



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Onboard Recording of Controller Pilot Data Link Communication In Crash Survivable Memory **Date:** 02/21/08 **AC No:** 20-160
Initiated by: AIR-100 **Change:**

1. What is the purpose of this Advisory Circular (AC)?

a. This advisory circular (AC) offers one way to achieve an acceptable level of performance for an aircraft recording system when a controller-pilot data communication capability is installed. We wrote this AC for aircraft equipment installers and type certificate applicants to identify design approval requirements for data link communication recording equipment. This AC will also help Federal Aviation Administration (FAA) staff to standardize data link communication message sets for retrieval from crash-survivable memory.

b. This AC is not mandatory and does not constitute a regulation. In this AC, we describe one acceptable means to gain design approval, but it is not the only means. However, if you are seeking to gain FAA approval of your data link communication recording system by using the means described in this AC, you must follow it in its entirety.

2. What does this AC apply to?

In this AC, we focus on aircraft recording performance and logical recording point locations for storing controller-pilot data link communication information in onboard crash-survivable memory. These logical point locations, also called observation points, are physical locations within airborne avionic architectures deemed ideal for recording system data sources.

3. Why we need crash survivable memory?

We increasingly rely on data link communication technology; yet one specific shortcoming of this technology is the lack of airborne recording of data link communication messages in crash-survivable memory. Retrievable data link communication information in crash survivable memory gives investigating authorities the tools for post-accident or -incident reconstruction.

4. Related Federal Aviation Regulations. The regulations in Title 14 of the Code of Federal Regulations (14 CFR) applying to the certification and approval of data link communication recording equipment are listed in Figure 1 below.

FIGURE 1. Table of Applicable 14 CFR Parts

| Description | 14 CFR Part 23 | 14 CFR Part 25 | 14 CFR Part 27 | 14 CFR Part 29 |
|--|-------------------|-------------------|-------------------|-------------------|
| Subpart F—Equipment | | | | |
| Function and installation. | § 23.1301 | § 25.1301 | § 27.1301 | § 29.1301 |
| Equipment, systems, and installations. | § 23.1309 | § 25.1309 | § 27.1309 | § 29.1309 |
| Cockpit Voice Recorders | § 23.1457 | § 25.1457 | § 27.1457 | § 29.1457 |

5. What are the means of compliance to the regulations of this AC?

You may satisfy the requirements of the regulations listed in Figure 1 above by satisfactorily addressing the instructions contained in the following sections of EUROCAE document ED-93, Minimum Aviation System Performance Specification for CNS/ATM Message Recording Systems, dated November 1998.

a. EUROCAE document ED-93, Sections 2.3.2.1 and 2.3.2.2, Choice of Data to be Recorded Onboard the Aircraft. These sections identify crew communication recording requirements and recording points.

b. EUROCAE document ED-93, Appendix D.2, Controller-Pilot Data Link Communications (CPDLC). This appendix specifies the data message set identified as “mandatory” for recording.

NOTE 1: We use the term “mandatory” only within the context of your need to satisfactorily demonstrate the performance specifications of EUROCAE document ED-93. For the purpose of CPDLC, ED-93, Appendix D, defines “mandatory.”

NOTE 2: For the purposes of this AC, we consider the use of “CPDLC” to be defined by ICAO Document 4444, Procedures for Air Navigation Services/Air Traffic Management, Appendix 5, CPDLC Message Sets. When applicable, we also consider other proposed message sets that satisfy the Message Use/Intent column of the tables contained in ICAO Document 4444, Appendix 5, “mandatory” for recording.

c. For data compression, this AC refers to EUROCAE document ED-112, Section IV-2.1.2 “Recording technique”. In it we state that, “no compression methods should be employed.”

d. This AC utilizes Technical Standard Order (TSO) C177, Data Link Recorder Systems, dated July 28, 2006, or latest approved revision, to establish the proper equipment compliance criteria.

6. What is the failure condition classification?

Failure of the data link communication recording equipment is a minor failure condition. An applicant should develop the data link communication recording equipment to, at least, the design assurance level equal to this classification.

7. What are the maintenance program requirements?

Maintenance tasks related to the continued operation of a data link communication recording system are not defined in this AC. See AC 20-141, Airworthiness and Operational Approval of Digital Flight Data Recorder Systems, dated October 5, 1999, for guidance on how to develop and obtain approval for a flight recorder maintenance program.

8. Are there any related FAA publications I should be look at?

a. AC 20-140, Guidelines for Design Approval of Aircraft Data Communication Systems, dated August 16, 1999.

b. AC 20-141, Airworthiness and Operational Approval of Digital Flight Data Recorder Systems, dated October 5, 1999.

c. AC 120-70A, Operational Authorization Process for Use of Data Link Communication System, dated December 29, 2005.

d. International Civil Aviation Organization (ICAO) International Standards and Recommended Practices--Operation of Aircraft, Annex 6, specify onboard recording requirements. These sections apply:

(1) Part I -- International Commercial Air Transport -- Aeroplanes, §§ 6.3.1.5 and 6.3.1.5.1, Amendment 27 Recording requirements for commercial air transport.

(2) Part II -- International General Aviation -- Aeroplanes, §§ 6.10.1.5, and 6.10.1.5.1 Amendment 19. Recording requirements for general aviation.

(3) Part III -- International Operations -- Helicopters, §§ 4.9.1.5 and Amendment 6. Recording requirements for helicopters.

e. ICAO Document 9705/third edition, Manual of Technical Provisions for the Aeronautical Telecommunication Network, dated April 19, 2002.

f. EUROCAE document ED-93, Minimum Aviation System Performance Specification for Communication, Navigation and Surveillance (CNS)/Air Traffic Management (ATM) Message Recording Systems, dated November 1998.

g. RTCA DO-290, Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard), dated April 29, 2004.

h. RTCA DO-306, Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard), dated October 11, 2007.

i. EUROCAE document ED-112, Minimum Operation Performance Specification for Crash Protected Airborne Recorder Systems, dated March 2003, including Amendment 1, dated July 2003, and Amendment 2, dated September 2003.

9. How can I get this and other FAA publications?

a. You can obtain ICAO documents by writing to ICAO Document Sales, 999 University, Montreal Quebec, Canada H3C 5H7. You may also contact the document sales office at (514) 954-8022 or visit the ICAO website at www.icao.org/.

b. You can order RTCA documents from RTCA Inc., 1828 L Street, N.W., Suite 805, Washington, D.C. 20036-4001. Telephone (202) 833-9339, fax (202) 833-9434. You can also order through the RTCA Internet website at www.rtca.org.


c. You can order EUROCAE documents from EUROCAE, 17 rue Hamelin, 75116 Paris France. Telephone 33 (0) 1 4505 7188, fax 33 (0) 1 4505 7230. You can also order from the EUROCAE Internet website at www.eurocae.org.

d. You can order copies of 14 CFR parts from the Superintendent of Documents, Government Printing Office, P.O. Box 37154, Pittsburgh PA 15250-7954. Telephone (202) 512-1800, fax (202) 512-2250. You can also order copies from the Government Printing Office, electronic CFR Internet website at www.gpoaccess.gov/ecfr. Select "Title 14, Aeronautics and Space."

e. You can find a current list of technical standard orders on the FAA Internet website Regulatory and Guidance Library at www.airweb.faa.gov/rgl. At the same site you will find the TSO Index of Articles, and if you select "Advisory Circulars," you'll be able to view and download all referenced FAA ACs.

10. Does this AC cancel any prior ACs?

This AC does not cancel any prior ACs.



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