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航空组织

Tel.: +1 514-954-8219 ext. 6890

Ref.: AN 7/63.1.3, AN 7/64.1.1- 23/59

31 July 2023

Subject: Proposed amendment to Annex 10, Volume III related to ATN/IPS and consequential amendment to Annex 10, Volume II, stemming from the sixth meeting of the Data Communications Infrastructure Working Group of the Communications Panel (CPDCIWG/6)

Action required: Comments to reach Montréal by 31 January 2024

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission (ANC), at the sixth meeting of its 223rd Session held on 13 June 2023, considered a proposal developed by the sixth meeting of the Data Communications Infrastructure Working Group of the Communications Panel (CPDCIWG/6) to amend Annex 10 — *Aeronautical Telecommunications, Volume III — Communication Systems, Part I — Digital Data Communication Systems* and Part II — *Voice Communication Systems*, and consequential amendment to Annex 10, Volume II — *Communication Procedures including those with PANS status*. The Commission authorized its transmission to Member States and appropriate international organizations for comments.

2. The proposal introduces provisions relating to updates to the aeronautical telecommunication network (ATN)/Internet Protocol Suite (IPS) requirements regarding IPS mobility across multiple media, naming and addressing, IPS security, quality of service (QoS), system management and overall transitional aspects.

3. The background of the aforementioned proposal is provided in Attachment A. The proposal for amendment to Annex 10, Volumes III, Parts I and II; and consequential amendment to Annex 10, Volume II are contained in Attachment B and C, respectively. A rationale box providing additional information has been included immediately following the proposal.

4. In examining the proposed amendment, you should not feel obliged to comment on editorial aspects as such matters will be addressed by the ANC during its final review of the draft amendment.

5. May I request that any comments you wish to make on the amendment proposal be dispatched to reach me not later than 31 January 2024. To facilitate the processing of replies with substantive comments, I invite you to submit an electronic version in Word format to icaohq@icao.int. The ANC has asked me to specifically indicate that comments received after the due date may not be considered by the ANC and the Council. In this connection, should you anticipate a delay in the receipt of your reply, please let me know in advance of the due date.

6. For your information, the proposed amendment to Annex 10, Volume III, Parts I and II; and consequential amendment to Annex 10, Volume II is envisaged for applicability on 27 November 2025. Any comments you may have thereon would be appreciated.

7. The subsequent work of the ANC and the Council would be greatly facilitated by specific statements on the acceptability or otherwise of the proposal.

8. Please note that for the review of your comments by the ANC and the Council, replies are normally classified as “agreement with or without comments”, “disagreement with or without comments” or “no indication of position”. If in your reply the expressions “no objections” or “no comments” are used, they will be taken to mean “agreement without comment” and “no indication of position”, respectively. In order to facilitate proper classification of your response, a form has been included in Attachment D which may be completed and returned together with your comments, if any, on the proposals in Attachment B and C.

Accept, Sir/Madam, the assurances of my highest consideration.



for
Juan Carlos Salazar
Secretary General

Enclosures:

- A — Background information
- B — Proposed amendment to Annex 10, Volume III
- C — Consequential amendment to Annex 10, Volume II
- D — Response form

BACKGROUND INFORMATION

1. AMENDMENT TO ANNEX 10, VOLUME III, PART I

1.1 The proposed amendment, as detailed in Attachment B, contains changes to several sections of Annex 10, Volume III, Part I, including provisions on:

1.1.1 a) exchange of information using the ATN/IPS; and

1.1.2 b) air navigation cyber resilience.

1.2 Several technical provisions relevant to the exchange of information and communications using the ATN/IPS are being introduced, especially relating to: IPS mobility across multiple media, naming and addressing, quality of service, system management and overall transitional aspects. The amendment introduces ATN/IPS provisions for ground-ground networks, including the use of Voice over Internet Protocol (VoIP), and air-ground networks.

1.3 Furthermore, this amendment clarifies the role of regional agreements and applicable local and security policies in relation to the operation of ATN/IPS. Introduction of the new ATN/IPS technical provisions will improve the availability and reliability of the ATN air-ground and ground-ground data subnetworks and enhance the security of aeronautical communications.

1.4 With the increasing reliance on automated systems and networked communications, protection from unlawful interference is necessary to ensure the safety and integrity of the global air traffic management (ATM) system. ATN, using both ATN/IPS and the aeronautical telecommunications network using open systems interconnection (ATN/OSI), is expected to carry the majority of telecommunications traffic for the global ATM system. The proposed amendments address the criticality of IPS cyber security and risk management to be considered within the ATN/IPS environment.

2. AMENDMENT TO ANNEX 10, VOLUME III, PART II

2.1 Updates to Annex 10, Volume III, Part II – Voice Communication Systems, Chapter 4 are also being proposed. The title of the chapter is being changed in order to become technology neutral, and the term VoIP is being introduced to accommodate the evolution to the Internet Protocol.

3. AMENDMENT TO ANNEX 10, VOLUME II

3.1 A consequential amendment as detailed in Attachment C, contains the changes proposed to Annex 10, Volume II, replacing the term “internet” with “ATN/IPS”, reflecting the fact that inter-centre communications (ICC) have never been implemented over the legacy ATN/OSI and no requirement exists to do so in the future.

ATTACHEMNT B to State letter AN 7/63.1.3, AN 7/64.1.1- 23/59

PROPOSED AMENDMENT TO ANNEX 10, VOLUME III

NOTES ON THE EDITORIAL PRESENTATION OF THE PROPOSED AMENDMENT

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~ text to be deleted
2. **New text to be inserted is highlighted with grey shading.** new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed **by the replacement text which is highlighted with grey shading.** new text to replace existing text

**PROPOSED AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES
AERONAUTICAL TELECOMMUNICATIONS**

ANNEX 10

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME III

COMMUNICATION SYSTEMS

INITIAL PROPOSAL 1

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PART I — DIGITAL DATA COMMUNICATION SYSTEMS

CHAPTER 1. DEFINITIONS

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Multilink. The ability to use all available air-ground subnetworks in order to provide the required performance.

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**CHAPTER 3. AERONAUTICAL
TELECOMMUNICATION NETWORK**

Note 1.— Detailed technical specifications for ATN/OSI applications are contained in the Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols (Doc 9880) and in the Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) (Doc 9705).

Note 2.— Detailed technical specifications for ATN/IPS applications are contained in the Manual for the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (Doc 9896) (available electronically on the ICAO Net).

Note 3.— ATN requirements specified in this Annex, apply for both ATN/OSI and ATN/IPS.

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3.2 INTRODUCTION

3.2.1 The ATN is specifically and exclusively intended to provide digital voice and data communications services to air traffic services provider organizations and aircraft operating agencies in support of:

...

3.4 GENERAL REQUIREMENTS

3.4.1 The ATN shall either use International Organization for Standardization (ISO) communication standards for open systems interconnection (OSI) or use the Internet Society (ISOC) communications standards for the Internet Protocol Suite (IPS).

Note 1.— ATN/IPS implementation is preferred for ground-ground networks. While ATN/OSI continues to be supported in air-ground networks, particularly when using VDL Mode 2, it is expected that future air-ground implementations will use the ATN/IPS.

Note 2.— Interoperability between interconnecting OSI/IPS networks is expected to be arranged prior to implementation.

Note 3.— Guidance material on interoperability between ATN/OSI and ATN/IPS is contained in Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (Doc 9896).

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~~3.4.3 An authorized path(s) shall be defined on the basis of a predefined routing policy.~~

3.4.4.3 The ATN shall transmit, relay and deliver messages in accordance with the priority classifications and without discrimination or undue delay QoS required for the ATN/IPS operation.

3.4.4 The ATN shall transmit, relay and deliver messages in accordance with the applicable local security policy.

3.4.5 The ATN shall transmit, relay and deliver messages in accordance with the applicable local routing policy.

Note.— The QoS as well as the applicable local security and routing policies are predetermined and agreed by the entity responsible (such as administration and/or aircraft operator) for the specific traffic types.

~~3.4.5 The ATN shall provide means to define data communications that can be carried only over authorized paths for the traffic type and category specified by the user.~~

3.4.6 The ATN shall provide communication in accordance with the prescribed required communication performance (RCP) specification and the required surveillance performance (RSP) specification.

Note.— The Manual on Required Communication Performance (RCP) For more guidance on RCP and RSP specifications, refer to the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869) contains the necessary information on RCP.

...

~~3.4.8 The ATN shall enable exchange of application information when one or more authorized paths exist.~~

3.4.98 The ATN shall notify the appropriate application(s) processes when no authorized path exists if a message cannot be successfully delivered.

Note.— It is the responsibility of the ATN upper layer communications services, such as a dialogue service, to determine the successful delivery of a message to the communicating peer and to notify a delivery failure event to the message originator and associated application in the absence of a delivery confirmation from the peer.

~~3.4.109~~ The ATN shall make provisions for the efficient use of limited bandwidth subnetworks.

3.4.10 ATN shall be capable of supporting multilink.

Note.— For more guidance, refer to the Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocol (Doc 9896).

~~3.4.11 Recommendation.— The ATN should enable an aircraft intermediate system (router) to connect to a ground intermediate system (router) via different subnetworks.~~

~~3.4.12 Recommendation.— The ATN should enable an aircraft intermediate system (router) to connect to different ground intermediate systems (routers).~~

~~3.4.13 The ATN shall enable the exchange of address information between applications.~~

3.4.1411 Where the absolute time of day is used within the ATN, it shall be accurate to within 1 second of coordinated universal time (UTC).

...

<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/35</p>	<p><i>Rationale:</i></p> <p>Section 3.4 describes general requirements of ATN implementation, applicable policies and supporting the required performance. The introduction of IPS is intended to enhance the air-ground communications security by enforcing security policy also introducing Multilink. Since multiple links may be available, this amendment ensures that ATN supports the use of these multiple links. This will improve availability and reliability of the ATN air-ground subnetworks.</p> <p>Several outdated provisions and recommendations are proposed for deletion.</p>
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3.5 ATN APPLICATIONS REQUIREMENTS

3.5.1 System applications

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3.5.1.1 The ATN shall support the data link initiation capability (DLIC) applications when air-ground data links are implemented.

Note.— ~~The Manual of Air Traffic Services Data Link Applications (Doc 9694, Part I)~~ Global Operational Data Link (GOLD) Manual (Doc 10037) ~~defines~~ provides guidance on the use of the DLIC applications.

3.5.1.2 The ATN/~~OSI end system~~ shall support the following directory services (DIR) ~~application~~ functions when ATSMHS ~~and/or security protocols are~~ is implemented:

...

Note.— DIR may also be used when security protocols are implemented.

3.5.2 Air-ground applications

3.5.2.1 The ATN shall be capable of supporting one or more of the following applications:

- a) ADS-C; and
- b) CPDLC; and
- e) ~~FIS (including ATIS and METAR).~~

Note.— ~~See the Manual of Air Traffic Services Data Link Applications (Doc 9694).~~ The Global Operational Data Link (GOLD) Manual (Doc 10037) provides guidance on the use of ADS-C and CPDLC.

...

3.5.3 Ground-ground applications

3.5.3.1 The ATN shall be capable of supporting the following applications:

- a) ATS interfacility data communication (AIDC); ~~and~~
- b) ATS message handling services applications (ATSMHS);
- c) aeronautical voice communications; and
- d) system-wide information management (SWIM)-enabled applications.

...

<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/35</p>	<p><i>Rationale:</i></p> <p>Editorial clean-up of provisions, such as updating references to Manuals.</p> <p>Note for DIR was added to clarify that the DIR can be used with or without security.</p> <p>Deletion of FIS from 3.5.2.1 is proposed as FIS data link applications over ATN have not been deployed and will not be in the future.</p> <p>The new and updated IPS technology brings a common layer for air-ground and ground-ground applications, which is an enabler for significant economies of scale.</p> <p>One example of a ground-ground application is the use of Voice over IP (VoIP) for ATM. Another example of ground-ground applications is SWIM. Examples of air-ground applications include ADS-C and CPDLC over ATN/IPS.</p>
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3.6 ATN COMMUNICATIONS SERVICE REQUIREMENTS

~~3.6.1 ATN/IPS upper layer communications service~~

~~3.6.1.1 An ATN host* shall be capable of supporting the ATN/IPS upper layers including an application layer.~~

~~3.6.2 ATN/OSI upper layer communications service~~

~~3.6.2.1 An ATN/OSI end-system (ES)* shall be capable of supporting the OSI upper layer communications service (ULCS) including session, presentation and application layers.~~

3.6.31 ATN/IPS communications service

Note.— ATN/IPS communications service is defined in the Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (Doc 9896).

~~3.6.3.1 An ATN host shall be capable of supporting the ATN/IPS including the:~~

- ~~a) transport layer in accordance with RFC 793 (TCP) and RFC 768 (UDP); and~~
- ~~b) network layer in accordance with RFC 2460 (IPv6).~~

~~3.6.3.2 An IPS router shall support the ATN network layer in accordance with RFC 2460 (IPv6) and RFC 4271 (BGP), and RFC 2858 (BGP multiprotocol extensions).~~

* An ATN host is an ATN end-system in OSI terminology; an ATN end-system is an ATN host in IPS terminology.

3.6.42 ATN/OSI communications service

Note.— *ATN/OSI communications service is defined in the Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols (Doc 9880).*

- 3.6.4.1 — ~~An ATN end system shall be capable of supporting the ATN including the:~~
 - a) ~~transport layer in accordance with ISO/IEC 8073 (TP4) and optionally ISO/IEC 8602 (CLTP); and~~
 - b) ~~network layer in accordance with ISO/IEC 8473 (CLNP).~~
- 3.6.4.2 — ~~An ATN intermediate system (IS) shall support the ATN network layer in accordance with ISO/IEC 8473 (CLNP) and ISO/IEC 10747 (IDRP).~~

<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/35</p>	<p><i>Rationale:</i></p> <p>Detailed provisions in 3.6 are proposed to be deleted from this Annex. Those provisions are frequently updated and will be included in the associated guidance material.</p>
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3.7 ATN NAMING AND ADDRESSING REQUIREMENTS

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3.7.2 The ATN shall ~~provide provisions for unambiguous addressing~~ have the capability to uniquely identify source and destination entities.

3.7.3 The ATN shall provide means to ~~unambiguously uniquely~~ address all ATN end-systems, (hosts), nodes, ~~and~~ intermediate systems and (routers).

...

<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/35</p>	<p><i>Rationale:</i></p> <p>The proposed modifications to 3.7.2 and 3.7.3 clarify principles of ATN naming and addressing requirements to support unambiguous identification of all components of the ATN/IPS and ATN/OSI.</p>
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3.8 ATN SECURITY REQUIREMENTS

3.8.1 The ATN shall make provisions whereby only the controlling ATS unit may provide ATC instructions to aircraft operating in its airspace.

Note.— *This is achieved through the current and next data authority aspects of the controller-pilot data link communications (CPDLC) application.*

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3.8.3 ATN end-systems supporting ATN security services shall be capable of authenticating the identity of peer end-systems, authenticating the source of messages and ensuring the data integrity of the messages.

Note.— The use of security is the default; however, its implementation is based on local policy capability to authenticate the identity of peer end-systems is intended to provide protection against spoofing, “phantom controllers” or “phantom aircraft”.

3.8.4 The ATN services shall be protected against service attacks to a level consistent with the application service requirements and to a level commensurate with security risks and local security policy.

Note.— Detailed information on security risks and local policy for ATN and their mitigation are provided in the Manual of Security Risk Assessment (SRA) for Aeronautical Communications (Doc 10145, forthcoming).

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<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/35</p>	<p><i>Rationale:</i></p> <p>With the introduction of ATN/IPS the commensurate security threats on the air traffic service provider organizations, aircraft and their communication need to be addressed. The security risks have to be identified, assessed and mitigated to an acceptable level.</p> <p>The proposed amendments to 3.8 highlight the requirement for entity identity and authentication and appropriate cybersecurity risk management. Several notes are added to clarify the specific terms related to security used in the requirements.</p> <p>A possibly misleading note on the role of current and next data authority for security purposes is removed and it is emphasized that the ATN security is subject to local policy.</p>
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INITIAL PROPOSAL 2

PART II — VOICE COMMUNICATION SYSTEMS

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CHAPTER 4. AERONAUTICAL ~~SPEECH CIRCUITS~~ VOICE COMMUNICATIONS

4.1 TECHNICAL PROVISIONS RELATING TO INTERNATIONAL AERONAUTICAL SPEECH CIRCUIT SWITCHING AND SIGNALLING VOICE COMMUNICATIONS FOR GROUND-GROUND APPLICATIONS

Note 1.— Detailed specifications and Guidance material on the implementation of aeronautical speech circuit switching and signalling Voice over Internet Protocol (VoIP) communications for ground-ground applications is contained in the Manual on Air Traffic Services (ATS) Ground-Ground Voice Switching and Signalling (Doc 9804) Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (Doc 9896). The material includes explanation of terms, performance parameters, guidance on basic call types and additional functions, references to appropriate ISO/IEC international standards and ITU-T recommendations, guidance on the use of signalling systems, details of the recommended numbering scheme and guidance on migration to future schemes. Aeronautical VoIP communications for ground-ground applications include inter-ATS unit telephony and radio air-ground applications on the ground component between the ATS unit and the air-ground control radio station, which is responsible for handling communications pertaining to the operation and control of aircraft in a given area.

Note 2.— Guidance material on the implementation of the speech circuits supported by air traffic services (ATS) ground-ground voice switching and signalling is contained in the Manual on Air Traffic Services (ATS) Ground-Ground Voice Switching and Signalling (Doc 9804).

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4.1.3 The operation of dedicated aeronautical VoIP communications for ground-ground applications to interconnect ATS units shall be performed based on an agreement between the administrations concerned.

4.1.4 Implementation of aeronautical VoIP communications for ground-ground applications shall be made on the basis of a regional agreement.

4.1.35 Recommendation.— *The ATC communication requirements defined in Annex 11, Section 6.2 should be met by implementation of one or more of the following basic three call types:*

- a) instantaneous access;*
- b) direct access; and*
- c) indirect access.*

Note.— Guidance on call types can be found in the Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (Doc 9896).

4.1.46 Recommendation.— *In addition to the ability to make basic telephone calls, the following functions should be provided in order to meet the requirements set out in Annex 11:*

- a) means of indicating the calling/called party identity;*
- b) means of initiating urgent/priority calls; and*
- c) conference capabilities.*

4.1.5 Recommendation.— *The characteristics of the circuits used in aeronautical speech circuit*

~~switching and signalling should conform to appropriate ISO/IEC international standards and ITU-T recommendations.~~

~~— 4.1.6 **Recommendation.** — Digital signalling systems should be used wherever their use can be justified in terms of any of the following:~~

~~— a) improved quality of service;~~

~~— b) improved user facilities; or~~

~~— c) reduced costs where quality of service is maintained.~~

~~— 4.1.7 **Recommendation.** — The characteristics of supervisory tones to be used (such as ringing, busy, number unobtainable) should conform to appropriate ITU-T recommendations.~~

4.1.87 **Recommendation.**— To take advantage of the benefits of interconnecting regional and national aeronautical ~~speech~~ legacy voice networks, ~~the an~~ an international aeronautical telephone network numbering scheme should be used.

<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/35</p>	<p><i>Rationale:</i></p> <p>The new term, aeronautical voice communication, is introduced to include the current evolution to VoIP. The term aeronautical voice communication is technology neutral and moves away from legacy-based circuit concept.</p> <p>Several obsoleted technical provisions are proposed for deletion.</p>
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ATTACHMENT C to State letter AN 7/63.1.3, AN 7/64.1.1- 23/59

CONSEQUENTIAL AMENDMENT TO ANNEX 10, VOLUME II

NOTES ON THE EDITORIAL PRESENTATION OF THE PROPOSED AMENDMENT

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1. ~~Text to be deleted is shown with a line through it.~~ text to be deleted
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CONSEQUENTIAL AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES
AND PROCEDURES FOR AIR NAVIGATION SERVICES
AERONAUTICAL TELECOMMUNICATIONS
ANNEX 10
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION
VOLUME II
COMMUNICATION PROCEDURES
including those with PANS status

INITIAL PROPOSAL 1

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CHAPTER 4. AERONAUTICAL FIXED SERVICE (AFS)

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4.7 INTER-CENTRE COMMUNICATIONS (ICC)

The inter-centre communications (ICC) applications set shall be used to exchange ATS messages between air traffic service users over the ATN/IPS ~~internet~~.

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<p><i>Origin:</i></p> <p>DCIWG/6 WG-I/27</p>	<p><i>Rationale:</i></p> <p>A consequential amendment to 4.7 of Annex 10 Volume II is proposed replacing “internet” with "ATN/IPS". ICC has never been implemented over the legacy ATN/OSI and no requirement exists to do so.</p>
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ATTACHMENT D to State letter AN 7/63.1.3, AN 7/64.1.1- 23/59

RESPONSE FORM TO BE COMPLETED AND RETURNED TO ICAO TOGETHER WITH ANY COMMENTS YOU MAY HAVE ON THE PROPOSED AMENDMENT

To: The Secretary General
 International Civil Aviation Organization
 999 Robert-Bourassa Boulevard
 Montréal, Quebec
 Canada, H3C 5H7

(State) _____

Please make a checkmark (✓) against one option for each amendment. If you choose options “agreement with comments” or “disagreement with comments”, **please provide your comments on separate sheets.**

	<i>Agreement without comments</i>	<i>Agreement with comments*</i>	<i>Disagreement without comments</i>	<i>Disagreement with comments</i>	<i>No position</i>
Amendment to Annex 10 — <i>Aeronautical Telecommunications</i> , Volume III — <i>Communication Systems</i> , Part I — <i>Digital Data Communication Systems</i> and Part II — <i>Voice Communication Systems</i> (Attachment B refers)					
Consequential amendment to Annex 10 — <i>Aeronautical Telecommunications</i> , Volume II — <i>Communication Procedures including those with PANS status</i> . (Attachment C refers)					

*“Agreement with comments” indicates that your State or organization agrees with the intent and overall thrust of the amendment proposal; the comments themselves may include, as necessary, your reservations concerning certain parts of the proposal and/or offer an alternative proposal in this regard.

Signature: _____ Date: _____

— END —