

**CERTIFICATION SPECIFICATIONS,
ACCEPTABLE MEANS OF COMPLIANCE AND
GUIDANCE MATERIAL
FOR
AIRBORNE COMMUNICATIONS, NAVIGATION AND SURVEILLANCE
CS-ACNS ISSUE 5**

The European Union Aviation Safety Agency (EASA) publishes Certification specifications, Acceptable Means of Compliance and Guidance Material for Airborne Communications, Navigation and Surveillance as consolidated documents. These documents are used for establishing the certification basis for applications submitted after the date of entry into force of a given issue.

Consequently, except for a note, e.g. '[CS-ACNS/5]', under the amended certification specification (CS), acceptable means of compliance (AMC), or guidance material (GM), the consolidated CS-ACNS Issue 5 (the Annex to ED Decision 2024/003/R) does not allow readers to see the amendments that have been introduced compared to the previous issue. To show the changes, this Change Information document is created, using the following format:

- deleted text is ~~struck through~~;
- new or amended text is highlighted in blue;
- an ellipsis '[...]' indicates that the rest of the text is unchanged.

Note to the reader

In amended, and in particular in existing (that is, unchanged) text, 'Agency' is used interchangeably with 'EASA'. The interchangeable use of these two terms is more apparent in the consolidated versions. Therefore, please note that both terms refer to the 'European Union Aviation Safety Agency (EASA)'.

SUBPART A — GENERAL

[...]

CS ACNS.A.GEN.005 Definitions

This point contains the definitions of terms used in CS-ACNS:

[...]

ADS-C refers to automatic dependent surveillance-contract and is a means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft via data link.

[...]

Controller–pilot data link communications (CPDLC) is a data link application that provides a means of communication between the controller and the pilot. ~~the ICAO standardised procedure for Controller–Pilot Data Link Communications. CPDLC takes the form of an application, present on both aircraft and ground-based ATC centres that provides support for the Data Link Communications Initiation Capability (DLIC), ATS communications management service (ACM), ATS Clearance and Information service (ACL) and ATS microphone check service (AMC).~~

[...]

Emergency indicators refers to specific Mode A Code values: (7500 unlawful interference, 7600 radio failure, 7700 general emergency) or to ADS-C emergency/urgency status (emergency and/or unlawful interference or cancellation of the emergency/urgency).

[...]

Extended projected profile (EPP) provides the aircraft's trajectory intent using ADS-C.

[...]

[CS-ACNS/5]

SUBPART B — Communications (COM)

[...]

Section 2 — Data Link Services (DLS) General

CS ACNS.B.DLS.B1.001 Applicability

(See GM1 ACNS.B.DLS.B1.001 and GM2 ACNS.B.DLS.001)

This section provides the airworthiness standards for ATN B1 and ATS B2 limited to the provision of ADS-C EPP with VDL Mode 2 data link aircraft systems to be installed on aircraft intended to be used for CPDLC Communications.

[CS-ACNS/5]

GM1 ACNS.B.DLS.B1001 Applicability

~~Controller-pilot communications through the data link are used worldwide. Different technologies may be used, and CS ACNS.B.DLS.B1.001 is intended to provide the airworthiness standard for such installations. Additionally, controller-pilot communications over the ATN B1 data link technology have been mandated in Europe through Regulation (EC) No 29/2009. Installations intended to operate within EU airspace, defined in the above-mentioned Regulation, should fully comply with all the requirements of the 'DATA LINK SERVICES' section.~~

~~Installations not intended to operate within EU airspace are not required to comply with the above-mentioned Regulation.~~

~~Note 1: CS ACNS.B.DLS.B1.010 and CS ACNS.B.DLS.B1.015 are also applicable for CPDLC installations where, in addition to ATN B1 over VDL M2, other means of communication and other services are also provided.~~

~~Note 2: further background information on data link systems is provided in Appendix B — Background information on data link systems.~~

ATN B1 data link installations referred to in this section (Section 2) support the data link services 'ATC Communications Management' (ACM), 'ATC Clearances and Information' (ACL) and 'ATC Microphone Check' (AMC) through CPDLC Version 1, as defined in EUROCAE Document ED-110B.

This section also refers to the capability of the data link installations to downlink the extended projected profile (EPP) through ADS-C Version 1, as defined in EUROCAE Document ED-229A, as part of the ATS B2 data link.

The Context Management (CM) application and the DLIC service are prerequisites for the initiation of CPDLC and ADS-C connections.

[CS-ACNS/5]

GM2 ACNS.B.DLS.001 Applicability

EASA recognises that ATS B2 in accordance with ED-228A and ED-229A (or later acceptable revisions) is the reference application for data link services in the future. EASA will accept and support applications for the approval of systems that offer ATS B2 data link services in lieu of ATN B1 systems. Applicants are encouraged to contact EASA at their earliest convenience to discuss the means to demonstrate compliance with the relevant applicable standards.

[CS-ACNS/5]

CS ACNS.B.DLS.~~B1~~.005 Installation Requirements

(See AMC1 ACNS.B.DLS.~~B1~~.005 and GM1 ACNS.B.DLS.005)

The data link system includes a means to enable data communication and flight deck annunciations and controls.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.005 Installation Requirements (VDL Mode 2 Sub-Network)

The data link system should comply with ICAO Document 9776 and ARINC 631-6 for VDL Mode 2 multi-frequency operations.

[CS-ACNS/5]

GM1 ACNS.B.DLS.~~B1~~.005 Data Link System Installation

An example of installation may be a system comprising the following components or inputs:

- A VHF Data Radio (VDR) with Mode 2 capability and its associated antenna;
- A Unit for Communication Management ~~with Mode 2 and ATN capabilities~~;
- A ~~display unit with~~ means for crew to be notified of ATS Requests and Clearances, and issue downlink crew requests to controllers or responses to outstanding messages (from controllers);
- An adequate source for UTC time, e.g. a Global Navigation Satellite System (GNSS);
- An adequate source of information for conducted flight plan information (e.g. Departure Airport, Destination Airport, Estimated Time of Arrival) and trajectory intent, e.g. Flight Management System (FMS);
- An adequate source of aeroplane position, e.g. Flight Management System (FMS), or a Global Navigation Satellite System (GNSS) or both;
- An adequate source for Air/Ground Status information, e.g. an interface with the landing gear or Flight Management System (FMS) or both;
- An adequate aural attention getter for announcements;
- Adequate indication means of system and service availability;
- Adequate control means for the crew.

[CS-ACNS/5]

FLIGHT DECK CONTROL AND INDICATION CAPABILITIES

CS ACNS.B.DLS.81-010 Flight Deck Interface

(See AMC1 ACNS.B.DLS.81-010)

- (a) A means is provided:
- (1) to inform clearly and unambiguously when uplinked messages are received;
 - (2) for the flight crew to initiate the logon, to terminate the ~~data-link-services~~ CPDLC connections and to terminate the ADS-C connections;
 - (3) for the flight crew to know in real time the identifier of the CPDLC ATS provider(s) and the established ADS-C connections ~~connecting with the aircraft~~;
 - (4) to display all messages, with minimal flight crew action, in a format that is easy to comprehend and distinguishable from each other;
 - (5) for the flight crew to respond to ATS messages;
 - (6) to inform the flight crew that pending or open messages are waiting for a response;
 - (7) for the flight crew to determine the status of the data link system;
- (b) A means is provided to prohibit the deletion, confirmation, or clearance of a message until the entire message is displayed.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.81-010 Flight Deck Interface

Flight crew control and display of data-link-related information (connectivity status, outstanding messages, etc.) should be consistent with the overall ~~crew~~ flight deck design philosophy.

Flight crew control and display of data link messages should satisfy integrity and interface design criteria appropriate for the intended purpose. Reference to the applicable CS xx.1309 requirements should be observed.

If a direct interface exists between the data link application and other on-board systems, (e.g. flight planning and navigation), a means may be provided for the flight crew to initiate the use of the data contained in the message by the other on-board system. The means provided should be separate from that used to respond to a message.

Flight deck annunciations should be compatible with the overall alerting scheme of the aircraft.

Audible and visual indications should be given by the data link system for each uplinked ATS message, including those messages not displayed immediately because of the lack of crew response to an earlier ATS message. Visual alerts alone may be used for non-ATS messages.

Annunciation of the receipt of a message during critical flight phases should be inhibited until after the critical flight phase. The criteria that define critical flight phases should be consistent with the particular flight deck philosophy and the particular data link services supported.

Means should be provided for the flight crew to list, select, and retrieve the most recent ATS messages received and sent by the flight crew during the flight segment. The status of each message, and the time it was received or sent, should be accessible.

When CPDLC messages are displayed:

- (a) such location should be in the maximum field of view.
- (b) messages should be provided in a dedicated display (or in a dedicated window of a display). Shared use of CPDLC and other applications in a common display (or in the same window of a display) should be avoided.

Note 1: (a) and (b) are intended for future extension of CPDLC use beyond the en-route flight phase. Installations not in accordance with these recommendations are liable to be limited for CPDLC operations in the en-route or prior departure flight phase.

Note 2: Where data link messages are displayed on a shared display or on a shared display area, the selection of another display format or function should not result in the loss of uplinked messages which are waiting for a response. In case the pilot is working on another task and a message is uplinked, the uplinked message should not interrupt the current work, nor result in the loss of any uplinked message and/or data entered while accomplishing the other task.

- (c) messages from the ATSU (Air Traffic Service Unit) should remain displayed until responded, or cleared, or until the flight crew selects another message.
- (d) means should be provided for the flight crew to clear uplinked messages from the display. However, this capability should be protected against inadvertent deletion.
- (e) If only part of the message is displayed, a visual indication should be provided to the pilot to indicate the presence of the remaining message.

Means should be provided for the flight crew to create, store, retrieve, edit, delete, and send data link messages.

The data link system should indicate when message storage and/or printing is not available.

A flight deck printer could be used as a means of storing data communications messages received or sent during flight.

If a message intended for visual display is greater than the available display area and only part of the message is displayed, a visual indication is to shall be provided to the pilot to indicate the presence of the remaining message.

~~Data link messages from the ATS should be displayed and remain displayed until responded, cleared or the flight crew selects another message.~~

The status of each message (i.e. source, time sent, open/closed) should be displayed together with the message.

[CS-ACNS/5]

CS ACNS.B.DLS.B1-015 Dual Data Link Capabilities (Dual stack)

(See AMC1 ACNS.B.DLS.B1-015)

For aircraft integrating both FANS 1/A and ATN B1 CPDLC applications:

- (a) Control and display: Messages with the same intent that are transmitted or received through these technologies are displayed in the same way.
- (b) Alerting: Where a common alerting is not demonstrable, a means is provided to distinguish between the alerting schemes in a format that is easy to comprehend.

[CS-ACNS/5]

AMC1.ACNS.B.DLS.B1-015 Dual Data Link Capabilities (Dual stack)

Note 1: A **Dual stack system** is either a bilingual system capable of automatically selecting the data link network or a dual system that uses manual selection with an interlock system.

The data link system should comply with ED-154A, interoperability requirements IR-207, IR-209, IR-210, IR-211, IR-212, IR-214, and IR-215 to ensure seamless transition between two adjacent ATSUs, one using FANS 1/A+ and the other using ATN B1.

The data link system should demonstrate common accessibility to the FANS 1/A and ATN B1 CPDLC applications. Accessibility demonstration should include common controls (i.e. line select keys) or, where different, the potential to introduce confusion or unacceptable flight crew workload should be evaluated.

The data link system should demonstrate common control and input procedures for retrieving and responding to FANS 1/A and ATN B1 uplink messages.

The data link system should demonstrate common control and input procedures for composing and sending FANS 1/A and ATN B1 downlink messages.

The data link system should demonstrate common flight deck indications for incoming FANS 1/A and ATN B1 messages. –Where common alerting is not demonstrable, the alerting scheme **should be evaluated** to ensure that neither confusion nor unnecessary flight crew workload is introduced.

Annunciations and indications should be clear, unambiguous, timely, and consistent with the flight deck philosophy.

~~FANS 1/A differentiates messages alerting between normal and Urgent. Upon receipt of a high alert CPDLC message, the data link system should indicate it to the flight crew.~~

Note 2: FANS 1/A standard (ED-100A) identifies the term ‘IMMEDIATELY’, within the phraseology standardised for CPDLC communications. This term is to be understood within the required communications performance **scope** (RCP) **scope**, which for oceanic and remote operations is either 240 seconds or 400 seconds. The use of these terms ‘IMMEDIATELY’ and ‘EXPEDITE’ are not to be confused with the terminology used in material related to CS 25.1322. However, annunciations and indications should allow flight crews to easily identify these messages (associated with Urgent and Distress urgency attribute) among the normal messages.

Flight Deck Display of Messages from either FANS 1/A or ATN B1 CPDLC Applications:

A common flight deck display should be capable of displaying messages with the same operational intent resulting from same message elements that may be implemented differently between FANS 1/A and ATN B1 CPDLC applications. –The common format to display FANS 1/A messages may be in accordance with the preferred format denoted in Annex A to ED 122, which is consistent with ICAO Doc 4444, 15th Edition, and ATN B1 message formats.

Dual Stack ATS Data Link System Status Indication:

The system should provide the flight crew with a means to clearly identify the status of different modes of the data link system that affect significantly operational capability. –Examples of different modes of data link may include situations where downlink messages are available in one airspace, but not the other; or messages that may or may not be loadable depending on system status, i.e. ATN B1 or FANS 1/A.

ATSU (Air Traffic Service Unit) Connections and Handoffs:

The system should be capable of the following functions:

- (1) Proper connection and termination for FANS 1/A ATSU.

- (2) Proper connection and termination for ATN B1 ATSU.
- (3) Transfer to next data authority (e.g. FANS 1/A ATSU to ATN B1 ATSU), in both directions. This should include proper connection, maintenance of connection and connection termination protocol to ensure that the aircraft does not hold two simultaneous active CPDLC connections **except for the transfer to the next data authority**.
- (4) Ability for flight crew to manually terminate existing connection and ~~establish new connection~~, initiate a DLIC 'logon' in both directions (i.e. FANS 1/A-to-ATN B1 and ATN B1-to-FANS 1/A).
- (5) Ability for flight crew to verify current and next facility designation or name.

Note 3: FAA AC 20-140AC provides adequate guidance related to the application interoperability, sub-networks and performance designators. (refer to Tables 5.1 and 5.2).

[CS-ACNS/5]

ATN B1 DATA LINK AND ADS-C EPP DOWNLINK CAPABILITY

CS ACNS.B.DLS.B1.020 Data Link Services Capabilities

(See AMC1 ACNS.B.DLS.B1.020, ~~and~~ GM1 ACNS.B.DLS.B1.020 and GM2 ACNS.B.DLS.020)

The data link system provides the following ~~services~~ capabilities:

- (a) Data Link Initiation Capability (DLIC);
- (b) ATC Communications Management (ACM);
- (c) ATC Clearances and Information (ACL); ~~and~~
- (d) ATC Microphone Check (AMC); ~~and~~
- (e) Downlink of ADS-C EPP.

AMC1 ACNS.B.DLS.B1.020 Data Link Services Capabilities

When the aircraft has no CPDLC Current Data Authority, the aircraft's data link aircraft equipment should provide crew members that entering an the airspace of a data-link-equipped ATS unit with the capability to initiate a DLIC 'Logon' function (e.g. send a CMLogonRequest message) with the applicable ATS unit, in order to identify the aircraft and initiate the use of data link services.

[CS-ACNS/5]

GM1 ACNS.B.DLS.B1.020 Data Link Services Capabilities

~~Community Specification EN 303 214 'Data Link Services (DLS) System' provides a set of test scenarios to~~ Data link capabilities should be demonstrated using a ~~verified~~ representative ground data link system or a ground data link system simulator able to support the transactions and information exchange defined in Subpart B, Section 2.

(a) ~~Data Link Initiation e~~ Capability (DLIC) ~~s~~ Service

The DLIC service enables the exchange of information between aircraft and ground data link equipment, necessary for the establishment of data link communications.

It ensures:

- (1) the unambiguous association of flight data from the aircraft with flight plan data used by an ATS unit;
- (2) the exchange of the supported air-ground application type and version information;
- (3) the delivery of the addressing information of the entity hosting the application.

(b) **ATC Communications Management (ACM) Service**

The ACM service provides automated assistance to flight crews for conducting the transfer of ATC communications (voice and data).

It includes:

- (1) the initial establishment of CPDLC with an ATS unit;
- (2) the CPDLC ATC transfer instruction from one ATS unit to the next ATS unit;

- (3) the CPDLC ATC instructions for a change in voice channel;
- (4) the normal termination of CPDLC with an ATS unit.

(c) **ATC Clearances and Information (ACL) Service**

The ACL service provides flight crews with the ability to:

- (1) send requests and reports to air traffic controllers;
- (2) receive clearances, instructions and notifications issued by air traffic controllers to flight crews.

(d) **ATC Microphone Check (AMC) Service**

The AMC service provides CPDLC ATC instructions to flight crews ~~(s)~~ requesting ~~him~~/them to verify the status of ~~his~~/their voice communication equipment.

(e) **Downlink of ADS-C EPP**

ADS-C provides the capabilities to:

- (1) establish and terminate ADS-C contracts (demand, periodic, event);
- (2) downlink the EPP report commensurate with the type of ADS-C contract.

[CS-ACNS/5]

GM2 ACNS.B.DLS.020 Data Link Capabilities — Testing

Testing demonstrations could be based on two main steps:

- Equipment testing (performed by the equipment manufacturer) using adequate simulation testing tools.
- System testing at system test bench and/or at aircraft test level (either on ground or in flight).

Equipment qualification testing data may be reused from the avionics manufacturer, provided that full and unrestricted access to the compliance data is established and maintained. However, the applicant remains responsible for all test data used in the course of compliance demonstration.

[CS-ACNS/5]

CS ACNS.B.DLS.~~B1~~.025 Protection mechanism

(See ~~AMC1 ACNS.B.DLS.B1.025~~ ~~AMC2 ACNS.B.DLS.B1.025~~ ~~AMC3 ACNS.B.DLS.B1.025~~, ~~GM1 ACNS.B.DLS.B1.025~~, ~~GM2 ACNS.B.DLS.B1.025~~ and ~~GM3 ACNS.B.DLS.B1.025~~)

A means is provided to protect the integrity of the message.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.025 Protection mechanism

The data link system ~~should comply~~ that complies with EUROCAE Documents ED-110B and ED-229A following ~~ATN Baseline 1 standards~~ satisfies the requirement.:

- ~~— ICAO Document 9705 (Edition 2) for ICS (Sub-Volume V), ULCS (Sub-Volume IV), CM-CPDLC (Sub-Volume II) ASE requirements;~~
- ~~— EUROCAE Document ED-110B;~~
- ~~— ICAO Document 9776 and ARINC 631-6 for VDL Mode 2 multi-frequency operations.~~

The data link aircraft equipment should provide support for the CPDLC application message integrity check mechanism, with support for 'default checksum algorithm' only.

[CS-ACNS/5]

AMC2 ACNS.B.DLS.B1.025 Protection mechanism

Testing demonstrations could be based in two main steps:

- ~~— Equipment testing (done by equipment manufacturer) using adequate simulation testing tools.~~
- ~~— System testing, at system test bench and/or at aircraft test level (either on ground or in flight).~~

Equipment qualification testing data may be reused from the avionics manufacturer, provided that full and unrestricted access to the compliance data is established and maintained. However, the applicant remains responsible for all test data used in the course of compliance demonstration.

[CS-ACNS/5]

AMC3 ACNS.B.DLS.B1.025 Protection mechanism

Where ARINC 631-6 identifies a specific deviation from ICAO Doc 9776 (Manual on VDL Mode 2), the provisions of the former should take precedence.

ARINC 631-6 also references ARINC 750 for definition of Signal Quality Parameter (SQP) levels. Measurements of SQP levels may be passed over the air-ground link as parameters in the XID exchanges.

[CS-ACNS/5]

GM1 ACNS.B.DLS.B1.025 Protection mechanism

EUROCAE Document ED-110B sections 3.3.5.1 and 3.3.6 mentions an 'ATN Message Checksum Algorithm' (or 'Application Message Integrity Check (AMIC)') that does not exist in ICAO Document 9705 Edition 2. These terms are correctly referenced in ICAO Doc 9705 PDR M60050001.

[CS-ACNS/5]

GM2 ACNS.B.DLS.B1.025 Protection mechanism

Both ICAO Document 9705 and EUROCAE Document ED-110B include requirements for the support of FIS and ADS-C applications. These two applications are not mandated for operations in European airspace. Data link aircraft implementations are free to support these applications and should notify their application availability in the DLIC logon function.

[CS-ACNS/5]

~~GM3-ACNS.B.DLS.B1.025 Protection mechanism~~

~~Further guidance material from EUROCONTROL is available on EUROCONTROL website (www.eurocontrol.int):~~

- ~~—— LINK2000+/ATC DATA LINK OPERATIONAL GUIDANCE, Version 6.0, Date: 17 December 2012.~~
- ~~—— LINK 2000+ Guidance to Airborne Implementers, Version 1.1, Date: 09 December 2009.~~
- ~~—— LINK2000+/FLIGHT CREW DATA LINK OPERATIONAL GUIDANCE Version 5.0, Date: 17 December 2012.~~
- ~~—— LINK2000+ Programme, Generic Interop Test Plan for Avionics – Part 1, Upper Layers and CM/CPDLC applications, Version 2.3, Date: 15th June 2010.~~

[CS-ACNS/5]

SYSTEM PERFORMANCE REQUIREMENTS

CS ACNS.B.DLS.B1.030 Integrity

The data link system integrity is designed commensurate with a 'major' failure condition.

[CS-ACNS/5]

CS ACNS.B.DLS.B1.035 Data Link System Continuity

(See AMC1 ACNS.B.DLS.B1.035 and GM1 ACNS.B.DLS.B1.035)

The data link system is designed to provide a level of continuity that supports the intended operation.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.035 Data Link System Continuity

The loss of the data link system function is considered to be a minor failure condition.

[CS-ACNS/5]

GM1 ACNS.B.DLS.B1.035 Data Link System Continuity

The definition of continuity in CS-ACNS is different from the definition of continuity in EUROCAE Documents ED-120 and ED-228A. Throughout CS-ACNS, continuity (system continuity) refers to 'the probability that a system will perform its required function without unscheduled interruption'.

In the context of ED-120, ~~this would be commensurate with the term 'availability'~~ and ED-228A, 'continuity' refers to the probability that the transaction is completed before the transaction expiration time, assuming that the communication system is available when the transaction is initiated.

[CS-ACNS/5]

TIME

CS ACNS.B.DLS.B1.040 Universal Time Coordinated (UTC)

(See AMC1 ACNS.B.DLS.B1.040)

For time synchronisation, a valid UTC time source is used.

Wherever time is utilised in the application of data link communications, it is accurate to within 1 second of UTC.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1-040 Universal Time Coordinated (UTC)

A Global Navigation Satellite System (GNSS) sensor provides an acceptable source of synchronised UTC time.

~~Time synchronisation is required by ICAO Annex II, chapter 3, section 3.5 as referred by EUROCAE Document ED-110B, section 3.3.2. It is also identified as a safety requirement in EUROCAE Document ED-120 (e.g. SR-ACL-15).~~

[CS-ACNS/5]

DATA LINK INITIATION CAPABILITY (DLIC) SERVICE MESSAGES

CS ACNS.B.DLS.B1-050 DLIC Uplink Messages

(~~s~~See AMC1 ACNS.B.DLS.B1-050)

The data link system is capable of receiving and processing the following messages for the DLIC Logon and ~~e~~Contact functions:

Function	Message
Logon	CMLogonResponse
Contact	CMContactRequest

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1-050 DLIC Uplink Messages

The ~~D~~data link ~~system~~ ~~aircraft equipment~~ should comply with ~~ICAO Doc 9705 (Edition 2), section 2.1.4~~ and EUROCAE Document ED-110B, ~~s~~Section 2.2.1 or ED-229A, Section 2.4.1.

Note 1: The B1 and B2 CM applications are fully compatible.

Note 2: Although ICAO Doc 9705 is not maintained any more, the DLIC message syntax should comply with ICAO Doc 9705 as referred to in ED-110B.

[CS-ACNS/5]

CS ACNS.B.DLS.B1-055 DLIC Downlink Messages

(~~s~~See AMC1 ACNS.B.DLS.B1-055)

The data link system is capable of sending the following messages for the DLIC Logon and ~~e~~Contact functions:

Function	Message
Logon	CMLogonRequest
Contact	CMContactResponse

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1-055 DLIC Downlink Messages

The data link system aircraft equipment should comply with ICAO Doc 9705 (Edition 2), section 2.1.4 and EUROCAE Document ED-110B, Section 2.2.1 or ED-229A, Section 2.4.1.

Note 1: The B1 and B2 CM applications are fully compatible.

Note 2: Although ICAO Doc 9705 is not maintained any more, the DLIC message syntax should comply with ICAO Doc 9705 as referred to in ED-110B.

[CS-ACNS/5]

CS ACNS.B.DLS.B1-060 DLIC initiation when in 'CPDLC inhibited' state (uplink)

When the data link system is in the 'CPDLC inhibited' state, a DLIC Contact Request is processed but the system remains in the 'CPDLC inhibited' state.

[CS-ACNS/5]

CPDLC MESSAGES

CS ACNS.B.DLS.B1-070 CPDLC Uplink Messages

(See AMC1 ACNS.B.DLS.B1-070, GM1 ACNS.B.DLS.B1-070 and GM2 ACNS.B.DLS.B1-070)

The data link system is capable of receiving, processing and displaying the following message elements:

ID	Message
UM0	UNABLE
UM1	STANDBY
UM3	ROGER
UM4	AFFIRM
UM5	NEGATIVE
UM19	MAINTAIN [level]
UM20	CLIMB TO [level]
UM23	DESCEND TO [level]
UM26	CLIMB TO REACH [level] BY [time]
UM27	CLIMB TO REACH [level] BY [position]
UM28	DESCEND TO REACH [level] BY [time]
UM29	DESCEND TO REACH [level] BY [position]
UM46	CROSS [position] AT [level]
UM47	CROSS [position] AT OR ABOVE [level]
UM48	CROSS [position] AT OR BELOW [level]
UM51	CROSS [position] AT [time]
UM52	CROSS [position] AT OR BEFORE [time]
UM53	CROSS [position] AT OR AFTER [time]
UM54	CROSS [position] BETWEEN [time] AND [time]
UM55	CROSS [position] AT [speed]
UM61	CROSS [position] AT AND MAINTAIN [level] AT [speed]

UM64	OFFSET [specifiedDistance] [direction] OF ROUTE
UM72	RESUME OWN NAVIGATION
UM74	PROCEED DIRECT TO [position]
UM79	CLEARED TO [position] VIA [routeClearance]
UM80	CLEARED [routeClearance]
UM82	CLEARED TO DEVIATE UP TO [specifiedDistance] [direction] OF ROUTE
UM92	HOLD AT [position] AS PUBLISHED MAINTAIN [level]
UM94	TURN [direction] HEADING [degrees]
UM96	CONTINUE PRESENT HEADING
UM106	MAINTAIN [speed]
UM107	MAINTAIN PRESENT SPEED
UM108	MAINTAIN [speed] OR GREATER
UM109	MAINTAIN [speed] OR LESS
UM116	RESUME NORMAL SPEED
UM117	CONTACT [unitname] [frequency]
UM120	MONITOR [unitname] [frequency]
UM123	SQUAWK [code]
UM133	REPORT PRESENT LEVEL
UM148	WHEN CAN YOU ACCEPT [level]
UM157	CHECK STUCK MICROPHONE [frequency]
UM159	ERROR [errorInformation]
UM162	SERVICE UNAVAILABLE
UM165	THEN
UM171	CLIMB AT [verticalRate] MINIMUM
UM172	CLIMB AT [verticalRate] MAXIMUM
UM173	DESCEND AT [verticalRate] MINIMUM
UM174	DESCEND AT [verticalRate] MAXIMUM
UM179	SQUAWK IDENT
UM183	[freetext]
UM190	FLY HEADING [degrees]
UM196	[freetext]
UM203	[freetext]
UM205	[freetext]
UM211	REQUEST FORWARDED
UM213	[facilitydesignation] ALTIMETER [altimeter]
UM215	TURN [direction] [degrees]
UM222	NO SPEED RESTRICTION
UM231	STATE PREFERRED LEVEL
UM232	STATE TOP OF DESCENT
UM237	REQUEST AGAIN WITH NEXT UNIT

The data link system is capable of receiving and processing the following message elements:

UM160	NEXT DATA AUTHORITY [facility]
UM227	LOGICAL ACKNOWLEDGEMENT

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.070 CPDLC Uplink Messages

The data link system should comply with EUROCAE Document ED-110B, ~~Section 2.2.3, and with the CPDLC message syntax in ICAO Doc 9705 (Edition 2), Part I, Section 2.1.4.~~

Note: *Although ICAO Doc 9705 is not maintained any more, the CPDLC message syntax should comply with ICAO Doc 9705 as referred to in ED-110B.*

The data link system should prepare the appropriate response downlink message to a received uplink message in compliance with EUROCAE Document ED-110B, Section 2.2.3.3, Table 2-4. ~~Received uplink messages with the response type 'A/N' indicated in the 'Response' column should be responded to with either DM2 (STANDBY), DM4 (AFFIRM) or DM5 (NEGATIVE). Received uplink messages with the response type 'R' indicated in the 'Response' column should be responded to with either DM2 (STANDBY), DM3 (ROGER) or DM1 (UNABLE).~~

The aircraft data link system should also handle unsupported messages (i.e. uplink messages not referenced in CS ACNS.B.DLS.B1.050070) as specified in EUROCAE Document ED-110B, Section 3.3.7.6.

[CS-ACNS/5]

GM1 ACNS.B.DLS.070 Uplink Messages

The following table associates uplink CPDLC messages to the data link services.

ID	Message	ACM	ACL	AMC
UM0	UNABLE		x	
UM1	STANDBY		x	
UM3	ROGER		x	
UM4	AFFIRM		x	
UM5	NEGATIVE		x	
UM19	MAINTAIN [level]		x	
UM20	CLIMB TO [level]		x	
UM23	DESCEND TO [level]		x	
UM26	CLIMB TO REACH [level] BY [time]		x	
UM27	CLIMB TO REACH [level] BY [position]		x	
UM28	DESCEND TO REACH [level] BY [time]		x	
UM29	DESCEND TO REACH [level] BY [position]		x	
UM46	CROSS [position] AT [level]		x	
UM47	CROSS [position] AT OR ABOVE [level]		x	
UM48	CROSS [position] AT OR BELOW [level]		x	
UM51	CROSS [position] AT [time]		x	
UM52	CROSS [position] AT OR BEFORE [time]		x	
UM53	CROSS [position] AT OR AFTER [time]		x	
UM54	CROSS [position] BETWEEN [time] AND [time]		x	
UM55	CROSS [position] AT [speed]		x	
UM61	CROSS [position] AT AND MAINTAIN		x	
UM64	OFFSET [specifiedDistance] [direction] OF ROUTE		x	
UM72	RESUME OWN NAVIGATION		x	
UM74	PROCEED DIRECT TO [position]		x	
UM79	CLEARED TO [position] VIA [routeClearance]		x	
UM80	CLEARED [routeClearance]		x	
UM82	CLEARED TO DEVIATE UP TO [specifiedDistance] [direction] OF ROUTE		x	
UM92	HOLD AT [position] AS PUBLISHED MAINTAIN [level]		x	
UM94	TURN [direction] HEADING [degrees]		x	
UM96	CONTINUE PRESENT HEADING		x	
UM106	MAINTAIN [speed]		x	
UM107	MAINTAIN PRESENT SPEED		x	
UM108	MAINTAIN [speed] OR GREATER		x	
UM109	MAINTAIN [speed] OR LESS		x	
UM116	RESUME NORMAL SPEED		x	
UM117	CONTACT [unitname] [frequency]	x		
UM120	MONITOR [unitname] [frequency]	x		
UM123	SQUAWK [code]		x	
UM133	REPORT PRESENT LEVEL		x	
UM148	WHEN CAN YOU ACCEPT [level]		x	
UM157	CHECK STUCK MICROPHONE [frequency]			x
UM159	ERROR [errorInformation]	x	x	
UM160	NEXT DATA AUTHORITY [facility]	x		

UM162	SERVICE UNAVAILABLE		x	
UM165	THEN		x	
UM171	CLIMB AT [verticalRate] MINIMUM		x	
UM172	CLIMB AT [verticalRate] MAXIMUM		x	
UM173	DESCEND AT [verticalRate] MINIMUM		x	
UM174	DESCEND AT [verticalRate] MAXIMUM		x	
UM179	SQUAWK IDENT		x	
UM183	[freetext]	x	x	x
UM190	FLY HEADING [degrees]		x	
UM196	[freetext]		x	
UM203	[freetext]		x	
UM205	[freetext]		x	
UM211	REQUEST FORWARDED		x	
UM213	[facilitydesignation] ALTIMETER [altimeter]		x	
UM215	TURN [direction] [degrees]		x	
UM222	NO SPEED RESTRICTION		x	
UM227	LOGICAL ACKNOWLEDGEMENT	x	x	
UM231	STATE PREFERRED LEVEL		x	
UM232	STATE TOP OF DESCENT		x	
UM237	REQUEST AGAIN WITH NEXT UNIT	x	x	

[CS-ACNS/5]

GM2 ACNS.B.DLS.B1-070 Uplink Messages

The above ACL messages correspond to the common subset of ACL messages defined in EUROCAE Document ED-120, Section 5.2.1.1.5 ~~as required by Regulation (EC) No 29/2009~~.

[CS-ACNS/5]

CS ACNS.B.DLS.B1-075 CPDLC Downlink Messages

(See AMC1 ACNS.B.DLS.B1-075, GM1 ACNS.B.DLS.B1-075, GM2 ACNS.B.DLS.B1-075 and GM3 ACNS.B.DLS.B1-075)

The data link system is capable of preparing and sending the following downlink message elements:

ID	Message
DM0	WILCO
DM1	UNABLE
DM2	STANDBY
DM3	ROGER
DM4	AFFIRM
DM5	NEGATIVE
DM6	REQUEST [level]
DM18	REQUEST [speed]
DM22	REQUEST DIRECT TO [position]
DM32	PRESENT LEVEL [level]
DM62	ERROR [errorInformation]
DM63	NOT CURRENT DATA AUTHORITY

DM65	DUE TO WEATHER
DM66	DUE TO AIRCRAFT PERFORMANCE
DM81	WE CAN ACCEPT [level] AT [time]
DM82	WE CANNOT ACCEPT [level]
DM98	[freetext]
DM99	CURRENT DATA AUTHORITY
DM100	LOGICAL ACKNOWLEDGEMENT
DM106	PREFERRED LEVEL [level]
DM107	NOT AUTHORIZED NEXT DATA AUTHORITY
DM109	TOP OF DESCENT [time]

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.075 Downlink Messages

The data link system should comply with EUROCAE Document ED-110B, ~~Section 2.2.3, and with the CPDLC message syntax in ICAO Doc 9705 (Edition 2), Section 2.1.4.~~

Note: Although ICAO Doc 9705 is not maintained any more, the CPDLC message syntax should comply with ICAO Doc 9705 as referred to in ED-110B.

The data link ~~aircraft equipment~~ system should prepare the appropriate ~~response~~ downlink message ~~response~~ to a received uplink message in compliance with EUROCAE Document ED-110B, Section 2.2.3.3, Table 2-4.

[CS-ACNS/5]

GM1 ACNS.B.DLS.B1.075 Downlink Messages

The following table associates downlink messages with data link services.

ID	Message	ACM	ACL	AMC
DM0	WILCO	x	x	
DM1	UNABLE	x	x	
DM2	STANDBY	x	x	
DM3	ROGER		x	
DM4	AFFIRM		x	
DM5	NEGATIVE		x	
DM6	REQUEST [level]		x	
DM18	REQUEST [speed]		x	
DM22	REQUEST DIRECT TO [position]		x	
DM32	PRESENT LEVEL [level]		x	
DM62	ERROR [errorInformation]	x	x	
DM63	NOT CURRENT DATA AUTHORITY	x		
DM65	DUE TO WEATHER		x	
DM66	DUE TO AIRCRAFT PERFORMANCE		x	
DM81	WE CAN ACCEPT [level] AT [time]		x	
DM82	WE CANNOT ACCEPT [level]		x	
DM98	[freetext]	x	x	
DM99	CURRENT DATA AUTHORITY	x		
DM100	LOGICAL ACKNOWLEDGEMENT	x	x	

DM106	PREFERRED LEVEL [level]		x	
DM107	NOT AUTHORIZED NEXT DATA AUTHORITY	x	x	
DM109	TOP OF DESCENT [time]		x	

[CS-ACNS/5]

GM2 ACNS.B.DLS.075 Downlink Messages

The above ACL messages correspond to the common subset of ACL messages defined in EUROCAE Document ED-120, section 5.2.1.1.5 ~~as required by Regulation (EC) No 29/2009.~~

[CS-ACNS/5]

GM3 ACNS.B.DLS.075 Optional ACL Downlink Messages

The data link system may also allow ~~the~~ sending the following ACL messages defined in EUROCAE Document ED-120, section 5.2.1.1.5. ~~The message syntax should also comply with ICAO Doc 9705 (Edition 2), section 2.3.4.~~

Note 1: Although ICAO Doc 9705 is not maintained any more, the CPDLC message syntax should comply with ICAO Doc 9705 as referred to in ED-110B.

ID	Message
DM9	REQUEST CLIMB TO [level]
DM10	REQUEST DESCENT TO [level]
DM27	REQUEST WEATHER DEVIATION UP TO [specifiedDistance] [direction] OF ROUTE

Note 2: To prevent costly retrofitting, implementation of the above optional messages is highly recommended.

[CS-ACNS/5]

ADS-C EPP DATA

CS ACNS.B.DLS.077 ADS-C EPP Data

(See AMC1 ACNS.B.DLS.077)

The data link system is capable of:

- receiving and processing ADS-C contract requests (demand, periodic, event); and
- preparing and downlinking EPP through ADS-C contract reports according to the ADS-C contract requests.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.077 ADS-C EPP Data

The data link system should comply with EUROCAE Document ED-228A, Section 6.2 and EUROCAE ED-229A, Sections 3.2 and 5.3 to support the exchange of EPP data.

[CS-ACNS/5]

DATA LINK SERVICES AND ADS-C EPP DOWNLINK REQUIREMENTS

CS ACNS.B.DLS.B1-080 Data Link Initiation Capability (DLIC) Service

(See AMC1 ACNS.B.DLS.B1-080 and GM1 ACNS.B.DLS.B1-080)

The data link system for DLIC service complies with Section 4.1, 4.2.2 and 4.3.2 of EUROCAE Documents ED-120 '~~Safety and Performance Requirements Standard For Initial Air Traffic Data Link Services In Continental Airspace~~', Sections 4.1, 4.2.2 and 4.3.2, and Sections 2.2.1 and 4.1 of EUROCAE Document ED-110B '~~Interoperability Requirements Standard for Aeronautical Telecommunication Network Baseline 1~~', Sections 2.2.1 and 4.1.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1-080 Data Link Initiation Capability (DLIC) Service

- (a) The data link aircraft equipment DLIC Logon function should comply with the aircraft system PR-DLIC-Init-ET_{RCTP} and PR-DLIC-Init-TT performance values, respectively 6 seconds and 4 seconds, as specified in EUROCAE Document ED-120 Table A-3.
- (b) The data link aircraft equipment DLIC Contact function should comply with the aircraft system PR-DLIC-Cont-ET_{RCTP} and PR-DLIC-Cont-TT performance values, respectively 12 seconds and 8 seconds, as specified in EUROCAE Document ED-120 Table A-3.
- (c) The data link system should:
 - (1) not permit data link services when there are incompatible DLIC version numbers;
 - (2) reinitiate the service with the applicable ATSUs when any of the application or flight information changes;
 - (3) insert the relevant initiation data in the initiation messages;
 - (4) not affect the intent of the DLIC message during processing (data entry/encoding/transmitting/decoding/displaying).

[CS-ACNS/5]

GM1 ACNS.B.DLS.~~B1~~.080 Data Link Initiation Capability (DLIC) Service

The Performance Tables in ~~the main body of~~ EUROCAE Document ED-120 for DLIC ~~service~~ (Table 4-8 and Table 4-9), ~~ACM (Table 5-21) and ACL (Table 5-31 and Table 5-32)~~ provide the allocated values for the required transaction performance.

A detailed allocation for ~~A~~ aircraft delays is provided in EUROCAE Document ED-120 Annex A Table A-3.

[CS-ACNS/5]

CS ACNS.B.DLS.~~B1~~.085 ATC ~~e~~ Communications ~~m~~ Management (ACM) ~~s~~ Service (See AMC1 ACNS.B.DLS.~~B1~~.085 and GM1 ACNS.B.DLS.~~B1~~.085)

The data link system for ACM ~~service complies~~ ~~conforms~~ with ~~Section 5.1.1, 5.1.2.3 (excluding requirements relating to downstream clearance) and 5.1.3.2 of~~ EUROCAE Document ED-120 ~~'Safety and Performance Requirements Standard For Initial Air Traffic Data Link Services In Continental Airspace'~~, Sections 5.1.1, 5.1.2.3 (excluding the requirements relating to downstream clearance) and 5.1.3.2.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.~~B1~~.085 ATC Communications Management (ACM) Service

The data link system for ACM service should comply with the aircraft system PR-ACM-ET_{RCTP} and PR-ACM-TT performance values, respectively 6 seconds and 4 seconds, as specified in EUROCAE Document ED-120 Annex A Table A-3.

[CS-ACNS/5]

GM1 ACNS.B.DLS.~~B1~~.085 ATC Communications Management (ACM) Service

The Performance Tables in ~~the main body of~~ EUROCAE Document ED-120 for ~~DLIC (Table 4-8 and Table 4-9),~~ ACM ~~service~~ (Table 5-21) ~~and ACL (Table 5-31 and Table 5-32)~~ provide the allocated values for the required transaction performance.

A detailed allocation for ~~A~~ aircraft delays is provided in EUROCAE Document ED-120 Annex A ~~A~~ Table A-3.

[CS-ACNS/5]

CS ACNS.B.DLS.~~B1~~.090 ACL ~~s~~ Service ~~s~~ Safety ~~r~~ Requirements

(See AMC1 ACNS.B.DLS.~~B1~~.090 and GM1 ACNS.B.DLS.~~B1~~.090)

The data link system for ACL ~~service complies~~ ~~conforms~~ with ~~Section 5.2.1, 5.2.2.3 and 5.2.3.2 of~~ EUROCAE Document ED-120, ~~'Safety and Performance Requirements Standard For Initial Air Traffic Data Link Services In Continental Airspace'~~ Sections 5.2.1, 5.2.2.3 and 5.2.3.2.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.81.090 ATC Clearances and Information (ACL) Service

The data link system for ACL service should comply with the aircraft system PR-ACL-ET_{RCTP} and PR-ACL-TT performance values, respectively 6 seconds and 4 seconds, as specified in EUROCAE Document ED-120 Annex A Table A-3.

[CS-ACNS/5]

GM1 ACNS.B.DLS.81.090 ATC Clearances and Information (ACL) Service

The Performance Tables in ~~the main body of~~ EUROCAE Document ED-120 for ~~DLC (Table 4-8 and Table 4-9), ACM (Table 5-21) and~~ ACL service (Table 5-31 and Table 5-32) provide the allocated values for the required transaction performance.

A detailed allocation for ~~A~~ aircraft delays is provided in EUROCAE Document ED-120 Annex A Table A-3.

[CS-ACNS/5]

CS ACNS.B.DLS.81.095 ATC mMicrophone eCheck (AMC) sService

The data link system for AMC service complies ~~conforms~~ with EUROCAE Document ED-120, Sections 5.3.1, 5.3.2.3 and 5.3.3.2 ~~of EUROCAE Document 'ED-120 Safety and Performance Requirements Standard For Initial Air Traffic Data Link Services in Continental Airspace'.~~

[CS-ACNS/5]

CS ACNS.B.DLS.097 ADS-C EPP Safety and Performance Requirements

(See AMC1 ACNS.B.DLS.097)

The data link system for ADS-C EPP complies with EUROCAE Document ED-228A, Sections 6.1, 6.3.1 and 6.3.2.

[CS-ACNS/5]

AMC1 ACNS.B.DLS.097 ADS-C EPP Safety and Performance Requirements

The required surveillance performance (RSP) 160 should apply, in accordance with the intended use of ADS-C EPP within the SES.

[CS-ACNS/5]

INTEROPERABILITY REQUIREMENTS

CS ACNS.B.DLS.~~B1~~.100 Network Layer Requirements

(See AMC1 ACNS.B.DLS.~~B1~~.100 and GM1 ACNS.B.DLS.~~B1~~.100)

The ATN Router conforms to Class 6 with the capability to support ~~H~~inter-domain routing protocol (IDRP).

[CS-ACNS/5]

AMC1 ACNS.B.DLS.~~B1~~.100 Network Layer Requirements

The ATN Router should comply with ICAO Document 9705 (Edition 2), ~~S~~sections 5.2.4.1, ~~and~~ 5.2.4.3, with an IDRP Hold Time value of 900 seconds.

[CS-ACNS/5]

GM1 ACNS.B.DLS.~~B1~~.100 Network Layer Requirements

Compression Schemes

Airborne ATN Routers ~~s~~ may implement several distinct, yet complementary, compression schemes.

Airborne ATN Routers should support the CLNP Header Compression (also known as 'LREF Compression'). Other compression schemes in ICS are optional.

In addition to the CLNP Header Compression, data link ATN Routers that ~~claims~~ support for optional DEFLATE compression should also support ICAO PDU M0070002 ('Interoperability impact when deflate compression is used. Non-compliance with Zlib').

[CS-ACNS/5]

CS ACNS.B.DLS.~~B1~~.105 Transport Layer Protocol Requirements

(See AMC1 ACNS.B.DLS.~~B1~~.105 and GM1 ACNS.B.DLS.~~B1~~.105)

The ATN Connection Oriented Transport Protocol (COTP) conforms to Transport Protocol Class 4.

[CS-ACNS/5]

AMC1 ACNS.B.DLS. ~~B1~~.105 Transport Layer Protocol Requirements

The ATN End System of the data link aircraft equipment should comply with ~~the~~ Transport Protocol Class 4 specified in ICAO Document 9705 (Edition 2), Sub-volume V, Section 5.5.2.

The data link aircraft equipment should implement Transport Protocol Class 4 parameter settings in accordance with the following table:

Scope	Parameter	Definition	Value
Inactivity	Inactivity time (I)	A bound for the time after which a transport entity will, if it does not receive a Transport Protocol Data Unit (TPDU), initiate the release procedure to terminate the transport connection.	360 seconds see
Re -Retransmission	Retransmission time (T1)	A bound for the maximum time the transport entity will wait for acknowledgement before re -retransmitting a TPDU. The retransmission time is adaptive.	Initial value 30 seconds see
	Maximum Retransmission (N)	Maximum number of TPDU retransmissions.	7
Window	Window time (W)	A bound for the maximum time a transport entity will wait before retransmitting up-to-date window information.	120 seconds see
Flow Control	Local Acknowledgement delay (AI)	A bound for the maximum time which can elapse between the receipt of a TPDU by the local transport entity from the network layer and the transmission of the corresponding acknowledgement.	1 second see

[CS-ACNS/5]

GM1 ACNS.B.DLS. ~~B1~~.105 Transport Layer Protocol Requirements

Transport Protocol Classes

ICAO Doc 9705 (Edition 2), Sub-volume V, Section 5.5 identifies both Connection-Oriented and Connection-Less Transport Protocols (as specified in, ~~respectively~~, ISO/IEC 8073 for COTP and ISO/IEC 8602 for CLTP ~~respectively~~). The only mandated support is for COTP (i.e. CLTP support is not required).

In addition, ISO/IEC 8073 identifies ~~5~~ five distinct possible implementations for COTP support, ranging from Class 0 (the less constraining to implement, but also the less reliable) to Class 4 (most reliable). The fifth ~~C~~ class, i.e. COTP Class 4 (also known as 'TP4'), is the only mandated implementation (all other implementations ~~s~~ classes are useless for the ATN COTP support).

Transport Protocol Classes

In the ATN Baseline 1 SARPs ~~S~~ (i.e. ICAO Doc 9705 (Edition 2)), ~~the~~ Transport Class 4 ~~as~~ ~~—~~ also known as 'TP4' ~~—~~ is as specified in ISO 8073, that mandates support for a 16-bit ~~s~~ checksum. Such checksum is considered ~~to be~~ insufficient to detect, and thus compensate, all potential miss-deliveries of CLNP Packets by the underlying network routers. The analysis that concluded ~~of~~ TP4 inability to detect and compensate all CLNP miss-deliveries is available in ICAO PDR M00040002. The use of a 32-bit ~~s~~ long checksum is identified as a solution to address this potential issue.

[CS-ACNS/5]

CS ACNS.B.DLS.B1.110 Session Layer Requirements (See AMC1 ACNS.B.DLS.B1.110)

The ATN Session protocol is capable of supporting the following session protocol data units (SPDUs):

Abbreviation	Full SPDU Name
SCN	Short Connect
DRP SAC	Short Accept
SACC	Short Accept Continue
SRF	Short Refuse
SRFC	Short Refuse Continue

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.110 Session Layer Requirements

- (a) The ATN End System of the data link aircraft equipment should support a Session Protocol as specified in ICAO Doc 9705 (Edition 2), Sub-volume IV, Section 4.4 including the ISO/IEC 8327 Technical Corrigendum 1 (2002), listed in the following table.

Value (Hex)	Abbreviation	Full SPDU Name
E8	SCN	Short Connect
F0	SAC	Short Accept
D8	SACC	Short Accept Continue
E0-E3	SRF	Short Refuse E0: TC retained, transient refusal E1: TC retained, persistent refusal E2: TC released, transient refusal E3: TC released, persistent refusal
A0	SRFC	Short Refuse Continue

- (b) The ATN End System Session Protocol of the data link system should make use of the value 'E3' to encode the Short Refuse (SRF) SPDU.

[CS-ACNS/5]

CS ACNS.B.DLS.B1.115 Presentation Layer Requirements

(See AMC1 ACNS.B.DLS.B1.115)

The ATN Presentation protocol is capable of supporting the presentation protocol data units (PPDUs) listed in the following table:

Abbreviation	Full PPDU Name
SHORT-CP	Short Presentation Connect, unaligned PER
SHORT-CPA	Short Presentation Connect Accept, unaligned PER
SHORT-CPR	Short Presentation Connect Reject

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.115 Presentation Layer Requirements

- (a) The ATN End System of the data link aircraft equipment should support a Presentation Protocol as specified in ICAO Doc 9705 (Edition 2), Sub-Volume IV, Section 4.5, and listed in the following table:

Value (Hex)	Abbreviation	Full PDU Name
02	SHORT-CP	Short Presentation Connect, unaligned PER
02	SHORT-CPA	Short Presentation Connect Accept, unaligned PER
x2	SHORT-CPR	Short Presentation Connect Reject Where x = reason code: 02: presentation-user 12: reason not specified (transient) 22: temporary congestion (transient) 32: local limit exceeded (transient) 42: called presentation address unknown (permanent) 52: protocol version not supported (permanent) 62: default context not supported (permanent) 72: user data not readable (permanent)

- (b) The ATN End System Presentation Protocol of the aircraft's data link aircraft equipment should make use of the value '02' to encode the SHORT-CPR PDU.

[CS-ACNS/5]

CS ACNS.B.DLS.B1.120 Application Layer Requirements

(See AMC1 ACNS.B.DLS.B1.120 and GM1 ACNS.B.DLS.B1.120)

The Application Layer is application-independent (also known as 'Layer 7a'), and is composed of a ~~Convergence~~ Control Function supporting operations of an Application Control Service Element (ACSE).

[CS-ACNS/5]

AMC1 ACNS.B.DLS.B1.120 Application Layer Requirements

- (a) The ATN End System of the data link system should support an ATN ~~Control~~ Convergence Function compliant with ICAO Doc 9705 (Edition 2), Sub-Volume IV, Section 4.3.
- (b) The ATN End System of the data link system should support an ATN Association Control Service Element (ACSE) compliant with ICAO Doc 9705 (Edition 2), Sub-Volume IV, Section 4.6.

[CS-ACNS/5]

GM1 ACNS.B.DLS.B1.120 Application Layer Requirements

From an OSI perspective, the ATN Application Layer is composed of three distinct parts:

- Layer 7a, ~~that~~ which includes all application-independent services (~~Control~~ Convergence Function + ACSE).
- Layer 7b, ~~that~~ which includes all application-dependent service elements (such as the CPDLC-ASE).

- Layer 7c, ~~that~~ which includes applications (such as the CPDLC application, ~~that~~ which uses CPDLC-ASE for its communications with ground-based systems).

[CS-ACNS/5]

CS ACNS.B.DLS.125 Database

(See GM1 ACNS.B.DLS.125)

The Network Service Access Point (NSAP) address database is capable of being updated.

[CS-ACNS/5]

GM1 ACNS.B.DLS.125 Database

The Network Service Access Point (NSAP) address database is subject to regular update in accordance with ICAO EUR Doc 028.

[CS-ACNS/5]

APPENDICES

Appendix A — Background information on voice communication systems

[...]

Appendix B — Background information on data link systems

~~(iv) — General~~

~~This appendix provides additional references, background information, and guidance for maintenance testing, as appropriate to Data Link System installations.~~

~~(b) — Related references~~

~~(1) — ICAO~~

~~i. — ICAO Doc 4444 Air Traffic Management 15th Ed 2007~~

~~ii. — ICAO Doc 9705 MANUAL OF TECHNICAL PROVISIONS FOR THE AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) 2nd Ed 1999~~

~~iii. — ICAO Doc 9776 Manual on VHF Digital Link (VDL) Mode 2 1st Ed 2001.~~

~~(2) — ARINC~~

~~Specification 631-6 Guidelines for Design Approval of Aircraft Data Link Communication Systems Supporting Air Traffic Services (ATS) dated 11/2010~~

~~(3) — FAA~~

~~AC-20-140B Guidelines for Design Approval of Aircraft Data Link Communication Systems Supporting Air Traffic Services (ATS) dated 27/09/2012~~

~~(4) — EUROCONTROL~~

- ~~i. LINK2000+/ATC DATA LINK OPERATIONAL GUIDANCE, Version 6.0, Date: 17 December 2012.~~
 - ~~ii. LINK 2000+ Guidance to Airborne Implementers, Version 1.1, Date: 09 December 2009.~~
 - ~~iii. LINK2000+/FLIGHT CREW DATA LINK OPERATIONAL GUIDANCE Version 5.0, Date: 17 December 2012.~~
 - ~~iv. LINK2000+ Programme, Generic Interop Test Plan for Avionics – Part 1, Upper Layers and CM/CPDLC applications, Version 2.3, Date: 15th June 2010.~~
- ~~(5) ISO/IEC~~
- ~~i. Document 8073 Information technology — Open Systems Interconnection — Protocol for providing the connection-mode transport service Edition 4,0 including amendment 1 dated 09/1998~~
 - ~~ii. Document 8602 Information technology — Protocol for providing the OSI connectionless-mode transport service Edition 2,0 including amendment 1 dated 12/1996~~
 - ~~iii. ISO/IEC 8327 1:1996 Information technology — Open Systems Interconnection — Connection-oriented Session protocol: Protocol specification TECHNICAL CORRIGENDUM 1 Published 15/05/2002~~
- ~~(6) EUROCAE~~
- ~~i. ED 110B, December 2007, ‘Interoperability Requirements Standard for Aeronautical Telecommunication Network Baseline 1’ (Interop-ATN-B1),~~
 - ~~ii. ED 120, May 2004, ‘Safety and Performance Requirements Standard For Initial Air Traffic Data Link Services In Continental Airspace (SPR-IC)’. Including change 1, change 2, and change 3.~~
 - ~~iii. ED-122 February 2011 Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic-SPR-Standard)~~
 - ~~iv. ED 154A March 2012 Future Air Navigation System 1/A (FANS 1/A) — Aeronautical Telecommunications Network (ATN) Interoperability Standard~~

[CS-ACNS/5]