SNPAs?	7.12.4	O	O	N
DLI	Does the G/G ROUTER support generation of the DIST_LIST_INCL attribute?	7.12.5	O	O	N
DLE	Does the G/G ROUTER support generation of the DIST_LIST_EXCL attribute?	7.12.6	O	O	N
TDLY	Does the G/G ROUTER support generation of the TRANSIT DELAY attribute?	7.12.8	O	O	N
RERR	Does the G/G ROUTER support generation of the RESIDUAL ERROR attribute?	7.12.9	O	O	N
EXP	Does the G/G ROUTER support generation of the EXPENSE attribute?	7.12.10	O	O	N
LQOSG	Does the G/G ROUTER support generation of the LOCALLY DEFINED QOS attribute?	7.12.11	O	OX	N
HREC	Does the G/G ROUTER support generation of the HIERARCHICAL RECORDING attribute?	7.12.12	O	OX	N
SECG	Does the G/G ROUTER support generation of the SECURITY attribute?	7.12.14	O	M	Y
PRTY	Does the G/G ROUTER support generation of the PRIORITY attribute?	7.12.16	O	O	N

B.10 Peer Entity Authentication

Table B-10 describes peer entity authentication requirements.

Table B-10: Peer Entity Authentication Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
AUTH	Does this G/G ROUTER correctly authenticate the source of a PDU?	7.7.2	O	M	Y

Note. Only support for an Authentication Code 1 is required

B.11 Propagating Well-Known Discretionary Attributes

Table B-11 describes requirements for propagating well-known discretionary attributes.

Table B-11: Propagating Well-Known Discretionary Attributes

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
EXTGP	Does the G/G ROUTER support propagation of the EXT_INFO attribute?	7.12.2	M	M	Y
NHRSP	Does the G/G ROUTER support propagation of the NEXT_HOP attribute in support of route servers?	7.12.4	O	O	N
NHSNP	Does the G/G ROUTER support propagation of the NEXT_HOP attribute to advertise SNPAs?	7.12.4	O	O	N
DLIP	Does the G/G ROUTER support propagation of the DIST_LIST_INCL attribute?	7.12.5	O	M	Y
DLEP	Does the G/G ROUTER support propagation of the DIST_LIST_EXCL attribute?	7.12.6	O	M	Y
TDLYP	Does the G/G ROUTER support propagation of the TRANSIT DELAY attribute?	7.12.8	O	O	N
RERRP	Does the G/G ROUTER support propagation of the RESIDUAL ERROR attribute?	7.12.9	O	O	N
EXPP	Does the G/G ROUTER support propagation of the EXPENSE attribute?	7.12.10	O	O	N
LQOSP	Does the G/G ROUTER support propagation of the LOCALLY DEFINED QOS attribute?	7.12.11	O	OX	N
HRECP	Does the G/G ROUTER support propagation of the HIERARCHICAL RECORDING attribute?	7.12.12	O	OX	N
SECP	Does the G/G ROUTER support propagation of the SECURITY attribute?	7.12.14	O	M	Y
PRTYP	Does the G/G ROUTER support propagation of the PRIORITY attribute?	7.12.16	O	O	N

B.12 Receiving Well-Known Discretionary Attributes

Table B-12 describes the requirements for receiving well-known discretionary attributes.

Table B-12: Receiving Well-Known Discretionary Attributes

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
EXTR	Does the G/G ROUTER recognise upon receipt the EXT_INFO attribute?	7.12.2	M	M	Y
NHRSR	Does the G/G ROUTER recognise upon receipt the NEXT_HOP attribute?	7.12.4	M	M	Y
DLIR	Does the G/G ROUTER recognise upon receipt the DIST_LIST_INCL attribute?	7.12.5	M	M	N
DLER	Does the G/G ROUTER recognise upon receipt the DIST_LIST_EXCL attribute?	7.12.6	M	M	N
TDLYR	Does the G/G ROUTER recognise upon receipt the TRANSIT DELAY attribute?	7.12.8	M	M	Y
RERRR	Does the G/G ROUTER recognise upon receipt the RESIDUAL ERROR attribute?	7.12.9	M	M	Y
EXPR	Does the G/G ROUTER recognise upon receipt the EXPENSE attribute?	7.12.10	M	M	Y
LQOSR	Does the G/G ROUTER recognise upon receipt the LOCALLY DEFINED QOS attribute?	7.12.11	M	O	N
HRECR	Does the G/G ROUTER recognise upon receipt the HIERARCHICAL RECORDING attribute?	7.12.12	M	M	Y
SECR	Does the G/G ROUTER recognise upon receipt the SECURITY attribute?	7.12.14	M	M	Y
PRTYR	Does the G/G ROUTER recognise upon receipt the PRIORITY attribute?	7.12.16	M	M	Y

B.13 IDRP Timers

Table B-13 describes the IDRP timer requirements.

Table B-13: IDRP Timers Requirements

Item	Description	ISO/IEC 10747 Ref.	ISO Status	ATN Support	G/G Router Support
Ta	KeepAlive time	7.6.5	M	M	Y
Tr	Retransmission (tr) timer	7.6.5	M	M	Y
Tmr	maxRIBIntegrityCheck timer	7.10.2	M	M	Y
Tma	MinRouteAdvertisement timer	7.17.3.1	M	M	Y
Trd	MinRDOriginationInterval timer	7.17.3.2	M	M	Y
Tcw	closeWaitDelay timer	7.6.4	M	M	Y

APPENDIX C - ACRONYMS

C.0 Acronyms

This appendix defines the acronyms used in this document.

APRLs	ATN Protocol Requirement Lists
ATN	Aeronautical Telecommunications Network
ATSMHS	Air Traffic Service Message Handling Service
CLNP	Connectionless Network Protocol
CM	Context Management
CPDLC	Controller-Pilot Data Link Communication
ES	End System
FIB	Forwarding Information Base
G-G (G/G)	Ground-Ground
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
ICS	Internet Communication Service
IDRP	Inter Domain Routing Protocol
IEC	International Electrotechnical Commission
ISO	International Standardization Organization
ITU	International Telecommunications Union
ITU-T	ITU Telecommunications Sector
NPDU	Network Protocol Data Unit
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
PICS	Protocol Implementation Compliance Statement
QOS	Quality of Service
RIB	Routing Information Base
SNDCF	Sub Network Dependent Convergence Functions