

**AC 20-140B PUBLIC Review and Response LOG
(Sorted by Comments on each Paragraph).**

1. Document No.:		2. Project Lead:		3. Reviewing Office:		4. Date of Review:		5. [reserved]	
AC 20-140B		Moin Abulhosn, AIR-130				20 Aug 2012			
6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:			
1.	Boeing	§ 1(b) Pg 1	The paragraph describes that if AC 20-140B is used that the applicant must follow it in its entirety. This requirement seems to disallow documented partial compliance, coordinated with the regulator, to this AC. This restriction is newly added into AC 20-140B.	AC 20-140B Change considered necessary	Delete the following sentence: However, if you use the means described in this AC, you must follow it in its entirety The applicants should be able to use alternate means for certain requirements described in this AC as long as the interoperability and the intent are maintained. It should not be “all or nothing”.	Not Accepted. By “entirety” we mean, that once you choose an Application Designator, you have to follow that Application Designator row in Table 5-1 in its entirety. AC maintained to indicate “the means described in this AC, you should follow it in its entirety”.			
2.	Boeing	§ 2 Sentence 2 Pg 1	The definition of ACARS ATS does not match that given on pg. 3	Inconsistent	Revise paragraph to the following: This AC addresses Flight Information Service (FIS) communication for Aircraft Communication Addressing and Reporting System (ACARS) Departure Clearance (DCL), Oceanic Clearance (OCL) and Datalink – Automatic Terminal Information Service (D-ATIS), supported by Aircraft Communications Addressing and Reporting System (ACARS) .application only. Flight Information Service – Broadcast (FIS-B) installation guidelines are contained in AC 20-149 or latest approved revision.	Accepted. Revised paragraph 2 as follow: ... ATS communication includes Flight Information Service (FIS) messages. This AC addresses only Data Link- Automatic Terminal Information Service (D-ATIS) for Flight Information Service (FIS) communications. Flight Information Service – Broadcast (FIS-B) installation guidelines are available in AC 20-149 or latest approved revision.			
3.	Boeing	§ 2 Sentence 1 Pg. 1	Paragraph is ambiguous	Clarification	Revise sentence: Who Does this AC Affect? This AC provides guidelines for applicants seeking design approval of aircraft data link systems (i.e. FMC, CMU, VDR, SATCOM, HFDL) used for communication supporting air traffic services (ATS) such as Controller Pilot Datalink Communications (CPDLC) and Automatic Dependent Surveillance	Not Accepted. No ambiguity intended. This section is not intended to comprehensively define the type of ATS communications, rather it relies upon the AC as a whole (i.e., inclusive of the guidance provided in Section 4 and 5). The general scope provided in Section 2 is considered adequate			

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					(ADS) and in part Flight Information Service (FIS) messages.	for a user of the AC to know if the AC is not applicable.
4.	Garmin	§ 4.a(1) Pg. 1	AC 120-70B is mentioned as the operational counterpart to this AC. Will AC 120-70B be reviewed and, if necessary, updated in concert with the updated of this AC?	Ensure consistency between certification and operational guidance.	Per FAA’s March 2012 NextGen Implementation Plan (NGIP) Appendix B Data Communications table, it appears that both AC 20-140B and AC 120-70C are scheduled to be complete in 2014. However, in case this draft of AC 20-140B is not being circulated to meet the NGIP schedule, consider a parallel review and, if required, update to AC 120-70B.	Accepted. FAA coordination will occur to ensure AC 20-140B and AC 120-70B are aligned with each other. Consistency between the airworthiness guidance in AC 20-140 and Operational guidance in AC 120-70 will be assured as both ACs evolves.
5.	Boeing	§ 4.a(2) Pg. 2	The GOLD title and date are incorrect.	Clarification	C “The International Civil Aviation Organization (ICAO) Global Operational Data Link Document (GOLD), published in June 2010...”	Accepted. First Edition of GOLD is June 14, 2010 and is the version used by this AC. The AC has been revised accordingly.

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6.	Garmin	§ 4.a(2) Pg. 2	ICAO GOLD 1 st edition is dated June 2010, and the 2 nd edition is currently scheduled for publication in 1Q 2013. There are references to a desired GOLD version 1.1 in ICAO meeting notes but it does not seem to be available. Further, this paragraph refers to ICAO GOLD “published in October 2011” not a specific version of GOLD.	ICAO GOLD version 1.1 could not be located through the ICAO store or other searches. Additionally, it is unclear what version is being referred to by “published in October 2011”.	Verify GOLD version 1.1 has been published and is available and then clarify the ICAO GOLD version within this AC (not just by date). Otherwise, per FAA’s March 2012 NGIP Appendix B Data Communications table, it appears that both AC 20-140B and AC 120-70C are scheduled to be complete in 2014. However, in case this draft of AC 20-140B is not being circulated to meet the NGIP schedule, consider harmonizing the release of this updated AC with the release of GOLD 2 nd edition.	Accepted. First Edition of GOLD is June 14, 2010 and is the version used by this AC. The AC has been revised accordingly.
7.	Boeing	§ 4.b Fig. 1 Pg. 3	The “FANS 1/A (+) ATN (prerequisite ATN B1)” descriptor in Figure 1 is unclear and does not match the subsequent text.	Clarification	Revise sentence The descriptor should be something like “FANS 1/A (+) & ATN B1” in order to match the subsequent text.	Accepted. Description of application designator revised to clarify.
8.	Boeing	§ 4.b Fig. 1 Pg. 3	The “FANS 1/A – ATN” descriptor in the text below Figure 1 is unclear and does not match the figure.	Clarification	Recommendation: Change the “FANS 1/A – ATN” descriptor in the text below Figure 1 to “FANS 1/A(+) & ATN B1” in order to match the figure.	Accepted. Description of application designator revised to clarify.
9.	United	§ 4.b Figure 1 Pg. 3	“FANS 1/A (Generic)” is only used in this one instance in the document and not part of Interoperability Criteria. Suggest it be removed	The term “FANS 1/A (Generic) can be confusing since it is not reference anywhere else in the document	Remove “FANS 1/A (Generic) from the document	Not Accepted. Figure 1 is maintained from AC 20-140A and the Designators not intended for future airworthiness approval are mentioned in section 4.b (2)..

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10.	GE	§ 4.b Figure 1 Pg. 3	Figure 1 has changed from version A, Why is FMC WPR, ATSU CFRS, ATSU AOC and ATSU CADS not listed any more.			Accepted. Figure 1 is maintained from AC 20-140A and the Designators not intended for future airworthiness approval are mentioned in section 4.b (2).
11.	Garmin	§ 4.b Figure 1 - Application Designator, ACARS ATS Pg. 3	TWIP is not shown in the list of ACARS ATS applications.	TWIP is also an ACARS ATS function defined by ARINC 623	Consider adding TWIP as an ACARS ATS application.	Accepted. TWIP has been added to the list of ACARS ATS applications in Figure 1 and Table 5-1.
12.	Garmin	§ 4.b Figure 1 - Application Designator, FANS 1/A+ Pg. 3	Editorial – ATS AFN is redundant	In the phrase "... FANS 1/A+ includes ATS AFN, ...",ATS is the first letter of the AFN acronym	Change the phrase to "... FANS 1/A+ includes AFN, ..."	Accepted. Changed the term "ATS AFN" to "AFN".
13.	Garmin	§ 4.b Figure 1 - Application Designator, ATN B1 Pg. 3	Editorial – ACM and ACL acronyms don't match DO-280	In the phrase "CPDLC for ATS communications management (ACM), ATS clearance (ACL), ...", "ATS" should be "ATC"	Change the phrase to "CPDLC for ATC communications management (ACM), ATC clearance (ACL), ..."	Accepted. Section 1.4.3, Acronyms and Glossary of Terms, in DO-280 defines ACL to be ATC Clearance and ACM to be ATC Communication Management. These acronyms will be revised to reflect these definitions.
14.	Collins	§ 4.b Pg. 2	The "Description" of FANS 1/A+ has been modified in going from 20-140A to 20-140B. The description in 20-140A was correct and accurate, whereas the description in 20-140B has added avionics-specific verbiage that seems out of place here (e.g. "ATS data link system functionally integrated with the aircraft flight management system allowing		Please clarify the appropriate differences or otherwise provide rationale.	Accepted. Definition of FANS 1/A+ in AC20-140A applied within AC 20-140B.

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			exchange of aircraft navigation and performance parameters.”) It is unclear why this verbiage was added. The statement may be true depending on the meaning of “functionally integrated”, but it is also true of FANS 1/A, and isn’t mentioned in that description.			
15.	GE	§ 4.c Table 4-2 and 4-3 Pages 4-5	Table 4-2 and Table 4-3 no longer have the terminology of Oceanic. Is this implied with the title of the tables?			Accepted. Yes, RCP and RSP are performance specifications that are independent of an operation or environment. For instance, RCP 240 is a performance specification to perform reduced separation in the oceanic environment but it can be used for other operational capabilities and other environments. AC revised to eliminate confusion that RCP 240 is an Oceanic Comm Performance only. Word added to indicate “Oceanic” and “other airspace”.
16.	Transport-Canada	§ 4.c Table 4-3 Pg 5	Numbering of “Notes”.	The note below the table should read “Note 1” not “Note”.	TCCA suggests updating with “Note 1”.	Accepted. The Note is the only note for the table, so the reference “see Note 1” in the body of the table revised to “see Note”. Table 4-3 itself will state “See note below”.
17.	Airbus	§ 4.c.(2) pg. 5	Safety and performance requirements as required per European mandate (EC29/2009 and associated specifications) are missing in this revision B of the AC.	Such requirements are still applicable for any applicant that would elect to certify an ATN B1 avionics suite intended to support European data link operations.	Reintroduce (2) with some adaptations compared with what used to be in revision A of the AC: (2) RTCA DO 290/EUROCAE ED 120, Change 1 and Change 2 (Continental SPR) provides operational, safety and performance criteria for data link services that are applicable in European airspace where radar services are provided. While no RCP types or surveillance specifications	Accepted. The section in the AC will be reworded as suggested, except instead of stating “European airspace”, it will say “Initial Continental Performance”.

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					<p>have been developed for the data link services, the VDL M2 subnetwork is the only subnetwork that has been prescribed for data link services in this airspace.</p> <p>Note: new section introduced in revision B of the AC intending to introduce WG78/SC214 activities can be kept as a paragraph (3) in § 4. c.</p>	
18.	UASC	§ 4.c(2) pg 5	Page 5, 4.c.(2). Though the information conveyed in Item (2) is correct, the work being performed by SC-214/WG-78 is not expected to be completed, released, and available for approval until after the expected affectivity date of this AC. How does that affect the adoption of this AC?			Accepted. Although text about the work being performed by SC-214/WG-78 is nice information, it does not provide value to any project that will use this version of the AC; hence, the paragraph will be changed.
19.	Boeing	§ 4.c(2) Pg. 5	In “RTCA SC-214/EURCAE WG-78 in cooperation with OPLINKP...”, EUROCAE is misspelled and the description of OPLINKP should be expanded	Clarification	Recommendation: Change to “RTCA SC-214/EUROCAE WG-78, in cooperation with the ICAO Operational Data Link Panel (OPLINKP),	Accepted. Although text about the work being performed by SC-214/WG-78 and OPLINKP is nice information, it does not provide value to any project that will use this version of the AC; hence, the paragraph will be changed.
20.	Collins	§ 4.c(2) Pg. 4	The contents in 20-140A regarding the Continental SPR was replaced with a new paragraph mentioning a future SPR standard. With this, there is no listed current continental SPR standard.		Please consider keeping the 4.c.(2) from 20-140A so that continental airspace SPR is still covered, and adding the new paragraph as 4.c.(3).	Accepted. The section in the AC will be reworded as suggested, except instead of stating “European airspace”, it will say “Initial Continental Performance”.

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21.	Airbus	§ 5.b.(3) Table 5-1 pg. 6	Wording is not adequate when reference is made to the capability to load CPDLC messages into FMS flight plan.	Navigation systems are not the only contributor to this capability in the aircraft.	<p>Replace “<i>The navigation system shall be capable to load the [route clearance] variable of message elements UM79, UM80 and UM83.</i>” With “Aircraft should provide the Flight Crew with automation for FMS Flight Plan modification based on data received in UM79, UM80 and UM83.” Note: Reference to paragraph 5.c of this AC is removed as the paragraph is proposed for deletion.</p> <p>Replace “<i>The navigation system shall provide the data for DM24, DM40, and DM59 containing the [route clearance] variable from the route in the FMS</i>” With “Aircraft should provide the Flight Crew with automation to generate DM24, DM40 and DM59 containing the [route clearance] variable from the route in the FMS.”</p>	<p>Partial acceptance. The comment is confusing, what is in the description of 5.b(3) and what is described within Table 5-1. For the 5.b(3) paragraph rewording see comment 39. Plus Table 5-1 is revised to indicate FANS 1/A implementations may occur without autoload capability; however, it identifies regulations the applicant must demonstrate for compliance without autoload capability.</p> <p>This comment caused Para 5.c to indicate “aircraft should provide the flight crew with automation for FMS Flight Plan modification based on data received by the data link system” as the second sentence in 5.c.</p>
22.	Airbus	§ 5.c. pg. 7 & 8	Detailed aircraft behavior with regards to FMS autoload capability shall not reside in this AC.	Information provided here is very partial and insufficient to ensure consistent implementations across aircraft fleet (which is actually the final target).	<p>AC should rather refer to another document that would describe in details the FANS 1/A & ATN B1 loading mechanisms. I would suggest this document results from the combination of the need expressed by ongoing activity within SC214/WG78 to define requirements future loading functions and the constraints from existing FANS 1/A and ATN B1 implementations.</p> <p>Delete 5. c. and add a reference to external specifications in Table 5-1 where applicable.</p> <p>Note: if §5. c. is kept anyway (in opposition to this comment), 5. c. (5) shall be fixed to be consistent with existing FANS 1/A implementations:</p>	<p>Partial acceptance. In the absence of an industry standard to define aircraft behavior, the AC intends to address it. Para 5.c is modified to indicate our intent.</p>

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23.	Airbus	§ 5.c. pg. 7 & 8	<ol style="list-style-type: none"> Reference to position in [routeClearance] in § 5. c. (1), (2), (4) and (5) is wrong. Provided description in § 5. c. (5) is not consistent with existing FANS 1/A implementations. 	<ol style="list-style-type: none"> The position used in uM79 and uM83 and referred to in 5. c. (1), (2), (4) and (5) is not contained in [routeClearance] variable, but in a separate [position] variable. With current FANS 1/A implementations, when UM83 position does not match a waypoint in the active flight plan, the resulting flight plan will begin with the uplinked route, followed by a discontinuity, and then the existing route. 	<p>If §5. c. is kept anyway (in opposition to Airbus comment n°3), wording should be fixed as follows:</p> <p>(1) If the [position] in UM79 matches a fix in the active flight plan, the aircraft replaces all fixes upstream of that fix with the specified [route clearance].</p> <p>(2) If the [position] in UM79 does not match a fix in the active flight plan, the aircraft inserts the [position] and [route clearance] before the existing route, followed by a discontinuity, and the existing route.</p> <p>(4) If the [position] in UM83 matches a fix in the active flight plan, the aircraft replaces all fixes subsequent to that fix with the specified [route clearance].</p> <p>(5) If the [position] in UM83 does not match a fix in the active flight plan, the aircraft inserts the [route clearance] and the [position] before the existing route, followed by a discontinuity, and the existing route.</p>	Accepted. Revised text on aircraft behavior as suggested.
24.	Airbus	§ 5.d.(2) Table 5-2 pg. 8	Reference to DO-306/ED-122 standard is wrong.	Revision A does not exist.	Replace DO-306A/ED-122A with DO-306-Change 1/ED-122-Change 1 in the table (i.e. for RCP240, RCP400, RSP180 and RSP400 rows).	Accepted. Table 5-2 revised to reference DO-306 Change 1/ED-122 Change 1 as suggested.
25.	Collins	§ 5.a Pg. 5	This section mentions substantiating “global seamless operations”. It is not clear how this is to be interpreted.		Please include clarification, particularly regarding what this means in context of the ATS designators.	Accepted. Phrase “global seamless operations” deleted.

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26.	Boeing	§ 5.b Table 5-1 Pg. 6	FANS 1/A+ compliance method does not reference POA as an acceptable media for Air/ Ground communication. Current FANS 1 design is media independent and is certificated to operate over VHF-POA, VHF-AOA, SATCOM Inmarsat, SATCOM Iridium , HF DL	AC 20-140B Change considered necessary Omission of POA in the list FANS-1 medias does not reflect the current design of all operational Boeing aircraft. As written this compliance method would be revising the current certification basis of the FANS-1 function.	Add Paragraph: Add POA to the referenced Paragraph and update referenced standards	Accepted. VDL M0/A is now recognized as a viable subnetwork for FANS 1/A+ and ACARS ATS. Performance designators in Table 5-2 no longer recognize specific subnetworks. Aircraft may be implemented with more than one subnetwork as specified in Table 5-1 of which the applicant would need to demonstrate a given performance designator can be satisfied (e.g., including performance associated with transitions, ATS vs. AOC messages, and number of ADS-C contracts).
27.	Boeing	§ 5.b Table 5-1 Pg. 6	States that the DO-280B/ED-110B Requirement references ARINC 631-6. DO-280B/ED-110B Requirement actually references ARINC 631-5.	Clarification	Revise requirement to ARINC 631-5	Not Accepted. ARINC 631-6 is the correct standard to specify VDL M2 protocols.
28.	United	§ 5.b Table 5-1 Pg. 6	Does not include FANS 1/A in Column 1, <u>Application Interop Designator.</u>	FANS 1/A using VDL M0/A is still very prevalent in the airline industry and currently undergoing evaluation by Boeing and the DCIT program as an acceptable means for DCL and other applications. And is expected to meet FIS and DATIS requirements	Add FANS 1/A in Column 1 of Table 5-1.	Not Accepted. An applicant seeking a type design approval after AC 20-140B is published will be leveraged to comply with DO-258A in lieu of the preceding interop standard DO-258 (i.e., FANS 1/A).
29.	United	§ 5.b Table 5-1 Pg. 6	VDL M0/A is not included under sub-networks of any <u>Application Interop Designator</u>	FANS 1/A using VDL M0/A is still very prevalent in the airline industry and currently undergoing evaluation by Boeing and the DCIT program as an acceptable means for DCL and other applications. And is expected to meet FIS and DATIS requirements (In addition, VDL M0/A is included in the	Add VDL M0/A to all sub-networks (including FANS 1/A)	Accepted. VDL M0/A is now recognized as a viable subnetwork for FANS 1/A+ and ACARS ATS. Performance designators in Table 5-2 no longer recognize specific subnetworks. Aircraft may be implemented with more than one subnetwork as specified in

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				example given on page 13, Paragraph 8 b (2))		Table 5-1 of which the applicant would need to demonstrate a given performance designator can be satisfied (e.g., including performance associated with transitions, ATS vs. AOC messages, and number of ADS-C contracts).
30.	GE	§ 5.b Table 5-1 Pg. 6	Table 5-1 does not include FANS 1/A. This may be a typo in which they forgot to include this designator. Another designator which is not listed is the FMC WPR, but this may be due to the changes in figure 1.			Partial acceptance. Figure 1 will show all aircraft designators but it will indicate which ones are only for historical purposes. The other designators in Figure 1 and indicated in Table 5-1 will be the recommended designators for new airworthiness approvals. An applicant seeking a type design approval after AC 20-140B is published will be leveraged to comply with DO-258A in lieu of the preceding interop standard DO-258 (i.e., FANS 1/A)
31.	Cessna	§ 5.b Table 5-1/ ATN B1 Applicable Standards Pg. 6	The proposed change does not appear to align with the position of EASA. In a recent Certification Review Item (CRI), EASA states that meeting the requirements of EUROCONTROL Specification SPEC-0116 is sufficient for EASA, but may not apply anywhere else, where as ED-110B is also sufficient for EASA and will also be valid for any other region that may install such a system.		Cessna suggests: DO-280B/ED-110B. Please remove “, as modified by Eurocontrol Specification on Data Link Services (EUROCONTROL SPEC 0116)”	Not Accepted. The ATN B1 data comm system in the AC is a data comm system to support Link 2000+ in Europe. Link 2000+ is a partial build of ATN B1 defined by DO-280B/ED-110B. The ATN B1 Interop Designator in the AC is to support Link 2000+ and not the entire data comm system defined in DO-280B/ED-110B (the “as modified by Eurocontrol Spec...” is how we achieve this).

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32.	Garmin	§ 5.b Table 5-1, “FANS 1/A+” Pg. 6	Includes the statement: The navigation system shall be capable to load the [routeclearance] variable of message elements UM79, UM80 and UM83 as specified in paragraph 5.c of this AC. UM79 and UM80 are also present in Link2000+ ATNB1. To achieve the goal of, “common flight deck display and process (i.e. functional integration with flight management system) of messages with the same operational intent,” include the [routeclearance] integration guidance for ATNB1 as well.	Ensure commonality among flight deck display and process.	Include the [routeclearance] integration direction for ATNB1 UM79 and UM80 as well.	Not Accepted. Autoload capability is not required for ATN B1.
33.	Garmin	§ 5.b Table 5-1, “FANS 1/A+” Pg. 7	Editorial – under “Sub-network Designator(s)” row, “TSO-C160A” should be “TSO-C160a” for consistency	Editorial	Change capitalization	Accepted. Modified AC to reference “TSO-C160a” in lieu of “TSO-C160A”
34.	Collins	§ 5.b Table 5-1. Item FANS 1/A+ Pg. 7	The statement “The navigation system shall be capable to load the [route clearance] variable of message elements UM79, UM80 and UM83 as specified in paragraph 5.c of this AC.” is overly restrictive. Because the crew can manually load the messages to the FMC and manually update the route of the flight, this feature unnecessarily makes the flight deck costly, and requires the vendor to implement a single FMS/Data Link solution.		It is requested that “as specified in paragraph 5.c of this AC” be deleted, or alternatively modify it to state exactly what parameters in uM79, uM80, and uM83 need to be auto loaded into the navigation system and provide the specific method on how the resolve flight plan discontinuity issues that are introduced by UM79, UM80, and UM83.	Partial acceptance. Table 5-1 revised to indicate FANS 1/A implementations may occur without autoload capability; however, identifies regulations the applicant must demonstrate for compliance without autoload capability.

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35.	Collins	§ 5.b Table 5-1. Item FANS 1/A+ Pg. 7	The statements “ a) TSO-C160a for (Class X) or (Class Z and Y).“ and “a) TSO-C160A, for (Class V) or (Class W and Y) non-International Standards Organization (ISO) 8208 compliant installations. Applicants should submit the performance standards that are used to qualify the sub-network access protocol (SNAcP) sub-layer.” should apply to new aircraft only. It is possible that existing aircraft do not/cannot comply with this statement.		It is requested that this statement be clarified to specify what this applies to (specifically that it does not apply to existing aircraft). It is noted immediately above Table 5-1 in the “Note” that alternatives such as flight crew instructions based on operational standards would be acceptable. Please clarify this as an option to accommodate those existing or newly developed data link systems and equipments.	Not Accepted. Revised ACs only apply to applications for new Type Design approvals. The only way to impact existing Type Design approvals is with an AD. Therefore, a note claiming that existing approvals is acceptable is unwarranted.
36.	Garmin	§ 5.b & 5.d Tables 5-1 and 5-2 Pg. 6-10	Regarding the multiple references to TSO-C160a: It is likely that aircraft using VDLM2 will be certified with and use equipment certified under TSO-C160 (not TSO-C160a) for many years to come.	The first VDLM2 equipment certified under TSO-C160a may be years in the future. Most, if not all, existing TSO-C160 equipment will have deviated from TSO-C160 to ensure compliance with the European VDLM2 networks, including multi-frequency capability. In most cases, the equipment will also have deviations against TSO-C160 such that it is functionally similar to TSO-C160a requirements.	Ensure the wording of the AC permits the use of VDLM2 radios already certified under TSO-C160.	Accepted. TSO C-160 is added to the Table. Although applicants seeking a new Type Design approval after this AC is published would use AC 20-140B. The minimum performance of VDL Mode 2 standards support multiple VDL M2 channels; hence, new aircraft type design approvals should include this minimum performance.
37.	Garmin	§ 5.b & 5.d Tables 5-1 and 5-2 Pg 6-10	ARINC 631-6 is listed as the acceptable subnet for ATN B1, FANS 1/A+, and multiple RCPs.	ARINC 631-5 is still an acceptable standard from the airborne point of view. There are many avionics which claim ARINC 631-5 which can interoperate with the VDL Mode 2 network.	Consider using “ARINC 631-5 or later” throughout document.	Not Accepted. ARINC 631-6 is the correct standard to specify VDL M2 protocols.
38.	Transport-Canada	§ 5.b(2) Table 5-1 Pg. 6	Use of Shall/Must/Should.	While "Should" is used throughout the document, in Table 5-1 "Shall" is used for some Functional Integration Requirements while “must” and “should” are used for others requirements.	TCCA suggests to replace “should” with “shall” in 5.b.(3). It is also suggested to revisit the use of should/shall/must throughout the document particularly in section 5 “Means of	Accepted. The AC has been revised to use only “should”.

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					Compliance".	
39.	Boeing	§ 5.b(3) Pg. 6	The paragraph requiring common levels of integration for FANS and ATN B1 will add unnecessary cost to dual-stack implementations. The Link2000+ ATN B1 implementation is based on not requiring integrated operation. Since all FANS implementations have been integrated (and this AC makes it mandatory for FANS) it now becomes mandatory for ATN when it is not needed, and provides no benefits.	AC 20-140B Change considered necessary	Revise sentence: Also, the aircraft should ensure common flight deck display and process based on operational utilization (i.e. functional integration with flight management system)	Accepted. Paragraph 5.b(3) revised as stated. It will indicate the following: "Also, the aircraft should ensure common flight deck display and process based on operational utilization of messages".
40.	Collins	§ 5.b(3) Pg. 6	The statement "for aircraft that are capable of using both FANS 1/A+ and ATN B1 applications on the same flight, the aircraft should comply with RTCA/DO-305A/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 ATSU's, one using FANS 1/A+ and the other using ATN B1." is overly restrictive. "Seamless" transfer between FANS 1/A+ and ATN B1 is not necessary for safe and efficient operations, and should not be required.		Please consider making this feature optional until ATN B2 is implemented.	Accepted. Table 5-1 revised to indicate seamless transition as optional.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
41.	Collins	§ 5.b(3) Pg. 6	The statement “Also, the aircraft should ensure common flight deck display and process (i.e. functional integration with flight management system) of messages with the same operational intent, resulting from different message sets between FANS 1/A+ and ATN B1 CPDLC applications.” is overly prescriptive to a specific architecture and does not allow vendors/OEMs to make their own decision on how their flight deck should look/operate. Currently, there is no requirement in the EU’s Link 2000+ program that requires the uplink messages to be loaded into the FMS. The crew can change the route and flight plan manually without requiring the FMS integration. Acquiring route clearance messages via data link and transferring this data manually to the FMS is proven to be very helpful compared to acquiring the data via voice and transferring this data manually into the FMS. This feature unnecessarily makes the flight deck costly, and requires the vendor to implement a single FMS/Data Link solution.		Please consider deleting this statement.	Accepted. Paragraph 5.b(3) revised as stated. It will indicate the following: “Also, the aircraft should ensure common flight deck display and process based on operational utilization of messages”.
42.	Buzz Associates	§ 5.c pg. 7	Auto loading of messages from FMS should not be required.	Existing FMS in business aircraft do not have this capability to auto load. This would limit the availability of FANS 1/A+ systems for many years until new systems are available. Manual entry should suffice with flight crew acceptance of clearance.	Change to “If auto loading is available it must be capable of	Accepted. Table 5-1 revised to indicate FANS 1/A implementations may occur without autoloading capability; however, identifies regulations the applicant must demonstrate for compliance without autoloading capability.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
43.	UASC	§ 5.c pg 7	Page 7, 5.c. To UASC's understanding there is no existing HITL or other study that shows that integrated or autoloading is a mandated function for uplinked flight plan changes. In fact, Mitre studies, although not specifically intended to make this determination, have stated that either manual or autoloading methods produced safe and satisfactory results in terms of the crew handling a flight plan change. Given this revision of the AC mandates a subset of the UM autoloading capability, UASC would ask for justification of this as a minimum functional system requirement..			Accepted. Table 5-1 revised to indicate FANS 1/A implementations may occur without autoloading capability; however, identifies regulations the applicant must demonstrate for compliance without autoloading capability.
44.	UASC	§ 5.c pg 7	. Page 7, 5.c. UASC designed its current implementation of our FANS Data Comm product to meet the intent of DO-306. The intended function of the system is to provide CPDLC capability in remote/oceanic airspace. If autoloading is a mandatory function in domestic airspace, then the AC should delineate between functionality mandated for domestic vs. remote airspace operations			Accepted. Table 5-1 revised to indicate FANS 1/A implementations may occur without autoloading capability; however, identifies regulations the applicant must demonstrate for compliance without autoloading capability.
45.	UASC	§ 5.c Pg 7	Page 7, 5.c. The requirements within this section appear to mimic the operational requirements drafted in the SC-214 SPR, but the terms here specify just the [route clearance] element and do not make note of the [position] element within the uplink. This could result in ambiguous uplink/autoloading schemes.			Accepted. Revised text on aircraft behavior.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
			<p>For example, CPDLC-I-OR-33 of the SPR (Chapter 5) states: "When the positionR in UM79R is a fix in the existing route, then loading of the UM79R shall result in the following route..."</p> <p>Item (1) of 5.c. of this AC states: "If the [route clearance] in UM79 concludes with a fix in the active flight plan, the navigation system..."</p> <p>These requirements are actually conflicting and will result in interoperability conflicts. All of the requirements in this section of the AC should be revisited</p>			
46.	UASC	§ 5.c Pg 8	<p>Page 8, 5.c. Item (5) of this section conflicts with the draft SC-214 SPR which contains the note: "<i>When the specified position in UM83R message is not a fix in the existing en-route segment of the route, the uplink element will be considered not loadable.</i>"</p> <p>This will result in interoperability conflicts.</p>			Accepted. Revised text on aircraft behavior.
47.	Boeing	§ 5.c Pg. 7	<p>Items (1) through (5) may be unduly restrictive, and preclude innovation.</p>	AC 20-140B Change considered necessary	<p>Recommended text:</p> <p>c. Functional Integration Requirements for FANS 1/A+. The data link system and navigation system should be, to the maximum extent possible, integrated so that navigation affecting messages can be loaded or transmitted without flight crew entry (although flight crew action is still required to accept the clearance).</p>	Accepted. Revised text on aircraft behavior and because autoload capability is only recommended (i.e., "should" instead of "must") the spirit of this comment is incorporated.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
					<p>(1) — If the [route clearance] in UM79 concludes with a fix in the active flight plan, the navigation system replaces all fixes upstream of that fix with the specified [route clearance].</p> <p>(2) — If the [route clearance] in UM79 does not conclude with a fix in the active flight plan, the navigation system inserts the [route clearance] before the existing route, followed by a discontinuity, and the existing route.</p> <p>(3) — UM80 replaces the entire active flight plan, beginning at the departure airport (when on the ground), and present position (when in the air).</p> <p>(4) — If the first position in the [route clearance] in UM83 is a fix in the active flight plan, the navigation system replaces all fixes subsequent to that fix with the specified [route clearance].</p> <p>(5) — If the first position in the [route clearance] in UM83 is not a fix in the active flight plan, the navigation system inserts the [route clearance] at the end of the existing route, preceded by a discontinuity.</p>	

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
48.	Transport-Canada	§ 5.c Pg 7	This numbered list (numbers (1) through (5) in Paragraph 5.c.) is effectively a copy of the text in Appendix C, Table C-1 of RTCA, Inc.'s DO-258 – “Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications.”	The list from RTCA, Inc. provides more detailed requirements than are usually included in an AC.	TCCA suggests replacing the text “as specified in paragraph 5.c of this AC” with “as specified in Table C-1 of DO-258 Appendix C”.	Not Accepted. Although the text on aircraft behavior has been revised, the behavior specified in the AC is provided to eliminate current confusion.
49.	Transport-Canada	§ 5.c Pg 7	A “flight crew entry” is usually required to initiate a route loading not just to “accept the clearance”.	The statement is somewhat misleading.	TCCA suggests to either rephrase the existing text or remove 5.c entirely as it provides little value above what is in the table.	Accepted. Revised text to eliminate confusion. Added the word “load” to the last sentence in 5.c.
50.	Garmin	§ 5.c(1) Pg. 7	Adds new guidance on data link system and navigation system integration for FANS 1/A+ to support loading/transmitting [route clearance] UM79 messages without flight crew entry.	<p>While this guidance is important to ensure that controllers and pilots have the same expectation as to how a [route clearance] message acts, the following concerns should be taken into consideration:</p> <ul style="list-style-type: none"> • Par. 5.c.(1) uses the phrase “upstream of that fix”. Suggest using “before that fix” to be consistent with the “before the existing route” phrase used in 5.c.(2) • Par. 5.c.(1) uses the phrase “the navigation system replaces all fixes upstream of that fix”. DO-258A section 4.6.7.8.3 cautions that: “In order to assure that the data are loaded correctly, the 	Clarify the expectations for how equipment is supposed to support loading [route clearance] UM79 messages.	Accepted. Revised text on aircraft behavior as suggested.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
				<p>following constituent variables of the [routeclearance] variable should not be used with elements uM79 and uM83: airportdeparture, proceduredeparture, procedureapproach, procedurearrival, and airwayintercept.”</p> <p>The 5.c.(1) guidance doesn’t specify whether equipment should allow UM79 to replace any departure fixes that might be “upstream” of the “fix in the active flight plan” that concludes UM79. Is such behavior consistent with clearance changes that controllers are currently allowed to issue (particularly if the active leg is still on the existing departure)?</p>		
51.	Collins	§ 5.c(1-5) Pg. 7	Because the crew can manually load the messages to the FMC and manually update the route of the flight, this feature unnecessarily makes the flight deck costly, and requires the vendor to implement a single FMS/Data Link solution.		Please consider making all of Section 5.c optional.	Not Accepted. Although para 5.c revised text on aircraft behavior, the spirit of this comment is incorporated.
52.	GE	§ 5.c(2) Pg. 7	On page 7 replace item (2) with the following: If the [route clearance] in UM79 does not conclude with a fix in the active flight plan, the navigation system inserts the [route clearance] and the fix, before the existing route, followed by a discontinuity, and the existing route.			Accepted. Revised text on aircraft behavior as suggested.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
53.	Garmin	§ 5.c(2) Pg. 7	Adds new guidance on data link system and navigation system integration for FANS 1/A+ to support loading/transmitting [routeclearance] UM79 messages without flight crew entry.	<p>While this guidance is important to ensure that controllers and pilots have the same expectation as to how a [routeclearance] message acts, the following concerns should be taken into consideration:</p> <ul style="list-style-type: none"> Par. 5.c.(2) uses the phrase “the navigation system inserts the [routeclearance] before the existing route”. DO-258A section 4.6.7.8.3 cautions that: <p align="center">“In order to assure that the data are loaded correctly, the following constituent variables of the [routeclearance] variable should not be used with elements uM79 and uM83: airportdeparture, proceduredeparture, procedureapproach, procedurearrival, and airwayintercept.”</p> <p>The 5.c.(2) guidance doesn’t specify whether equipment should allow UM79 to insert the “[route clearance]” before any existing departure route that might be “before the existing route”. Is such behavior consistent with clearance changes that controllers are currently allowed to issue?</p>	Clarify the expectations for how equipment is supposed to support loading [routeclearance] UM79 messages.	Accepted. Revised text in paragraph 5.c and 5.c(1) thru (5) as suggested.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
54.	Garmin	§ 5.c(4) Pg. 8	Adds new guidance on data link system and navigation system integration for FANS 1/A+ to support loading/transmitting [route clearance] UM83 messages without flight crew entry.	<p>While this guidance is important to ensure that controllers and pilots have the same expectation as to how a [route clearance] message acts, the following concerns should be taken into consideration:</p> <ul style="list-style-type: none"> Par. 5.c.(4) uses the phrase “the navigation system replaces all fixes subsequent to that fix”. DO-258A section 4.6.7.8.3 cautions that: <p align="center">“In order to assure that the data are loaded correctly, the following constituent variables of the [route clearance] variable should not be used with elements uM79 and uM83: airportdeparture, proceduredeparture, procedureapproach, procedurearrival, and airwayintercept.”</p> <p>The 5.c.(4) guidance doesn’t specify whether equipment should allow UM83 to replace any arrival or approach fixes that might be “subsequent to that fix in the active flight plan” that is the first position in the UM83 [route clearance]. Is such behavior consistent with clearance changes that controllers are currently allowed to issue (particularly if the active leg is already on the arrival or approach)?</p>	Clarify the expectations for how equipment is supposed to support loading [route clearance] UM83 messages.	Accepted. Revised text in paragraph 5.c and 5.c(1) thru (5) as suggested.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
55.	Boeing	§ 5.c(5) Pg. 8	If the sub paragraphs remain in document then As written, the requirement would imply that the [route clearance] would be loaded after the terminal area procedures at the destination aerodrome	Clarification	Recommendation: Revise the wording to read, "...navigation system inserts the [route clearance] at the end of the en route portion of the existing route, preceded by a discontinuity".	Accepted. Revised text on aircraft behavior as suggested; however, route modification must be relative to [position] in UM83 instead of the enroute portion of the route (i.e., FMS ignorant to know which waypoint in the route is the end of the enroute portion of the route.)
56.	GE	§ 5.c(5) Pg. 8	On page 8 replace item (5) with the following: If the first position in the [route clearance] in UM83 is not a fix in the active flight plan, the navigation system inserts the fix and the [route clearance] at the end of the existing route, preceded by a discontinuity.			Accepted. Revised text on aircraft behavior in 5.c(5) as suggested.
57.	Garmin	§ 5.c(5) Pg. 8	Adds new guidance on data link system and navigation system integration for FANS 1/A+ to support loading/transmitting [routeclearance] UM83 messages without flight crew entry.	<p>While this guidance is important to ensure that controllers and pilots have the same expectation as to how a [routeclearance] message acts, the following concerns should be taken into consideration:</p> <ul style="list-style-type: none"> Par. 5.c.(5) uses the phrase "the navigation system inserts the [routeclearance] at the end of the existing route". DO-258A section 4.6.7.8.3 cautions that: <p style="padding-left: 40px;">"In order to assure that the data are loaded correctly, the following constituent variables of the [routeclearance] variable should not be used with elements uM79 and uM83: airportdeparture, proceduredeparture,</p>	Clarify the expectations for how equipment is supposed to support loading [routeclearance] UM83 messages.	Accepted. Revised text in paragraph 5.c and 5.c(5) as suggested.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
				<p>procedureapproach, procedurearrival, and airwayintercept.”</p> <p>The 5.c.(5) guidance doesn’t specify whether equipment should allow UM83 to insert the “[route clearance]” after any existing arrival or approach that might be “at the end of the existing route”. Is such behavior consistent with clearance changes that controllers are currently allowed to issue?</p>		
58.	Boeing	§ 5.d Table 5-2 Pg. 8	DO-306A and ED-122A do not exist.	Clarification	Recommendation: Change all four instances of “DO-306A/ED-122A” to “DO-306/ED-122”.	Accepted. Table 5-2 revised to reference DO-306/ED-122 and Appendix A to define this reference to be Change 1 of the SPR.
59.	Boeing	§ 5.d Table 5-2 Pg. 8	Table 5-2 doesn’t match Section 8.b.(2) by listing VDLM0/A as an acceptable subnetwork for RCP240 and RCP400.	AC 20-140B Change considered necessary	Recommendation: In Table 5-2, add VDLM0/A as an acceptable subnetwork for RCP240 and RCP400 in order to match Section 8.b.(2).	Accepted. VDL M0/A is now recognized as a viable subnetwork for FANS 1/A+ and ACARS ATS in Table 5-1. Performance designators in Table 5-2 no longer recognize specific subnetworks. Aircraft may be implemented with more than one subnetwork as specified in Table 5-1 of which the applicant would need to demonstrate a given performance designator can be satisfied (e.g., including performance associated with transitions, ATS vs. AOC messages, and number of ADS-C contracts.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
60.	Boeing	§ 5.d Table 5-2 Pg. 8	ARINC 618-6, Section 11 for INFO frame data format	Clarification	Recommendation: Change all four instances of “ARINC 618-6, Section 11 for INFO frame data format” to just “ARINC 618-6, Section 11”	Accepted. Revised enabling criteria for a VDL M2 subnetwork to ARINC 618-6, Section 11 as suggested. Only one revision in Table 5-1 for the VDL M2 subnetwork in lieu of four instances because subnetwork in Table 5-2 was deleted.
61.	United	§ 5.d Figure 5-2 Pg. 8	VDL M0/A is not included under sub-networks of any <u>RCP Performance Designator</u>	There is no indication that VDL M0/A will not meet the RCP/RSP requirements	Add VDL M0/A to RCP and RSP criteria	Accepted. VDL M0/A is now recognized as a viable subnetwork for FANS 1/A+ and ACARS ATS in Table 5-1. Performance designators in Table 5-2 no longer recognize specific subnetworks. Aircraft may be implemented with more than one subnetwork as specified in Table 5-1 of which the applicant would need to demonstrate a given performance designator can be satisfied (e.g., including performance associated with transitions, ATS vs. AOC messages, and number of ADS-C contracts).
62.	Garmin	§ 5.d Table 5-2 “RCP 400” Pg. 8	Editorial – under “Sub-networks that are recognized to meet RCP 400” row, “TSO-C160A” should be “TSO-C160a” for consistency	Editorial	Change capitalization	Accepted. Performance designators in Table 5-2 no longer recognize specific subnetworks. Therefore, reference to TSO-160 no longer necessary. Aircraft may be implemented with more than one subnetwork as specified in Table 5-1 of which the applicant would need to demonstrate a given performance designator can be satisfied (e.g., including performance associated with transitions, ATS vs. AOC messages, and number of ADS-C

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
						contracts).
63.	Boeing	§ 6.a(3) Pg. 10	The phrase “provide the crew with the capability to ensure that the different modes of the data link system meet the criteria for the intended operation” is very unclear	Clarification	Recommendation: If the data link system includes multiple ATS data link applications and sub-networks, provide the crew with the capability to ensure that the different modes of the data link system are available for the intended operation.	Accepted. Revised text to clarify paragraph.
64.	Airbus	§ 6.a(5) pg. 10	Reference to GOLD should be preferred for CPDLC message set wording.	GOLD material is more likely to be up to date with regards to latest operational assessment of the CPDLC message set (e.g. side effects on FANS 1/A msg set from joint SC214/WG78 and OPLINKP activities).	Replace “(e.g., the preferred message format identified in DO-306, Change 1, Appendix A),” with “(e.g., the preferred message format identified in GOLD, Appendix A),”.	Not Accepted. Para 6.a(5) is deleted. DO 258A indicate the messages.
65.	Boeing	§ 6.a(5) Pg. 10	This could be taken to imply that every recertification has to update to the latest standards.	AC 20-140B Change considered necessary	Recommend: Remove it. The interop standard specified as the cert basis defines the messages.	Accepted. Para 6.a(5) is deleted.
66.	Garmin	§ 6.b(2) Pg. 11	The term “carefully incorporated” is ambiguous	It is hard to understand how to meet this requirement	Remove “carefully” or provide additional details to qualify what is meant by “carefully”	Accepted. The word “carefully” was removed as suggested.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
67.	Collins	§ 6.b(2) Pg. 11	This item is very vague.		Please include clarification, especially for the meaning of “carefully incorporated” in this context.	Accepted. The word “carefully” was removed.
68.	Buzz Associates	§ 6.b(3) pg 11	Dedicated Datalink failure indication in primary field of view requires additional annunciators in a cockpit full of annunciators already.	Today’s cockpits have too many annunciators already. Confusion exists with momentary indications or misinterpretation of indication.	Allow use of existing FMS MESSAGE indications to alert the flight crew of a datalink failure message on the FMS CDU.	Accepted. Para changed to indicate “in the pilot’s normal field of view,” Although, the flight crew needs to be alerted of a data link failure even if the hosted system (e.g.,FMS) does not fail. The spirit of this requirement is met if/when the hosted system gives an indication to the flight crew the data comm system no longer functions.
69.	UASC	§ 6.b(3) Pg 11	Page 11, 6.b.(3) The inclusion of the clause "...in the primary field of view" is new from AC 20-140A. Does the indication in the PFV need to be unique or can the alert take the form of a generic alert informing the crew of a "loss of datalink", allowing the crew to look somewhere else for the detailed information?			Partial Acceptance. The intent of this requirement is met, provided the aircraft flight deck alerting philosophy supports a generic alert which the flight crew must look somewhere else to learn what actually failed.
70.	Buzz Associates	§ 6.b(4) pg 11	Dedicated SUB-NETWORK failure indication in primary field of view requires additional annunciators in a cockpit full of annunciators already.	Today’s cockpits have too many annunciators already. Confusion exists with momentary indications or misinterpretation of indication.	Allow use of existing FMS MESSAGE indications to alert the flight crew of a SUB-NETWORK failure message on the FMS CDU.	Partial Acceptance. An indication in the “pilot’s normal field of view” to have to look somewhere else to gain insight would meet the intent of this requirement.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
71.	UASC	§ 6.b(4) Pg 11	Page 11, 6.b.(4) Is this requirement intending to state a unique identifier for <u>each</u> subnetwork (as defined by Table 4-1 of the AC) must be provided in the PFV or for a single alert to show when <u>all</u> media links are lost? Should this be different from a datalink failure as indicated in Item (3)? The primary field of view seems drastic for so many unique alerts. Suggest simply having one PFV alert for all “loss of communication”, with access to the details elsewhere (e.g., CDU).			Accepted. In addition to a box failure (i.e., aircraft data link system) an indication when the connection is lost should also be provided. Therefore, the requirement in 6.b(4) was deleted and the indication requirement of 6.b(3) was revised to include connection failures.
72.	Boeing	§ 6.b(4) Pg. 11	The subnetwork and/or the air/ground link may change and they may have no impact to the availability of the application. The flight crew should not be concern with the mechanic of the function.	AC 20-140B Change considered necessary	Recommend: Indication of status to the flight crew of the lost of the application connection, in the primary field of view	Accepted. In addition to a box failure (i.e., aircraft data link system) an indication when the connection is lost should also be provided. Therefore, the requirement in 6.b(4) was deleted and the indication requirement of 6.b(3) was revised to include connection failures.
73.	Garmin	§ 6.b(4) Pg. 11	Does the status of the subnetwork really need to be in the primary field of view?	Depending on the airspace and the subnet, coverage may be spotty (i.e. VHF data links). Do we really want the equipment to indicate to the pilot, in the primary field of view, every time the subnet connection is lost?	Would recommend allowing the communications application to annunciate changes in status in the primary field of view. For example, aircraft could be connected to VDL Mode 2 and have a CPDLC connection. VDL Mode 2 could be lost for a short period of time but the CPDLC application is still considered connected due to the timers not yet expiring. It is possible for a VDL Mode 2 connection to be regained without interrupting the CPDLC application. Suggest further considering if it is correct to alert the pilot in the primary field of view every time the subnetwork changes state. Consider letting	Accepted. In addition to a box failure (i.e., aircraft data link system) an indication when the connection is lost should also be provided. Therefore, the requirement in 6.b(4) was deleted and the indication requirement of 6.b(3) was revised to include connection failures.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
					the application annunciate the status in the primary field of view (i.e. an alert if CPDLC is lost due to subnet being lost for too long for timers to recover).	
74.	UASC	§ 6.b(7) Pg 11	Page 11, 6.b.(7) FANS technically defines up to two ATS connections, one for the active controller and one for the next. Does this requirement intend to mandate that the all applications and sub-networks for the <u>next</u> controller also be listed or only of the current (active) controller? Application and sub-network information for the next controller may not be known by the aircraft until it becomes the active controller. Does the crew need to be cognizant of that information?			Accepted. Deleted 6.b(7) and replaced it with the following three indication guidelines: <ul style="list-style-type: none"> • Indication of the active center which the aircraft has a CPDLC connection. • Indication of active sub-networks. • Indication of centers that have established ADS contracts with the aircraft.
75.	Boeing	§ 6.b(7) Pg. 11	The system is not capable of having different provider/subnetwork for each application or connection.	Clarification	Recommend: Indication of the ATS provider(s) connected to the aircraft; and the sub-networks.	Accepted. Deleted 6.b(7) and replaced it with the following three indication guidelines: <ul style="list-style-type: none"> • Indication of the active center which the aircraft has a CPDLC connection. • Indication of active sub-networks. • Indication of centers that have established ADS contracts with the aircraft.

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
76.	Boeing	§ 6.b(11) Pg. 11	Indication of the time a message was sent seems unnecessary	AC 20-140B Change considered necessary	Recommend: revise sentence to read: Indication of the status of each message, if acknowledged or not, and the time it was sent by the originator or received by the airplane, together with the message.	Accepted. Revised paragraph as suggested. Indication of the time a message has been received by the aircraft data link system is sufficient for pilot indication.
77.	Garmin	§ 6.c(1) Pg. 11	Controls to allow activation and deactivation of individual applications or subnetworks can become quite complex as the number of applications and number of transceivers increases.	A complex, difficult to use control suite that provides fine-grained control of each application and subnetwork may not provide the capability that seems to be intended by this item. Additionally, operator policy may preclude the flight crew from disabling some applications.	Consider rewording to permit control of some groups of functionality instead. Consider rewording to take operator policies for some applications into account.	Not Accepted. Control by functionality is considered even more complex.
78.	Airbus	§ 6.g. pg. 12	Even though the objective is certainly very worthwhile (i.e. making CPDLC message set evolutions independent from the heavy and lengthy aircraft system design approval process), such considerations are fully premature.	CPDLC Message Set is highly integrated in deep layers of the ATS Data Comm mechanisms in the systems. No comparison can realistically be made with navigation data base which contains static data only without particular logics associated to it. Such proposal would require further industrial assessment before it can be introduced in an AC.	Even though it is clearly stated not applicable (as mentioned in the last sentence of the paragraph), Airbus propose to delete.	Accepted. Agree the paragraph can be confusing and misinterpreted to be applicable guidance to the data link applications addressed within this AC. The paragraph was intended to provide a vision for a future data link application. Although the FAA continues to consider the objective worthy for industry consideration, the AC may not be the best vehicle to introduce ideas for future data link applications. The text for this vision was moved to a <i>Note</i> : under paragraph 5.b(2).
79.	Boeing	§ 6.g Pg. 12	This seems to be an attempt to design the software, rather than providing any guidance from certification.	AC 20-140B Change considered necessary	Recommend: Deletion	Accepted. Agree the paragraph can be confusing and misinterpreted to be applicable guidance to the data link applications addressed within this AC. The paragraph was intended to provide a vision for a future data link application. Although the FAA continues to consider the

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6. #	3. Reviewing Office	7. Page and Paragraph No.:	8. Comment:	9. Reason For Comment:	10. Suggested Change:	11. Disposition:
						objective worthy for industry consideration, the AC may not be the best vehicle to introduce ideas for future data link applications. The text for this vision was moved to a <i>Note</i> : under paragraph 5.b(2).
80.	Boeing	§ 7 Pg. 13	This AC only applies to demonstrating that the airplane meets its allocations of the interoperability and safety/performance requirements. I don't think end-to-end testing is necessarily appropriate in that context.	AC 20-140B Change considered necessary	1. Recommend: Test your aircraft data link system's safety requirements and performance allocations against a ATS ground environment that is representative of the operational environment that the aircraft will operate in. and application by end-to-end ground testing that verifies system interoperability and performance per DO 264/ED 78A, section 6. Test with either an appropriate ATS unit or with test equipment that is representative of an actual ATS unit. Retain evidence that the representative ATS ground test equipment demonstrates appropriate interface with the aircraft, in compliance with the interoperability and performance designators identified in Table 5-1 and Table 5-2.	Not Accepted. The necessary aircraft Interop/Safety/Performance requirements for airworthiness is achieved demonstrating compliance to the designators in Table 5-1 and 5-2. Evaluation of ATS Data communications between the controller and the pilot (i.e., end-to-end entities) can occur only with an actual ATS unit or one considered to be representative of an actual ATS unit. The existing text for paragraph 7 is considered correct and appropriate. Hence, the FAA is working on establishing a representative Ground System Lab, at WJHTC, for applicants to test their aircraft data link system against.
81.	UASC	§ 8 pg 13	Multiple: Please confirm if VDL Mode A (POA) will be allowed for FANS messaging within this AC. Informal notice was given (during SC-214 Plenary #15) that the FAA Data Comm Initiative will be modified to allow use of POA in addition to VDL M2 (AOA). Affected items: Table 5-1, Table 5-2. The example in Section 8.b.(2)			Partial Acceptance. VDL M0/A is recognized as a viable subnetwork for FANS 1/A+ and ACARS ATS in Table 5-1. Furthermore, VDL M0/A is also used in the Flight Manual example (see paragraph 8.b(2)). However, an operator must go to the AIP or NOTAM to determine if data communication service for a

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			suggests VLD M0/A will be an accepted network for FANS 1/A+			specific subnetwork is or is not offered within a given FIR.
82.	United	§ 8.b(2) Table Pg. 13	Should “ADS-C at Type 180” read “ADS-C at RSP 180”	Apparent Error	Correct Text	Accepted. Type 180 changed to RSP 180 as suggested.
83.	Transport-Canada	§ 8.b(2) Pg 13	ATN Entry missing from table.	The example table should include an ATN entry.	TCCA suggests adding another row with an ATN example.	Accepted. Added an example entry for ATN B1 as suggested.
84.	UASC	General	General: This revision of the AC creates new system requirements not mandated by RTCA DO-306. New system requirements should be implemented through the RTCA committee process for industry concurrence			Not Accepted. An AC is a mechanism to identify one means of compliance to regulations. Often AC material invokes industry developed standards through the RTCA committee process but is not a prerequisite. However, if the comments is in regards to autoloading capability for FANS 1/A implements; Then Table 5-1 has been revised to indicate FANS 1/A implementations may occur without autoloading capability. However, it identifies regulations the applicant must demonstrate for compliance without autoloading capability.

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85.	GE	General	The draft is missing the description on the way it was developed, in other words what organizations were considered and whether SPR and INTEROP were considered in developing their guidance. I believe this give the AC a better credibility if it states what points were considered in developing the AC.			Accepted. Although the text in paragraph 1.c of AC 20-140A has been removed; the credibility of the AC and its contents is not considered to be in question based on the fact that Section 4 of the AC makes reference to multiple industry developed standards, including ICAO material, to provide an overview and explanation of ATS Data Comm Systems.
86.	GE	General	Is the draft mandatory, does it constitute a regulation; there is no disclaimer in the draft.			Not Accepted. Although the text in paragraph 1.d of AC 20-140A has been removed; the text in paragraph 1.b clearly indicates that compliance to the AC is not mandatory. Furthermore, AC material never invokes mandatory requirements; rather it provides guidance for how an applicant is able to demonstrate compliance to regulations found in 14 CFR.
87.	Collins	Multiple	The terms “Should” and “Shall” are both used in this AC but they are not defined. Is there an FAA document that defines the specific meanings of these words as used in this AC? If not, can definitions be added to this AC to provide clarity as to their specific meaning?		It is noted that FAA policy statements, e.g.,PS-ANM-25-08, include such definitions. This approach is suggested for clarity.	Accepted. The AC uses the term “should”. Order 1320.46C, Advisory Circular System, defines these terms and when to use them within any AC.