International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

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Ref.: AN 7/64.1.3- 25/51

23 May 2025

Subject: Proposals for the amendment of Annex 10, Volume III relating to satellite communication systems in support of ASBU Blocks 1 and 2, arising from the seventh meeting of the Data Communication Infrastructure Specific Working Group of the Communications Panel (CP-DCIWG/7)

Action required: Comments to reach Montréal by 24 November 2025

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission (ANC), at the tenth meeting of its 228th Session held on 13 March 2025, considered a proposal developed by the seventh meeting of the Data Communication Infrastructure Specific Working Group of the Communications Panel (CP-DCIWG/7) to amend Annex 10 — *Aeronautical Telecommunications*, Volume III — *Communication Systems*, Part I — *Digital Data Communication Systems*, and Part II — *Voice Communication Systems*. The Commission authorized its transmission to Member States and appropriate international organizations for comments.

2. The proposal introduces updates to the aeronautical mobile-satellite (route) service (AMS(R)S) provisions. These changes aim to enhance the reliability, efficiency and safety of satellite communication systems in aviation. The amendment aligns AMS(R)S capabilities with current technological advancements ultimately improving communication in air traffic management.

3. The background of the aforementioned proposal is explained in Attachment A. The proposal for amendment to Annex 10, Volume III, Parts I and II is contained in Attachment B. To facilitate your review of the proposed amendments, a rationale box providing more information has been included immediately following each 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.

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5. May I request that any comments you wish to make on the amendment proposal be dispatched to reach me not later than 24 November 2025. 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 is envisaged for applicability on 25 November 2027. 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. To facilitate proper classification of your response, a form has been included in Attachment C which may be completed and returned together with your comments, if any, on the proposals in Attachment B.

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, Parts I and II
C — Response form

ATTACHMENT A to State letter AN 7/64.1.3- 25/51

BACKGROUND INFORMATION

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

1.1 The proposed amendment, as detailed in Attachment B, contains changes to Annex 10, Volume III, Part I. These changes aim to enhance the reliability, efficiency and safety of satellite communication systems in aviation. The amendment aligns AMS(R)S capabilities with current technological advancements ultimately improving communication in air traffic management. The amendment includes the following**:**

a) update of definitions;

b) update Radio Frequency (RF) characteristics;

c) update outage notifications requirements and recommendations;

d) updated data performance requirements and recommendations;

e) updated voice performance requirements and recommendations;

f) new section for availability, handover and support for multilink; and

g) new section for the use of AMS(R)S as a sole Long-Range Communication Systems (LRCS) means.

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

2.1 The proposal also introduces a note to Annex 10, Volume III, Part II— *Voice Communication Systems*, Chapter 2: *Aeronautical Mobile Service* to indicate that both data and voice requirements as well as general requirements for the AMS(R)S systems are in Part I.

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ATTACHMENT B to State letter AN 7/64.1.3- 25/51

PROPOSED AMENDMENT TO

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ANNEX 10

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

AERONAUTICAL TELECOMMUNICATIONS

VOLUME III
COMMUNICATION SYSTEMS

NOTES ON THE 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:

~~Text to be deleted is shown with a line through it.~~	Text to be deleted
New text to be inserted is highlighted with grey shading.	New text to be inserted
~~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

ANNEX 10

AERONAUTICAL TELECOMMUNICATIONS

VOLUME III

COMMUNICATION SYSTEMS

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

INITIAL PROPOSAL 1

PART I — DIGITAL DATA COMMUNICATION SYSTEMS

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CHAPTER 4. AERONAUTICAL MOBILE-SATELLITE (ROUTE) SERVICE (AMS(R)S)

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4.1 DEFINITIONS

Aeronautical mobile satellite (route) service system (AMS(R)S system). A satellite system which offers AMS(R)S in accordance with the ITU Radio Regulations, with the boundary of the AMS(R)S system on the ground side being between the communications service provider (CSP) and the air traffic services provider (ATSP), and on the air side being between the aircraft earth station (AES) and the aircraft avionics.

AMS(R)S availability. The ability of an AMS(R)S system to perform its required function at the initiation of the intended operation, quantified as the proportion of the time the system is available to the time the system is planned to be available.

AMS(R)S Outage. The time duration in which the AMS(R)S system is not able to support the intended service.

Anchor point system. A component of the communications system on the ground or in the aircraft, which controls the air-ground link selection in the ground-to-air and air-to-ground direction.

Call set-up time. The time from when the address information required for setting up a call is received by the CSP or the AES to when the ringing tone or answer signal is provided to the called party.

Communications network provider (CNP). An entity that consists of the element or elements of the communications service provider (CSP) that provide terrestrial network, aggregation, context switching, etc., necessary to interface the air traffic service provider with the satellite service provider.

Communications service provider (CSP). An entity that provides ground-ground and/or air-ground communication services in support of air traffic services.

~~***Connection establishment delay.*** Connection establishment delay, as defined in ISO 8348, includes a component, attributable to the called subnetwork (SN) service user, which is the time between the SNCONNECT indication and the SNCONNECT response. This user component is due to actions outside the boundaries of the satellite subnetwork and is therefore excluded from the AMS(R)S specifications.~~

~~***Data transfer delay (95th percentile).*** The 95th percentile of the statistical distribution of delays for which transit delay is the average.~~

Data transit delay. In accordance with ISO 8348, the average value of the statistical distribution of data delays. This delay represents the subnetwork delay and does not include the connection establishment delay.

Designated operational coverage (DOC) area. The area in which a particular service is provided in accordance with the relevant SARPS and in which the service is afforded frequency protection.

Dropped call rate. The probability that a call that has been successfully set-up is dropped during a voice transaction of 120 seconds.

Grade of service (GoS). Grade of service is the probability of a call in a circuit group being blocked or delayed for more than a specified interval.

Long range communications system (LRCS). A system that supports voice and/or data beyond terrestrial VHF/UHF coverage.

~~***Network (N).*** The word "network" and its abbreviation "N" in ISO 8348 are replaced by the word "subnetwork" and its abbreviation "SN", respectively, wherever they appear in relation to the subnetwork layer packet data performance.~~

~~***Residual error rate.*** The ratio of incorrect, lost and duplicate subnetwork service data units (SNSDUs) to the total number of SNSDUs that were sent.~~

Satellite service provider (SSP). An entity that provides satellites, ground traffic gateways, ground interconnection and associated monitoring and control to enable data and/or voice communications between aircraft and ground systems of the CNP.

~~***Spot beam.*** Satellite antenna directivity whose main lobe encompasses significantly less than the earth's surface that is within line-of-sight view of the satellite. May be designed so as to improve system resource efficiency with respect to geographical distribution of user earth stations.~~

~~**Subnetwork (SN). See *Network (N).***~~

~~***Subnetwork service data unit (SNSDU).*** An amount of subnetwork user data, the identity of which is preserved from one end of a subnetwork connection to the other.~~

~~***Total voice transfer delay***~~ ***Voice latency.*** The elapsed time commencing at the instant that speech is presented to the AES or GES and concluding at the instant that the speech enters the interconnecting network of the counterpart GES or AES. This delay includes vocoder processing time, physical layer delay, RF propagation delay and any other delays within an AMS(R)S subnetwork.

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4.2 GENERAL

4.2.1 Any mobile-satellite system intended to provide AMS(R)S shall conform to the ~~requirements~~ Standards of this chapter.

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Origin:	**Rationale**
CP-DCIWG/7	The "Definitions" section has been updated to include new definitions needed to support the introduction of new SARPs and missing definitions. In addition, definitions referred or used in deleted SARPs have been removed as not needed. The following points explain the introduced new definitions: a) designated operational coverage (DOC) definition comes from Annex 10, Volume III; b) the AMS(R)S System, CNP, CSP, LRCS and SSP definitions are proposed to also be introduced, where applicable, in the next version of the *Performance-based Communication and Surveillance (PBCS) Manual* (Doc 9869); c) The CSP definition is reflecting the evolving role of CSPs in modern aviation communications; d) for dropped call rate, the value of 120 seconds is selected based on a typical duration of a safety service voice call between pilot and ATS. The value is established only for the purpose of computing the dropped call rate; and e) other definitions are based on relevant industry documents and the work in aeronautical groups.

INITIAL PROPOSAL 2

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4.3 RF CHARACTERISTICS

4.3.1 Frequency bands

~~*Note. – ITU Radio Regulations permit systems providing mobile satellite service to use the same spectrum as AMS(R)S without requiring such systems to offer safety services. This situation has the potential to reduce the spectrum available for AMS(R)S. It is critical that States consider this issue in frequency planning and in the establishment of national or regional spectrum requirements.*~~

4.3.1.1 When providing AMS(R)S communications, an AMS(R)S system shall operate only in frequency bands which are appropriately allocated on a primary basis to the AMS(R)S ~~and protected by the ITU Radio Regulations.~~ or the mobile satellite service (MSS) under the condition that:

a) in at least some portion of the operational frequency band of the system, there is a clear indication in the ITU Radio Regulations that priority is given to accommodating the spectrum requirements of the AMS(R)S through priority access and immediate availability, by pre-emption, if necessary, over all other mobile-satellite communications operating within a network in that portion of the frequency band; and

b) there is the capability, in the case of interference for the system, to fall back to operating only in that portion of the frequency band that meets the provisions defined in a) above.

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	Rationale
CP-DCIWG/7	Subsection 4.3.1 is amended to clarify for the States the special case of the AMSS in the ITU Radio Regulations; the specific text was drafted by FSMP. The AMS(R)S systems can operate in certain allocations to the Mobile Satellite Service (MSS) (generic service allocation), with the condition that the ITU Radio Regulations provide priority within those allocations to AMS(R)S (a safety service allocation with much more stringent protection against interference, both in the assignment process and in reactive measures by National Radio Regulators in case of interference).

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4.6 PERFORMANCE REQUIREMENTS

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4.6.2 ~~Failure~~ Outage notifications

~~4.6.2.1 In the event of a service failure, an AMS(R)S system shall provide timely predictions of the time, location and duration of any resultant outages until full service is restored.~~

~~*Note.— Service outages may, for example, be caused by the failure of a satellite, satellite spot beam, or GES. The geographic areas affected by such outages may be a function of the satellite orbit and system design, and may vary with time.*~~

~~4.6.2.2 The system shall annunciate a loss of communications capability within 30 seconds of the time when it detects such a loss.~~

4.6.2.1 UNPLANNED OUTAGE

4.6.2.1.1 The AMS(R)S system shall report to ATSPs being provided with the AMS(R)S, all unplanned AMS(R)S system outages impacting multiple aircraft, lasting more than 6 minutes.

4.6.2.1.2 **Recommendation**.— *The AMS(R)S system should report to ATSPs being provided with the AMS(R)S all unplanned AMS(R)S system outages impacting multiple aircraft.*

4.6.2.1.3 **Recommendation.—** *The AMS(R)S system should report to ATSPs being provided with the AMS(R)S all unplanned AMS(R)S system outages as stated in 4.6.2.1.1, no later than 30 minutes after the start of the outage.*

Note.— The requirement and two recommendations above include the time for the SSP to report an unplanned outage to the CSP.

4.6.2.1.4 **Recommendation.—** *If an unplanned AMS(R)S system outage lasts longer than 2 hours, the AMS(R)S system should provide, as a minimum, a status update on the outage to ATSPs being provided with the AMS(R)S, at two-hour intervals.*

4.6.2.1.5 When an unplanned AMS(R)S system outage per 4.6.2.1.1 is resolved, the AMS(R)S system shall provide a status update to ATSPs being provided with the AMS(R)S on the resolution.

4.6.2.2 PLANNED OUTAGE

4.6.2.2.1 The AMS(R)S system shall report to ATSPs being provided with the AMS(R)S the expected time, location and duration of all planned outages (excluding emergency maintenance activities) at least 24 hours before the planned outage occurs.

4.6.2.2.2 For the purpose of emergency maintenance activities with less than 24 hours advance notice, the AMS(R)S system shall report to ATSPs being provided with the AMS(R)S the expected time, location and duration of the emergency maintenance activity.

4.6.2.2.3 **Recommendation.—** *When a planned AMS(R)S system outage is resolved, the AMS(R)S system should provide a status update to ATSPs being provided with the AMS(R)S on the resolution.*

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Origin	**Rationale**
CP-DCIWG/7	The proposed outage notification requirements aim to achieve a balance between operational needs and system capabilities, distinguishing between minor interruptions and system-wide issues affecting multiple aircraft as currently, some outages have not been formally reported for many hours. Subsection 4.6.2 for the planned and unplanned AMS(R)S system outage notifications has been updated to better reflect the current systems capabilities and operations introducing the following: a) a requirement and a recommendation on the duration of unplanned outages that shall/should be reported; b) statements about the entities that should be reported to; c) a recommendation on how soon unplanned outages should be reported; d) a recommendation on the interval for providing status updates for unplanned outages; e) a requirement on providing an update upon resolution of unplanned outages; f) a requirement on reporting planned outages in advance, and another on reporting emergency maintenance activities; and g) a recommendation on providing a status update when a planned outage is resolved. In relation to subsection 4.6.2.1, the published AMS(R)S SARPs do not provide a requirement for the duration of unplanned AMS(R)S system outages that must be reported to ATSPs. Requirement 4.6.2.1.1 states a minimum duration for an outage that must be reported, and the value is set at a level that the AMS(R)S system is currently able to meet. Since it is, however, desirable for efficient operations that all unplanned outages are reported, recommendation 4.6.2.1.2 was introduced. In addition, the timeliness of reporting is important, therefore recommendation 4.6.2.1.3 was introduced.

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4.6.4 Packet data service performance

Note. — Information on the operational compliance monitoring practices of the performance requirements is available in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925).*

4.6.4.1 If the system provides AMS(R)S packet data service, it shall meet the standards of the following subparagraphs.

Note. — System performance standards for packet data service may also be found in RTCA Documents DO-270 and RTCA DO-343/EUROCAE ED-242.

4.6.4.1.1 An AMS(R)S system providing a packet data service shall be capable of operating as a constituent mobile subnetwork of the ATN.

Note. — In addition, an AMS(R)S system may provide non-ATN data services ~~functions~~.

~~4.6.4.1.2 *DELAY PARAMETERS*~~

~~*Note. — The term "highest priority service" denotes the priority which is reserved for distress, urgency and certain infrequent network system management messages. The term "lowest priority service" denotes the priority used for regularity of flight messages. All delay parameters are under peak-hour traffic loading conditions.*~~

~~4.6.4.1.2.1 *Connection establishment delay*. Connection establishment delay shall not be greater than 70 seconds.~~

~~4.6.4.1.2.1.1 **Recommendation.** — *Connection establishment delay should not be greater than 50 seconds.*~~

~~4.6.4.1.2.2 In accordance with ISO 8348, data transit delay values shall be based on a fixed subnetwork service data unit (SNSDU) length of 128 octets. Data transit delays shall be defined as average values.~~

~~4.6.4.1.2.3 *Data transit delay, from aircraft, highest priority*. From aircraft data transit delay shall not be greater than 40 seconds for the highest priority data service.~~

~~4.6.4.1.2.3.1 **Recommendation.** — *Data transit delay, from aircraft, highest priority. From aircraft data transit delay should not be greater than 23 seconds for the highest priority data service.*~~

~~4.6.4.1.2.3.2 **Recommendation.** — *Data transit delay, from aircraft, lowest priority. From aircraft data transit delay should not be greater than 28 seconds for the lowest priority data service.*~~

~~4.6.4.1.2.4 *Data transit delay, to aircraft, highest priority*. To aircraft data transit delay shall not be greater than 12 seconds for the highest priority data service.~~

~~4.6.4.1.2.4.1 **Recommendation.** — *Data transit delay, to aircraft, lowest priority. To aircraft data transit delay should not be greater than 28 seconds for the lowest priority data service.*~~

~~4.6.4.1.2.5 *Data transfer delay (95th percentile), from aircraft, highest priority*. From aircraft data transfer delay (95th percentile), shall not be greater than 80 seconds for the highest priority data service.~~

~~4.6.4.1.2.5.1 **Recommendation.** — *Data transfer delay (95th percentile), from aircraft, highest priority. From aircraft data transfer delay (95th percentile), should not be greater than 40 seconds for the highest priority data service.*~~

~~4.6.4.1.2.5.2 **Recommendation.** — *Data transfer delay (95th percentile), from aircraft, lowest priority. From aircraft data transfer delay (95th percentile), should not be greater than 60 seconds for the lowest priority data service.*~~

~~4.6.4.1.2.6 *Data transfer delay (95th percentile), to aircraft, highest priority*. To aircraft data transfer delay (95th percentile), shall not be greater than 15 seconds for the highest priority data service.~~

~~4.6.4.1.2.6.1 **Recommendation.** — *Data transfer delay (95th percentile), to-aircraft, lowest priority. To-aircraft data transfer delay (95th percentile), should not be greater than 30 seconds for the lowest priority data service.*~~

~~4.6.4.1.2.7 *Connection release delay (95th percentile)*. The connection release delay (95th percentile) shall not be greater than 30 seconds in either direction.~~

~~4.6.4.1.2.7.1 **Recommendation.** — *The connection release delay (95th percentile) should not be greater than 25 seconds in either direction.*~~

~~4.6.4.1.3 *INTEGRITY*~~

~~4.6.4.1.3.1 *Residual error rate, from-aircraft*. The residual error rate in the from-aircraft direction shall not be greater than 10^{-4} per SNSDU.~~

~~4.6.4.1.3.1.1 **Recommendation.** — *The residual error rate in the from-aircraft direction should not be greater than 10^{-6} per SNSDU.*~~

~~4.6.4.1.3.2 *Residual error rate, to-aircraft*. The residual error rate in the to-aircraft direction shall not be greater than 10^{-6} per SNSDU.~~

~~4.6.4.1.3.3 *Connection resilience*. The probability of a subnetwork connection (SNC) provider-invoked SNC release shall not be greater than 10^{-4} over any one-hour interval.~~

~~*Note.— Connection releases resulting from GES-to-GES handover, AES log-off or virtual circuit preemption are excluded from this specification.*~~

~~4.6.4.1.3.4 The probability of an SNC provider-invoked reset shall not be greater than 10^{-1} over any onehour interval.~~

4.6.4.1.2 The AMS(R)S system shall ensure that at least 95 per cent of all CPDLC messages transmitted by the ATSP or aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a two-way transit delay of no more than 100 seconds (see *Note 1* following Figure 4-1).

4.6.4.1.3 **Recommendation.—** *The AMS(R)S system should ensure that at least 95 per cent of all CPDLC messages transmitted by the ATSP or aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a two-way transit delay of no more than 12 seconds (see Note 1 following Figure 4-1).*

4.6.4.1.4 The AMS(R)S system shall ensure that at least 95 per cent of all ADS-C messages transmitted by the aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a one-way transit delay of no more than 84 seconds (see *Note 2* following Figure 4-1).

4.6.4.1.5 **Recommendation.—** *The AMS(R)S system should ensure that at least 95 per cent of all ADS-C messages transmitted by the aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a one-way transit delay of no more than 6 seconds (see Note 2 following Figure 4-1).*

4.6.4.1.6 The AMS(R)S system shall ensure that at least 99.9 per cent of all CPDLC messages transmitted by the ATSP or aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a two-way transit delay of no more than 120 seconds (see *Notes 1* and *3* following Figure 4-1).

4.6.4.1.7 **Recommendation.—** *The AMS(R)S system should ensure that at least 99.9 per cent of all CPDLC messages transmitted by the ATSP or aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a two-way transit delay of no more than 22 seconds* (*see Notes 1 and 3 following Figure 4-1).*

4.6.4.1.8 The AMS(R)S system shall ensure that at least 99.9 per cent of all ADS-C messages transmitted by the aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a one-way transit delay of no more than 170 seconds (see *Notes 2* and *3* following Figure 4-1).

4.6.4.1.9 **Recommendation.—** *The AMS(R)S system should ensure that at least 99.9 per cent of all ADS-C messages transmitted by the aircraft and routed through the SATCOM link are delivered without corruption or misrouting with a one-way transit delay of no more than 14 seconds (see Notes 2 and 3 following Figure 4-1).*

Note.— The following figure illustrates the key components in the CPDLC and ADS-C exchanges over the SATCOM service elements and highlights the measurement points applicable.

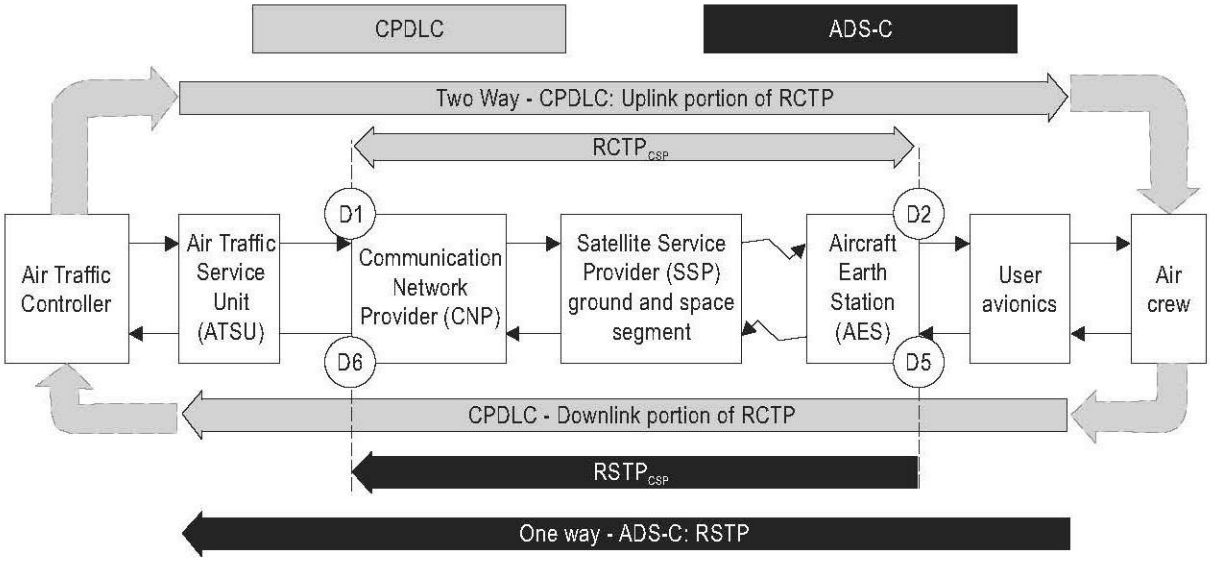

Figure 4-1. CPDLC and ADS-C measurement points

Note 1.— The "two-way data transit delay" is measured between D1 and D2 for uplink and between D5 and D6 in downlink in Figure 4-1. This includes the transit delay for the following components:

a) *The ground-ground subnetwork connecting the ATSU with the SSP via the CNP;*

b) *The air-ground SATCOM subnetwork, including the ground infrastructure of the SSP, the actual air-ground link and the AES.*

Note 2.— The "one-way data transit delay" is measured between D5 and D6 in Figure 4-1. This includes the transit delay for the following components:

a) *The ground-ground subnetwork connecting the ATSU with the SSP via the CNP;*

b) *The air-ground SATCOM subnetwork, including the ground infrastructure of the SSP, the actual air-ground link and the AES.*

Note 3 — For the message latency allocations, the CSP consists of the CNP and SSP. Additional information is available in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925).*

Origin **CP-DCIWG/7**	**Rationale** Subsection 4.6.4 for the data performance requirements has been updated to better reflect the current systems capabilities and operations. The subnetwork latency requirements in the existing SARPs have been removed as they are not used today for the performance monitoring of the service. With the proposed performance requirements, we have introduced alignment to RCPs and RSPs applicable to oceanic datalink (RCP240 and RSP180). In addition, more stringent recommendations were introduced to enable the use of the new SATCOM systems to support ATS/B2, based on the RCTP and RSTP components of RCP130 and RSP160. Effectively, the new data service performance requirements and recommendations aim to allow SATCOM technologies to be considered as options to support ATN/B1 as well as ATS/B2 data services, and emerging new concepts, and to promote global harmonization and convergence, mitigating the risk of divergence with regional implementations adhering to regional standards. The figure depicts the flow of data where the two-way CPDLC communications (uplink and downlink portions of RCTP) and one-way ADS-C communications (RSTP) are highlighted.

4.6.5 Voice service performance

Note. — Specific satellite voice communication (SATVOICE) system characteristics are also contained in Annex 10, Volume III, Part II — Voice Communication Systems, section 2.5.

4.6.5.1 If the system provides an AMS(R)S voice service, it shall meet the ~~requirements~~ Standards of the following subparagraphs.

~~*Note. — ICAO is currently considering these provisions in the light of the introduction of new technologies.*~~

~~4.6.5.1.1 *CALL PROCESSING DELAY*~~

~~4.6.5.1.1.1 *AES origination*. The 95th percentile of the time delay for a GES to present a call origination event to the terrestrial network interworking interface after a call origination event has arrived at the AES interface shall not be greater than 20 seconds.~~

~~4.6.5.1.1.2 *GES origination*. The 95th percentile of the time delay for an AES to present a call origination event at its aircraft interface after a call origination event has arrived at the terrestrial network interworking interface shall not be greater than 20 seconds.~~

4.6.5.1.1 The AMS(R)S system shall provide a voice ground to air call set-up time of no more than 25s for at least 95 per cent of call attempts.

4.6.5.1.2 **Recommendation.—** *The AMS(R)S system should provide a voice ground to air call set-up time of no more than 12s for at least 95 per cent of call attempts.*

4.6.5.1.3 The AMS(R)S system shall provide a voice ground to air call set-up time of no more than 30s for at least 99 per cent of call attempts.

4.6.5.1.4 **Recommendation.—** *The AMS(R)S system should provide a voice ground to air call set-up time of no more than 15s for at least 99 per cent of call attempts.*

Note 1.— The ground to air call set-up time covers the time from when a controller presses a call button to connect to a CNP/SSP or a radio operator, if any, until hearing the ringing tone. Additional information and a timing diagram is provided in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925). This call set-up time includes the following components:*

a) the ground-ground subnetwork connecting the ATSP with the SSP via the CNP; and

b) the air-ground SATCOM subnetwork, including the ground infrastructure of the SSP, the air-ground link and the AES.

Note 2.— For validation purposes the ground-to-air call set-up time can be measured from the time the AMS(R)S receives the call request signal from the ATSU to the time when the AMS(R)S system forwards the associated ring signal from the aircraft to the ATSU.

4.6.5.1.5 The AMS(R)S system shall provide a voice air to ground call set-up time of no more than 10s for at least 95 per cent of call attempts.

4.6.5.1.6 The AMS(R)S system shall provide voice air to ground call set-up time of no more than 15s for at least 99 per cent of call attempts.

Note 1.— The air to ground call set-up time covers the time from when the call is placed on the AES side until the recipient's phone starts ringing.

Note 2.— There is no indication available on the ground of when the pilot initiated a call. The performance thus cannot be monitored during normal operations and instead needs to be verified with a representative number of calls using AES in a laboratory, while operating over the satellite with the ground network.

Note 3.— For validation purposes, the measurements can be performed from the time the AMS(R)S system receives the incoming call request from the aircraft voice system (input of AES) to the time it receives the ring signal from the ATSU on the ground side.

~~4.6.5.1.2 *VOICE QUALITY*~~

~~4.6.5.1.2.1 The voice transmission shall provide overall intelligibility performance suitable for the intended operational and ambient noise environment.~~

~~4.6.5.1.2.2 The total allowable transfer delay within an AMS(R)S subnetwork shall not be greater than 0.485 seconds.~~

~~4.6.5.1.2.3 **Recommendation.** — *Due account should be taken of the effects of tandem vocoders and/or other analog/digital conversions.*~~

~~4.6.5.1.3 *VOICE CAPACITY*~~

~~4.6.5.1.3.1 The system shall have sufficient available voice traffic channel resources such that an AES- or GES-originated AMS(R)S voice call presented to the system shall experience a probability of blockage of no more than 10^{-2}.~~

~~*Note.— Available voice traffic channel resources include all pre-emptable resources, including those in use by non-AMS(R)S communications.*~~

4.6.5.1.7 The AMS(R)S system shall provide a mean intelligibility Diagnostic Rhyme Test (DRT) score of at least 85 when measured in a jet transport aircraft noise environment.

Note. — Information for the DRT measurement conditions can be found in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925).*

4.6.5.1.8 The 1-way voice latency of the AMS(R)S system shall be 1.5 seconds or less in both the air-to-ground and ground-to-air directions.

Note.— SATVOICE is not expected to have the same latency performance as the terrestrial VHF voice system.

4.6.5.1.9 The AMS(R)S system shall provide a dropped call rate of 0.01 or less.

4.6.5.1.10 The AMS(R)S system shall provide a grade of service (GoS) of 0.01 or better.

4.6.5.1.11 The AMS(R)S system shall provide security mechanisms to ensure that only authorised entities can call the aircraft flight deck.

4.6.5.1.12 The AMS(R)S system shall provide voice channels with three (3) additional levels of priority (i.e., a total of four (4), including aeronautical passenger communications (APC) in both air-to-ground and ground-to-air directions, aligned with the relevant ICAO Standards, namely airline operational control/airline administrative control (AOC/AAC), air traffic services (ATS) and emergency (EMG), that are all prioritized above cabin voice calling (APC).

4.6.5.1.13 The AMS(R)S system shall support the voice priority indication for both ground-to-air and air-to-ground calls.

4.6.5.1.14 The AMS(R)S system shall have provision of voice caller line identity information and priority indication for both ground-to-air to and air-to-ground calls.

4.6.5.1.15 The AMS(R)S system shall support the provision to the users of call status indications for both ground-to-air and air-to-ground calls.

Origin	**Rationale**
CP-DCIWG/7	Subsection 4.6.5 for the voice performance requirements has been updated to better reflect the current systems capabilities and operations. New voice requirements have been introduced which are more comprehensive than the existing requirements, ensuring that the satcom voice service will meet the demands for current applications. The new performance requirements for voice services aim to: a) characterize the capabilities of the current satellite technology, facilitate the definition of appropriate voice operations based on the current system capabilities, and support the use of these systems for new concepts; b) enable the adoption/approval of satellite voice to be used as direct controller-pilot communications means, taking benefit from available improvements in standardized communications technologies such as one stage dialling (i.e. automatic caller authentication); and c) support the development of new concepts of operation for satellite voice services and new specifications, by describing the technical capabilities of the current satellite systems.

4.6.6 Security

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4.6.7 AMS(R)S availability

4.6.7.1 The AMS(R)S system shall be capable of providing an AMS(R)S availability of 99.9 per cent or better.

Note 1.— Further information on the availability of the AMS(R)S system is provided in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925), and information on RCP and RSP availabilities are provided in the* Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869).*

Note 2.— For the availability calculation of the AMS(R)S system, only the CNP and SSP are included, while the AES is not included.

4.6.7.2 **Recommendation.—** *The AMS(R)S system should provide an AMS(R)S availability of 99.95 per cent or better.*

Origin	**Rationale**

CP-DCIWG/7	The new subsection 4.6.7 on the AMS(R)S availability introduces requirement for the SATCOM system availability since the current provisions do not contain such requirement or recommendation. Availability is a core part of requirements based on performance-based principles. The availability level of 0.999 is the minimum required for the application of RCP240 and RSP180 in oceanic airspace and can be met by the current SATCOM systems. The recommendation for an availability level of 0.9995 is based on the availability performance levels required for continental airspace as currently published in EUROCAE ED-228B/RTCA DO-350B as RCP130 and RSP160.

4.6.8 Handover

Note.— This section covers intra-system handovers, that is within the same AMS(R)S during normal operations.

4.6.8.1 The AMS(R)S system shall support handover between different satellites and/or ground stations within the same AMS(R)S system.

4.6.8.2 **Recommendation.—** *During satellite handover, if loss of communication occurs both voice and data services should be available within 120 seconds.*

Note.— Systems that operate as a "make before break" architecture, such as cross-linked satellite networks, support a seamless satellite handover.

4.6.9 Multilink

Note.— The two recommendations below are to support automatic fallback to an alternative data link in the event of a failure of the SATCOM link, within the ATN multilink infrastructure.

4.6.9.1 **Recommendation.—** *The AMS(R)S system should, for each aircraft, automatically report to the airborne anchor point systems, such as the airborne communications management unit, a link-down status no later than 90 seconds of the time when the relevant air-ground connectivity service for given aircraft was lost.*

4.6.9.2 **Recommendation.—** *The AMS(R)S system should, for each aircraft, automatically report to the ground anchor point systems at the CSP(s) a link-down status no later than 90 seconds of the time when the relevant air-ground connectivity service for given aircraft was lost.*

Note .— The time defined in recommendations 4.6.9.1 and 4.6.9.2 is measured from the moment when a connection via the AMS(R)S system is lost until the information about the loss is delivered to the anchor points. This time, therefore, includes the time to detect the loss and the time to report the loss to the anchor points.

Origin	**Rationale**
CP-DCIWG/7	In the existing SARPS, there are no handover requirements, therefore, the new subsection 4.6.8 proposes new requirement and recommendation that aim to support efficient and timely handover within the same AMS(R)S system. The proposed value

	indicated is based on the observed performance of existing geostationary systems and is not concerning "make before break" architectures, as explained in the note. A new section 4.6.9 is introduced containing two recommendations to support automatic fallback to an alternative data link in the event of a failure of the SATCOM communications link, within a multilink environment.

4.7 SYSTEM INTERFACES

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4.7.2 Packet data service interfaces

4.7.2.1 If the system provides AMS(R)S packet data service, it shall provide an interface to the ATN/OSI services, or ATN/IPS services or both.

Note 1.— The detailed technical specifications related to provisions of the ATN/OSI-compliant subnetwork service are contained in Doc 9880 — Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and protocols ~~(in preparation)~~.

Note 2.— The detailed technical specifications related to provisions of the ATN/IPS-compliant subnetwork service are contained in Part I of the Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (*Doc 9896)*.

Note 3.— In addition, an AMS(R)S system may provide non-ATN data services.

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Origin	**Rationale**
CP-DCIWG/7	The updates on section 4.7 aim to introduce the consideration of ATN/IPS services in addition to ATN/OSI services as well as allow for non ATN data services to be provided by AMS(R)S systems.

INITIAL PROPOSAL 3

4.8 USE OF AMS(R)S AS SOLE LRCS MEANS

4.8.1 When AMS(R)S is used as the sole means for long-range communication systems (LRCS), the aircraft AMS(R)S avionics shall be designed and installed in a manner that prevents the loss of long-range communications due to any single point of failure.

4.8.2 Where more than one AMS(R)S avionics installation is used to support LRCS, each of these installations shall independently meet the applicable requirements.

Note 1.— Further technical details on the LRCS implementation are available in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925).*

4.8.3 Irrespective of which AMS(R)s avionics installations are providing the service, a single access process via the unique 24-bit aircraft address shall be used for ground-to-air calls from the ATS unit to the flight deck.

4.8.4 A single ground-to-air call from the ATS unit to the flight deck shall result in a single incoming call announced in the flight deck, even when all AMS(R)S avionics installations are active.

Origin:	**Rationale:**
CP-DCIWG/7	This section is introducing new requirements, which will allow the SATCOM systems to be considered as an option for a sole means long-range communication system. These SARPs address technical and operational requirements that will allow a dual installation of SATCOM systems to be considered as an alternative to HF voice communications for LRCS.

INITIAL PROPOSAL 4

PART II — VOICE COMMUNICATION SYSTEMS

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2.5 SATELLITE VOICE COMMUNICATION (SATVOICE) SYSTEM CHARACTERISTICS

Note 1.— The detailed satellite communication (SATCOM) system requirements supporting both data and voice AMS(R)S are contained in Annex 10, Vol III, Part I — Digital Data Communication Systems, Chapter 4 on Aeronautical mobile-satellite (route) service (AMS(R)S).

Note 2.— Guidance material for the implementation of the aeronautical mobile satellite service is contained in the Manual on the Aeronautical Mobile Satellite (Route) Service *(Doc 9925). Additional guidance for SATVOICE ~~systems~~ is contained in the* Satellite Voice Operations Manual *(Doc 10038), and the* Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869)*.

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Origin:	**Rationale:**
CP-DCIWG/7	Historically, data and voice were carried over separate channels. With new technologies, voice is managed as data and carried over the same digital data link. A note has, therefore, been introduced in Part II to indicate that both data and voice requirements are contained in Part I.

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ATTACHMENT C to State letter AN 7/64.1.3- 25/51

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**.

	Agreement without comments	*Agreement with comments**	*Disagreement without comments*	*Disagreement with comments*	*No position*
Amendment to Annex 10, Volume III, Parts I and II (Attachment B 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 —