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

Tel.: +1 (514) 954-6757

Ref.: AN 11/32.3.7-10/23 1 April 2010

Subject: Adoption of Amendment 15 to Annex 6, Part III

Action required: a) Notify any disapproval before 12 July 2010; b) Notify any differences and compliance before 18 October 2010

Sir/Madam,

1. I have the honour to inform you that Amendment 15 to the *International Standards and Recommended Practices, Operation of Aircraft — International Operations — Helicopters* (Annex 6, Part III to the Convention on International Civil Aviation) was adopted by the Council at the seventh meeting of its 189th Session on 26 February 2010. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (www.icao.int/icaonet).

2. When adopting the amendment, the Council prescribed 12 July 2010 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 15, to the extent it becomes effective, will become applicable on 18 November 2010.

3. Amendment 15 arises from:

a) recommendations of the ninth meeting of the Operations Panel Working Group of the Whole (OPSP/WG-WHL/9) regarding head-up displays (HUD)/enhanced vision systems (EVS) requirements;

b) recommendations of the twelfth meeting of the Airworthiness Panel Working Group of the Whole (AIRP/WG/WHL/12) pertaining to consistency in propulsion terminology; and

c) the Secretariat, with the assistance of the second meeting of the Flight Recorder Panel Working Group of the Whole (FLIRECP/WG/WHL/2), regarding updates to flight recorder provisions.

999 University Street
Montréal, Quebec
Canada H3C 5H7

Tel.: +1 514-954-8219
Fax: +1 514-954-6077

E-mail: icaohq@icao.int
www.icao.int

4. The amendment arising from OPSP/WG-WHL/9 recommendations pertaining to HUD/EVS introduces new definitions for EVS and HUD; new Notes to Section II, 2.2.8.1 and Section III, 2.2 to indicate that a State may give operational credit for the use of HUD/EVS by allowing operations with visibilities lower than those associated with the normal aerodrome operating minima; new Standards to require the State of the Operator for commercial operations and State of Registry for general aviation operations to approve the use of such systems to gain operational benefit; training requirements; and adds the use of HUD/EVS as suggested content of a company operations manual in Attachment H.

5. The existing definitions for propulsion terminology in Annexes 6 and 8 — *Airworthiness of Aircraft* are not consistent. As a result, AIRP/WG/WHL/12 recommendations proposed harmonization of terms between the two Annexes. The amendment replaces the words "power-unit" or "power-units" and "powerplant" or "powerplants" to "engine" or "engines" in all instances in Annex 6, Part III.

6. The amendment relating to flight recorder provisions addresses problems arising from the recovery of data from flight recorder systems, their obsolescence, the lack of data in accidents to small helicopters, and the need to prescribe recording of data link communications, the proposed amendments address these issues and include, among others: provisions for cockpit voice recorders; flight data recorders; data link recorders; combination recorders; recorders for small aircraft; and discontinuation of magnetic tape recorders.

7. The subjects are given in the amendment to the Foreword of Annex 6, Part III, a copy of which is in Attachment A.

8. In accordance with the decision of the 26th Session of the Assembly, I would like to bring to your attention the Organization's long-standing practice of providing documentation to States upon request. In this regard, I wish to refer you to the ICAO-NET website (www.icao.int/icaonet) where you can access all relevant documentation. The practice of dispatching printed copies of such documentation has now been discontinued.

9. In conformity with the Resolution of Adoption, may I request:

a) that before 12 July 2010 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 15 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;

b) that before 18 October 2010 you inform me of the following, using the form in Attachment C for this purpose:

1) any differences that will exist on 18 November 2010 between the national regulations or practices of your Government and the provisions of the whole of Annex 6, Part III, as amended by all amendments up to and including Amendment 15, and thereafter of any further differences that may arise; and

2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 6, Part III, as amended by all amendments up to and including Amendment 15.

10. With reference to the request in paragraph 9 a) above, it should be noted that a registration of disapproval of Amendment 15 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 9 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

11. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D.

12. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

13. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 9 b) above, to the ICAO Regional Office accredited to your Government.

14. As soon as practicable after the amendment becomes effective, on 12 July 2010, replacement pages incorporating Amendment 15 will be forwarded to you.

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

Raymond Benjamin
Secretary General

Enclosures:

A — Amendment to the Foreword of Annex 6, Part III
B — Form on notification of disapproval of all or part of Amendment 15 to Annex 6, Part III
C — Form on notification of compliance with or differences from Annex 6, Part III
D — Note on the Notification of Differences

ATTACHMENT A to State letter AN 11/32.3.7-10/23

AMENDMENT TO THE FOREWORD OF ANNEX 6, PART III

Add the following at the end of Table A:

Amendment	***Source(s)***	***Subject***	***Adopted/Approved Effective Applicable***
15	Ninth meeting of the Operations Panel Working Group of the Whole (OPSP/WGWHL/9); twelfth meeting of the Airworthiness Panel Working Group of the Whole (AIRP/WG/WHL/12); Secretariat, with the assistance of the second meeting of the Flight Recorder Panel Working Group of the Whole (FLIRECP/WG/WHL/2)	a) new provisions for head-up displays (HUD)/enhanced vision systems (EVS) requirements; b) amendment to provisions to provide consistency in propulsion terminology; and c) new and updated provisions regarding flight recorders.	26 February 2010 12 July 2010 18 November 2010

— — — — — — — — —

ATTACHMENT B to State letter AN 11/32.3.7-10/23

NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF AMENDMENT 15 TO ANNEX 6, PART III

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada H3C 5H7

(State) ———————————————— hereby wishes to disapprove the following parts of Amendment 15 to Annex 6, Part III:

Signature ————————————————

Date ————————————

NOTES

1) If you wish to disapprove all or part of Amendment 15 to Annex 6, Part III, please dispatch this notification of disapproval to reach ICAO Headquarters by 12 July 2010. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment 15, it is not necessary to return this notification of disapproval.**

2) This notification should not be considered a notification of compliance with or differences from Annex 6, Part III. Separate notifications on this are necessary. (See Attachment C.)

3) Please use extra sheets as required.

— — — — — — — —

ATTACHMENT C to State letter AN 11/32.3.7-10/23

NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM ANNEX 6, PART III
(Including all amendments up to and including Amendment 15)

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada H3C 5H7

1. No differences will exist on ———————————————— between the national regulations and/or practices of **(State)** ———————————————— and the provisions of Annex 6, Part III, including all amendments up to and including Amendment 15.

2. The following differences will exist on ———————————————— between the regulations and/or practices of **(State)** ———————————————— and the provisions of Annex 6, Part III, including Amendment 15 (Please see Note 3) below.)

a) **Annex Provision** (Please give exact paragraph reference)	b) **Difference Category** (Please indicate A, B, or C)	c) **Details of Difference** (Please describe the difference clearly and concisely)	d) **Remarks** (Please indicate reasons for the difference)

(Please use extra sheets as required)

3. By the dates indicated below, **(State)** _____ will have complied with the provisions of Annex 6, Part III, including all amendments up to and including Amendment 15 for which differences have been notified in 2 above.

a) **Annex Provision** (Please give exact paragraph reference)	**b)** **Date**	**c)** **Comments**

(Please use extra sheets as required)

Signature _____ Date _____

NOTES

1) If paragraph 1 above is applicable to you, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.

2) Please dispatch the form to reach ICAO Headquarters by 18 October 2010.

3) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

4) Guidance on the notification of differences from Annex 6, Part III is provided in the Note on the Notification of Differences at Attachment D.

5) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

— — — — — — — —

ATTACHMENT D to State letter AN 11/32.3.7-10/23

NOTE ON THE NOTIFICATION OF DIFFERENCES TO ANNEX 6, PART III AND FORM OF NOTIFICATION

(*Prepared and issued in accordance with instructions of the Council)*

1. *Introduction*

1.1 The Assembly and the Council, when reviewing the notification of differences by States in compliance with Article 38 of the Convention, have repeatedly noted that the state of such reporting is not entirely satisfactory.

1.2 With a view to achieving a more comprehensive coverage, this note is issued to facilitate the determination and reporting of such differences and to state the primary purpose of such reporting.

1.3 The primary purpose of reporting of differences is to promote safety and efficiency in air navigation by ensuring that governmental and other agencies, including operators and service providers, concerned with international civil aviation are made aware of all national regulations and practices in so far as they differ from those prescribed in the ICAO Standards.

1.4 Contracting States are, therefore, requested to give particular attention to the notification before 18 October 2010 of differences with respect to Standards in Annex 6, Part III. The Council has also urged Contracting States to extend the above considerations to Recommended Practices.

1.5 Contracting States are asked to note further that it is necessary to make an explicit statement of intent to comply where such intent exists, or where such is not the intent, of the difference or differences that will exist. This statement should be made not only to the latest amendment but to the whole Annex, including the amendment.

1.6 If previous notifications have been made in respect of this Annex, detailed repetition may be avoided, if appropriate, by stating the current validity of the earlier notification. States are requested to provide updates of the differences previously notified after each amendment, as appropriate, until the difference no longer exists.

2. *Notification of differences to Annex 6, Part III, including Amendment 15*

2.1 Past experience has indicated that the reporting of differences to Annex 6, Part III has in some instances been too extensive since some appear merely to be a different manner of expressing the same intent.

2.2 Guidance to Contracting States in the reporting of differences to Annex 6, Part III can only be given in very general terms. Where the national regulations of States call for compliance with procedures that are not identical but essentially similar to those contained in the Annex, no difference should be reported since the details of the procedures existing are the subject of notification through the medium of aeronautical information publications. Although differences to Recommended Practices are not notifiable under Article 38 of the Convention, Contracting States are urged to notify the Organization of the differences between their national regulations and practices and any corresponding Recommended Practices contained in an Annex. States should categorize each difference notified on the basis of whether the corresponding national regulation is:

a) ***More exacting or exceeds the ICAO Standard or Recommended Practice (SARP) (Category A)***. This category applies when the national regulation is more demanding than the corresponding SARP, or imposes an obligation within the scope of the Annex which is not covered by a SARP. This is of particular importance where a State requires a higher standard which affects the operation of aircraft of other Contracting States in and above its territory;

b) ***Different in character or other means of compliance (Category B)***[*]. This category applies when the national regulation is different in character from the corresponding ICAO SARP, or when the national regulation differs in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and

c) ***Less protective or partially implemented/not implemented (Category C)***. This category applies when the national regulation is less protective than the corresponding SARP; or when no national regulation has been promulgated to address the corresponding SARP, in whole or in part.

2.3 When a Contracting State deems an ICAO Standard concerning aircraft, operations, equipment, personnel, or air navigation facilities or services to be not applicable to the existing aviation activities of the State, notification of a difference is not required. For example, a Contracting State that is not a State of Design or Manufacture and that does not have any national regulations on the subject, would not be required to notify differences to Annex 8 provisions related to the design and construction of an aircraft.

2.4 For States that have already fully reported differences from Annex 6, Part III or have reported that no differences exist, the reporting of any further differences occasioned by the amendment should be relatively straightforward; however, attention is called to paragraph 1.5 wherein it is indicated that this statement should be not only to the latest amendment but to the whole Annex, including the amendment.

3. *Form of notification of differences*

3.1 Differences should be notified in the following form:

a) *Reference*: The number of the paragraph or subparagraph in Annex 6, Part III as amended which contains the Standard or Recommended Practice to which the difference relates;

b) *Category*: Indicate the category of the difference as A, B or C in accordance with paragraph 2.2 above;

---

[*] The expression "different in character or other means of compliance" in b) would be applied to a national regulation which achieves, by other means, the same objective as that of the corresponding ICAO SARPs and so cannot be classified under a) or c).

c) *Description of the difference*: Clearly and concisely describe the difference and its effect; and

d) *Remarks*: Under "Remarks" indicate reasons for the difference and intentions including any planned date for implementation.

3.2 The differences notified will be recorded in a Supplement to the Annex, normally in the terms used by the Contracting State when making the notification. In the interest of making the supplement as useful as possible, please make statements as clear and concise as possible and confine remarks to essential points. Comments on implementation, in accordance with paragraph 4 b) 2) of the Resolution of Adoption, should not be combined with those concerning differences. The provision of extracts from national regulations cannot be considered as sufficient to satisfy the obligation to notify differences. General comments that do not relate to specific differences will not be published in Supplements.

— END —

AMENDMENT No. 15

TO THE

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

OPERATION OF AIRCRAFT

ANNEX 6

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

PART III
INTERNATIONAL OPERATIONS — HELICOPTERS

The amendment to Annex 6, Part III contained in this document was adopted by the Council of ICAO on **26 February 2010**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **12 July 2010** will become effective on that date and will become applicable on **18 November 2010** as specified in the Resolution of Adoption. (State letter AN 11/32.3.7-10/23 refers.)

FEBRUARY 2010

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENT 15 TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

OPERATION OF AIRCRAFT — INTERNATIONAL OPERATIONS — HELICOPTERS

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. *Hereby adopts* on 26 February 2010 Amendment 15 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Operation of Aircraft, International Operations — Helicopters* which for convenience is designated Annex 6, Part III to the Convention;

2. *Prescribes* 12 July 2010 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;

3. *Resolves* that the said amendment or such parts thereof as have become effective shall become applicable on 18 November 2010;

4. *Requests the Secretary General*:

a) to notify each Contracting State immediately of the above action and immediately after 12 July 2010 of those parts of the amendment which have become effective;

b) to request each Contracting State:

1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 18 November 2010 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 18 October 2010, and thereafter to notify the Organization of any further differences that arise;

2) to notify the Organization before 18 October 2010 of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;

c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.

— — — — — — — —

NOTES ON THE PRESENTATION OF THE AMENDMENT TO ANNEX 6, PART III

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

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

TEXT OF AMENDMENT 15 TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

OPERATION OF AIRCRAFT

ANNEX 6
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

PART III
INTERNATIONAL OPERATIONS — HELICOPTERS

. . .

Editorial Note.— Replace the words "power-unit" or "power-units" and "powerplant" or "powerplants" to "engine" or "engines" in all instances in Annex 6, Part III.

. . .

SECTION I
GENERAL

CHAPTER 1. DEFINITIONS

Insert new definitions as follows:

. . .

Airworthy. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.

. . .

Continuing airworthiness. The set of processes by which all aircraft comply with the applicable airworthiness requirements and remain in a condition for safe operation throughout their operating life.

. . .

Engine. A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for functioning and control, but excludes the propeller/rotors (if applicable).

. . .

Enhanced vision system (EVS). A system to display electronic real-time images of the external scene achieved through the use of image sensors.

. . .

Head-up display (HUD). A display system that presents flight information into the pilot's forward external field of view.

. . .

SECTION II

INTERNATIONAL COMMERCIAL AIR TRANSPORT

CHAPTER 2. FLIGHT OPERATIONS

. . .

2.2 Operational certification and supervision

. . .

2.2.8 Heliport operating minima (operations under IFR)

. . .

2.2.8.1 The State of the Operator shall require that the operator establish heliport operating minima for each heliport to be used in operations and shall approve the method of determination of such minima. Such minima shall not be lower than any that may be established for such heliports by the State in which the heliport is located, except when specifically approved by that State.

Note 1.— This Standard does not require the State in which the heliport is located to establish heliport operating minima.

Note 2.— The use of head-up displays (HUD) or enhanced vision systems (EVS) may allow operations with lower visibilities than normally associated with the heliport operating minima.

. . .

CHAPTER 4. HELICOPTER INSTRUMENTS, EQUIPMENT, AND FLIGHT DOCUMENTS

. . .

4.3 Flight recorders

Note 1.— Crash protected ~~F~~flight recorders comprise ~~two~~ four systems~~,~~: a flight data recorder (FDR)~~ and~~, a cockpit voice recorder (CVR), an airborne image recorder (AIR) and a data-link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.

Note 2.— Combination recorders (FDR/CVR) ~~can only~~ may be used to meet the flight recorder equipage requirements ~~as specifically indicated~~ in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in ~~Attachment B~~ Appendix 5.

4.3.1 Flight data recorders~~— types~~

Note.1— FDR and AIR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note.2— Parameters to be recorded are listed in Table A5-1 of Appendix 5.

4.3.1.1 ~~*Type IV FDRs*~~Types

4.3.1.1.1 A Type IV FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.

4.3.1.1.2 A Type IVA FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, operation and configuration.

~~4.3.1.2~~ 4.3.1.1.3 A Type V FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude and engine power.

4.3.1.2 Operation

Editorial Note.— Paragraph 4.3.1.2.1 was previously paragraph 4.3.4.

~~4.3.4~~ 4.3.1.2.1 ~~Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005~~ All helicopters of a maximum certificated take-off mass of over ~~3 175 kg~~ 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with a Type IVA FDR ~~with a recording duration of at least 10 hours~~.

~~4.3.3 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1989~~

Editorial Note.— Paragraphs 4.3.1.2.2 and 4.3.1.2.3 were previously paragraphs 4.3.3.1 and 4.3.3.2 respectively.

~~4.3.3.1~~ 4.3.1.2.2 All helicopters of a maximum certificated take-off mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type IV FDR.

~~4.3.3.2~~ 4.3.1.2.3 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over ~~2 730 kg~~ 3 180 kg, up to and including 7 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, should be equipped with a Type V FDR.*

4.3.1.3 Discontinuation

~~4.3.1.3~~ 4.3.1.3.1 The use of engraving metal foil FDRs shall be discontinued by 1 January 1995.

~~4.3.1.4~~ 4.3.1.3.2 **Recommendation.—** *The use of analogue FDRs using frequency modulation (FM) should be discontinued by 5 November 1998.*

~~4.3.1.4.1~~ 4.3.1.3.3 The use of photographic film FDRs shall be discontinued from 1 January 2003.

4.3.1.3.4 The use of analogue FDRs using frequency modulation (FM) shall be discontinued by 1 January 2012.

4.3.1.3.5 **Recommendation.—** *The use of magnetic tape FDRs should be discontinued by 1 January 2011.*

4.3.1.3.6 The use of magnetic tape FDRs shall be discontinued by 1 January 2016.

Editorial Note.— Paragraphs 4.3.1.5 and 4.3.1.5.1 have been *relocated* to paragraphs 4.3.3.1.1 and 4.3.3.1.2 respectively.

~~4.3.1.5 All helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005, that utilize data link communications and are required to carry a CVR shall record, on a flight recorder, all data link communications to and from the helicopter. The minimum recording~~

~~duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.~~

~~4.3.1.5.1 From 1 January 2007, all helicopters that utilize data link communications and are required to carry a CVR shall record, on a flight recorder, all data link communications to and from the helicopter. The minimum recording duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.~~

Editorial Note.— Paragraph 4.3.5.1.2 has been *relocated* as a Note to 5.1.1 of Appendix 5.

~~4.3.1.5.2 Sufficient information to derive the content of the data link communications message and, whenever practical, the time the message was displayed to or generated by the crew shall be recorded.~~

~~*Note.— Data link communications include, but are not limited to, automatic dependent surveillance — contract (ADS-C), controller-pilot data link communications (CPDLC), data link flight information services (D-FIS) and aeronautical operational control (AOC) messages.*~~

~~4.3.1.6 **Recommendation.** — *All helicopters of a maximum certificated take-off mass over 2 700 kg, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).*~~

~~4.3.2~~ 4.3.1.4 ~~Flight data recorders — duration~~Duration

Types IV, IVA and V FDRs shall be capable of retaining the information recorded during at least the last ten hours of their operation.

Editorial Note.— Paragraphs 4.3.3.1 and 4.3.3.2 have been *relocated* to paragraphs 4.3.1.2.2 and 4.3.1.2.3 respectively.

~~4.3.3 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1989~~

~~4.3.3.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a Type IV FDR.~~

~~4.3.3.2 **Recommendation.** — *All helicopters of a maximum certificated take-off mass of over 2 730 kg, up to and including 7 000 kg, should be equipped with a Type V FDR.*~~

Editorial Note.— Paragraph 4.3.4 has been *relocated* to paragraph 4.3.1.2.1.

~~4.3.4 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005~~

~~All helicopters of a maximum certificated take-off mass of over 3 175 kg shall be equipped with a Type IVA FDR with a recording duration of at least 10 hours.~~

~~*Note.— A single, combination CVR/FDR is acceptable.*~~

4.3.2 Cockpit voice recorders

Editorial Note.— The Note below was previously under paragraph 4.3.6.

Note.— CVR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) ~~document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE)~~ for Crash Protected Airborne Recorder Systems, or equivalent documents.

4.3.2.1 Operation

~~4.3.5 Cockpit voice recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1987~~

~~4.3.5.1~~ 4.3.2.1.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR~~, the objective of which is the recording of the aural environment on the flight deck during flight time~~. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on ~~one track of~~ the CVR.

~~4.3.5.2 All helicopters of a maximum certificated take-off mass of over 3 175 kg, up to and including 7 000 kg, shall be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.~~

4.3.2.1.2 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on the CVR.*

~~4.3.6~~ 4.3.2.1.3 ~~Cockpit voice recorders — helicopters for which the individual certificate of airworthiness was first issued before 1 January 1987~~ All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness was first issued before 1 January 1987 shall be equipped with a CVR~~, the objective of which is the recording of the aural environment on the flight deck during flight time~~. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on ~~one track of~~ the CVR.

Editorial Note.— The Note below has been *relocated* as a Note to paragraph 4.3.2.

~~*Note. — CVR performance requirements are as contained in the Minimum Operational Performance Specification (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.*~~

4.3.2.2 Discontinuation

4.3.2.2.1 The use of magnetic tape and wire CVRs shall be discontinued by 1 January 2016.

4.3.2.2.2 **Recommendation.—** *The use of magnetic tape and wire CVRs should be discontinued by 1 January 2011.*

~~4.3.7~~ 4.3.2.3 ~~Cockpit voice recorders — duration~~Duration

~~4.3.7.1~~ 4.3.2.3.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

4.3.2.3.2 From 1 January 2016, all helicopters required to be equipped with a CVR shall be equipped with a CVR capable of retaining the information recorded during the last two hours of its operation.

Editorial Note.— Paragraph 4.3.2.3.3 was previously paragraph 4.3.7.2.

~~4.3.7.2~~ 4.3.2.3.3 **Recommendation.**— ~~*A CVR, installed in*~~ *All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990,* ~~*should be*~~ *and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of its operation.*

Editorial Note.— Paragraph 4.3.7.2 has been *relocated* to paragraph 4.3.2.3.3.

~~4.3.7.2 **Recommendation.** — *A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*~~

~~4.3.7.3 A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.~~

4.3.3 Data link recorders

Note.— Data link recorders performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

4.3.3.1 Applicability

Editorial Note.— Paragraphs 4.3.3.1.1 and 4.3.3.1.2 were previously paragraphs 4.3.1.5 and 4.3.1.5.1 respectively.

~~4.3.1.5~~ 4.3.3.1.1 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January ~~2005, that~~ 2016, which utilize any of the data link communications applications listed in 5.1.2 of Appendix 5 and are required to carry a CVR shall record~~,~~ on a flight recorder~~, all~~ the data link communications messages~~to and from the helicopter. The minimum recording duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.~~

~~4.3.1.5.1~~ 4.3.3.1.2 ~~From 1 January 2007~~, All helicopters ~~that~~ which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix 5 and are required to carry a CVR, shall record~~,~~ on a flight recorder~~, all~~ the data link communications messages.~~, to and from the helicopter. The minimum recording duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.~~

Note 1.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped helicopter.

Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

4.3.3.2 Duration

The minimum recording duration shall be equal to the duration of the CVR.

4.3.3.3 Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

~~4.3.8~~ 4.3.4 Flight recorders — ~~construction and installation~~general

4.3.4.1 Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

Note.— Industry crashworthiness and fire protection specifications ~~can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A~~ are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

~~4.3.9~~ 4.3.4.2 ~~Flight recorders — operation~~Operation

~~4.3.9.1~~ 4.3.4.2.1 Flight recorders shall not be switched off during flight time.

~~4.3.9.2~~ 4.3.4.2.2 To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with Annex 13.

Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 2.— The operator's responsibilities regarding the retention of flight recorder records are contained in Section II, 9.6.

~~4.3.10~~ 4.3.4.3 ~~Flight recorders — continued~~ Continued serviceability

Operational checks and evaluations of recordings from the ~~FDR and CVR~~ flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Note.— Procedures for the inspections of the flight ~~data and CVR~~ recorder systems are given in ~~Attachment B~~Appendix 5.

4.3.4.4 Flight recorders electronic documentation

Recommendation.— *The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities should be in electronic format and take account of industry specifications.*

Note.— Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.

. . .

4.13 Helicopters equipped with head-up displays (HUD) and/or enhanced vision systems (EVS)

Where helicopters are equipped with HUD and/or EVS, the use of such systems to gain operational benefit shall be approved by the State of Registry.

Note.— Guidance on HUD and EVS is contained in Attachment J to Annex 6, Part I.

~~4.13~~ 4.14 Helicopters required to be equipped with a pressure-altitude reporting transponder

Except as may be otherwise authorized by the appropriate authority, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the provisions of Annex 10, Volume IV.

Note.— This provision is intended to support the effectiveness of ACAS as well as to improve the effectiveness of air traffic services. The intent is also for aircraft not equipped with pressure-altitude reporting transponders to be operated so as not to share airspace used by aircraft equipped with airborne collision avoidance systems.

~~4.14~~ 4.15 Microphones

All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones.

~~4.15~~ 4.16 Vibration health monitoring system

Recommendation.— *A helicopter which has a maximum certificated take-off mass in excess of 3 175 kg or a maximum passenger seating configuration of more than 9 should be equipped with a vibration health monitoring system.*

. . .

4.17 Helicopters equipped with head-up displays (HUD) and/or enhanced vision systems (EVS)

. . .

Where helicopters are equipped with HUD and/or EVS, the use of such systems to gain operational benefits shall be approved by the State of the Operator.

Note.— Guidance on HUD and EVS is contained in Attachment J to Annex 6, Part I.

. . .

CHAPTER 7. HELICOPTER FLIGHT CREW

. . .

7.3 Flight crew member training programmes

7.3.1 An operator shall establish and maintain a ground and flight training programme, approved by the State of the Operator, which ensures that all flight crew members are adequately trained to perform their assigned duties. The training programme shall:

. . .

e) ensure that all flight crew members know the functions for which they are responsible and the relation of these functions to the functions of other crew members, particularly in regard to abnormal or emergency procedures; ~~and~~

f) shall include knowledge and skills related to the operational use of head-up display and/or enhanced vision systems for those helicopters so equipped; and

g) be given on a recurrent basis, as determined by the State of the Operator and shall include an examination to determine competence.

. . .

SECTION III
INTERNATIONAL GENERAL AVIATION

. . .

CHAPTER 2. FLIGHT OPERATIONS

. . .

2.2 Heliport operating minima

The pilot-in-command shall not operate to or from a heliport using operating minima lower than those which may be established for that heliport by the State in which it is located, except with the specific approval of that State.

Note 1.— It is the practice in some States to declare, for flight planning purposes, higher minima for a heliport when nominated as an alternate, than for the same heliport when planned as that of intended landing.

Note 2.— The use of head-up displays (HUD) or enhanced vision systems (EVS) may allow operations with lower visibilities than normally associated with the heliport operating minima.

. . .

CHAPTER 4. HELICOPTER INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

. . .

4.7 Flight recorders

Note 1.— Crash protected ~~F~~flight recorders comprise ~~two~~ four systems~~—~~: a flight data recorder (FDR)~~ and~~, a cockpit voice recorder (CVR) an airborne image recorder (AIR) and a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.

Note 2.— Combination recorders (FDR/CVR) ~~can only~~ may be used to meet the flight recorder equipage requirements ~~as specifically indicated~~ in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in ~~Attachment B~~ Appendix 5.

4.7.1 Flight data recorders~~— types~~

Note.1— FDR and AIR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note.2— Parameters to be recorded are listed in Table A5-1 of Appendix 5.

4.7.1.1 ~~*Type IV FDRs*~~ Types

4.7.1.1.1 A Type IV FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.

4.7.1.1.2 A Type IVA FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, operation and configuration.

~~4.7.1.2~~ 4.7.1.1.3 A Type V FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude and engine power.

4.7.1.2 Operation

Editorial Note.— Paragraph 4.7.1.2.1 was previously paragraph 4.7.4.

~~4.7.4~~ 4.7.1.2.1 ~~Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005~~ All helicopters of a maximum certificated take-off mass of over ~~3 175 kg~~ 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with a Type IVA FDR ~~with a recording duration of at least 10 hours~~.

~~4.7.3 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1989~~

Editorial Note.— Paragraphs 4.7.1.2.2 and 4.7.1.2.3 were previously paragraphs 4.7.3.1 and 4.7.3.2 respectively.

~~4.7.3.1~~4.7.1.2.2 All helicopters of a maximum certificated take-off mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type IV FDR.

~~4.7.3.2~~4.7.1.2.3 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over ~~2 730 kg~~ 3 180 kg, up to and including 7 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 should be equipped with a Type V FDR.*

4.7.1.3 Discontinuation

~~4.7.1.3~~ 4.7.1.3.1 The use of engraving metal foil FDRs shall be discontinued ~~by 1 January 1995~~.

~~4.7.1.4~~ 4.7.1.3.2 **Recommendation.—** *The use of analogue FDRs using frequency modulation (FM) should be discontinued ~~by 5 November 1998~~.*

~~4.7.1.4.1~~ 4.7.1.3.3 The use of photographic film FDRs shall be discontinued ~~from 1 January 2003~~.

4.7.1.3.4 The use of analogue FDRs using frequency modulation (FM) shall be discontinued by 1 January 2012.

4.7.1.3.5 **Recommendation.—** *The use of magnetic tape FDRs should be discontinued by 1 January 2011.*

4.7.1.3.6 The use of magnetic tape FDRs shall be discontinued by 1 January 2016.

Editorial Note.— Paragraph 4.7.1.4 was previously paragraph 4.7.2.

~~4.7.2~~ 4.7.1.4 ~~Flight data recorders — duration~~Duration

Types IV, IVA and V FDRs shall be capable of retaining the information recorded during at least the last ten hours of their operation.

Editorial Note.— Paragraphs 4.7.1.5 and 4.7.1.5.1 have been *relocated* to paragraphs 4.7.3.1.1 and 4.7.3.1.1.1 respectively.

~~4.7.1.5 All helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005, which utilize data link communications and are required to carry a CVR, shall record on a flight recorder all data link communications to and from the helicopter. The minimum recording duration shall be equal to the duration of the CVR and shall be correlated to the recorded cockpit audio.~~

~~4.7.1.5.1 From 1 January 2007, all helicopters which utilize data link communications and are required to carry a CVR, shall record on a flight recorder, all data link communications to and from the helicopter. The minimum recording duration shall be equal to the duration of the CVR and shall be correlated to the recorded cockpit audio.~~

~~4.7.1.5.2 Sufficient information to derive the content of the data link communications message and, whenever practical, the time the message was displayed to or generated by the crew shall be recorded.~~

~~*Note.— Data link communications include, but are not limited to, automatic dependent surveillance — contract (ADS-C), controller-pilot data link communications (CPDLC), data link-flight information services (D-FIS) and aeronautical operational control (AOC) messages.*~~

~~4.7.1.6 **Recommendation.** — *All helicopters of a maximum certificated take-off mass over 2 730 kg, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR)*~~

Editorial Note.— Paragraph 4.7.2 has been *relocated* to paragraph 4.7.1.4.

~~4.7.2 Flight data recorders — duration~~

~~Types IV and V FDRs shall be capable of retaining the information recorded during at least the last ten hours of their operation.~~

4.7.2 Cockpit voice recorders

Note.— CVR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

4.7.2.1 Operation

Editorial Note.— Paragraphs 4.7.2.1.1 and 4.7.2.1.2 were previously paragraphs 4.7.5.1 and 4.7.5.2 respectively.

~~4.7.5 Cockpit voice recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1987~~

~~4.7.5.1~~ 4.7.2.1.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR~~, the objective of which is the recording of the aural environment on the flight deck during flight time~~. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on ~~one track of~~ the CVR.

~~4.7.5.2~~ 4.7.2.1.2 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over ~~3 175 kg, up to and including 7 000 kg,~~ 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR~~, the objective of which is the recording of the aural environment on the flight deck during flight time~~. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on ~~one track of~~ the CVR.*

4.7.2.1.3 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness was first issued before 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.7.2.2 Discontinuation

4.7.2.2.1 The use of magnetic tape and wire CVRs shall be discontinued by 1 January 2016.

4.7.2.2.2 **Recommendation.—** *The use of magnetic tape and wire CVRs should be discontinued by 1 January 2011.*

~~4.7.3 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1989~~

Editorial Note.— Paragraphs 4.7.3.1 and 4.7.3.2 have been *relocated* to paragraphs 4.7.1.2.2 and 4.7.1.2.3 respectively.

~~4.7.3.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a Type IV FDR.~~

~~4.7.3.2 **Recommendation.** — *All helicopters of a maximum certificated take-off mass of over 2 730 kg, up to and including 7 000 kg, should be equipped with a Type V FDR.*~~

Editorial Note.— Paragraph 4.7.4 has been *relocated* to paragraph 4.7.1.2.1.

~~4.7.4 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005~~

~~All helicopters of a maximum certificated take-off mass of over 3 175 kg shall be equipped with a Type IVA FDR with a recording duration of at least 10 hours.~~

~~*Note. — A single, combination CVR/FDR is acceptable.*~~

~~4.7.5 Cockpit voice recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1987~~

~~*Note. — CVR performance requirements are as contained in the Minimum Operational Performance Specification (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.*~~

Editorial Note.— Paragraphs 4.7.5.1 and 4.7.5.2 have been *relocated* to paragraphs 4.7.2.1.1 and 4.7.2.1.2 respectively.

~~4.7.5.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a CVR, the objective of which is the recording of the aural environment on the flight~~

~~deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.~~

~~4.7.5.2 **Recommendation.** — *All helicopters of a maximum certificated take-off mass of over 3 175 kg, up to and including 7 000 kg, should be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on one track of the CVR.*~~

~~4.7.6~~ 4.7.2.3 ~~Cockpit voice recorders — duration~~Duration

~~4.7.6.1~~ 4.7.2.3.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

4.7.2.3.2 From 1 January 2016, all helicopters required to be equipped with a CVR shall be equipped with a CVR capable of retaining the information recorded during the last two hours of its operation.

Editorial Note.— Paragraph 4.7.2.3.3 was previously paragraph 4.7.6.2.

~~4.7.6.2~~ 4.7.2.3.3 **Recommendation.**— ~~*A CVR, installed in*~~ *All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990,* ~~*should be*~~ *and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of its operation.*

Editorial Note.— Paragraph 4.7.6.2 has been *relocated* to paragraph 4.7.2.3.3.

~~4.7.6.2 **Recommendation.** — *A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*~~

~~4.7.6.3 A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.~~

4.7.3 Data link recorders

Note.— Data link recorders performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

4.7.3.1 Applicability

Editorial Note.— Paragraphs 4.7.3.1.1 and 4.7.3.1.1.1 were previously paragraphs 4.7.1.5 and 4.7.1.5.1 respectively.

~~4.7.1.5~~ 4.7.3.1.1 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January ~~2005~~ 2016, which utilize any of the data link communications applications listed in 5.1.2 of Appendix 5, and are required to carry a CVR, shall record on a flight recorder ~~all~~, the data link communications ~~to and from the helicopter~~ messages. ~~The minimum recording duration shall be equal to the duration of the CVR and shall be correlated to the recorded cockpit audio.~~

~~4.7.1.5.1~~ 4.7.3.1.1.1 ~~From 1 January 2007, all~~ All helicopters which are modified on or after 1 January 2016, to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix 5 and are required to carry a CVR, shall record on a flight recorder~~, all~~ the data link communications ~~to and from the helicopter~~ messages. ~~The minimum recording duration shall be equal to the duration of the CVR and shall be correlated to the recorded cockpit audio.~~

Note 1.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped aircraft.

Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or prohibitively expensive to record those data link communications applications messages on FDR or CVR.

4.7.3.2 Duration

The minimum recording duration shall be equal to the duration of the CVR.

4.7.3.3 Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

~~4.7.7~~ 4.7.4 Flight recorders — ~~construction and installation~~general

4.7.4.1 Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

Note.— Industry crashworthiness and fire protection specifications are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

~~4.7.8~~ 4.7.4.2 ~~Flight recorders — operation~~Operation

~~4.7.8.1~~ 4.7.4.2.1 Flight recorders shall not be switched off during flight time.

~~4.7.8.2~~ 4.7.4.2.2 To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with Annex 13.

Note 1.— The need for removal of the flight recorder records from the aircraft ~~is to~~ will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 2.— The ~~operator's~~ operator/owner's responsibilities regarding the retention of flight recorder records are contained in Section II, 9.6.

~~4.7.9~~ 4.7.4.3 ~~Flight recorders — continued~~ Continued serviceability

Operational checks and evaluations of recordings from the ~~FDR and CVR~~ flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Note.— Procedures for the inspections of the flight ~~data and CVR~~ recorder systems are given in ~~Attachment B~~ Appendix 5.

4.7.4.4 Flight recorders electronic documentation

Recommendation.— *The documentation requirement concerning FDR parameters provided by operator/owners to accident investigation authorities should be in electronic format and take account of industry specifications.*

Note.— Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.

. . .

Editorial Note.— Delete Attachment B in toto and *relocate* the information to a new Appendix 5 as shown below.

~~ATTACHMENT B.~~ APPENDIX 5. FLIGHT RECORDERS

(~~Supplementary to~~ Note — See Section II, Chapter 4, 4.3 and Section III, Chapter 4, 4.7)

Introduction

The material in this ~~Attachment~~ Appendix concerns flight recorders intended for installation in helicopters engaged in international air navigation. Crash protected ~~F~~flight recorders comprise ~~two~~ four systems~~—~~: a flight data recorder ~~and~~ (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and a data link recorder (DLR). ~~Flight data recorders for helicopters are classified as Type IV, IVA and Type V depending upon the number of parameters to be recorded.~~

1. ~~Flight data recorder (FDR)~~General requirements

~~1.1 General requirements~~

Editorial Note.— Paragraph 1.1.1 has been *relocated* to paragraph 2.1.

~~1.1.1 The FDR is to record continuously during flight time.~~

~~1.1.2~~ 1.1 The ~~FDR container is to~~ flight recorder systems containers shall:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate ~~its~~ their location; and

c) have securely attached an automatically activated underwater locating device.

~~1.1.3~~ 1.2 The ~~FDR is to~~ flight recorder systems shall be installed so that:

a) the probability of damage to the ~~recording~~ recordings is minimized;

b) ~~it receives its~~ they receive electrical power from a bus that provides the maximum reliability for operation of the ~~FDR~~ flight recorder systems without jeopardizing service to essential or emergency loads; ~~and~~

c) there is an aural or visual means for pre-flight checking that the ~~FDR is~~ flight recorder systems are operating properly~~.~~; and

Editorial Note.— Sub-paragraph d) below was previously paragraph 2.1.4 d).

d) if the ~~CVR has~~flight recorder systems have a bulk erasure device, the installation ~~should~~ shall be designed to prevent operation of the device during flight time or crash impact.

Editorial Note.— Paragraphs 1.3, 1.4 and 1.5 were previously paragraphs 2.2.3, 2.2.4 and 2.3 respectively.

~~2.2.3~~ 1.3 The ~~CVR~~ flight recorder systems, when tested by methods approved by the appropriate certificating authority, ~~will~~ shall be demonstrated to be suitable for the environmental extremes over which ~~it is~~ they are designed to operate.

~~2.2.4~~ 1.4 Means ~~will~~ shall be provided for an accurate time correlation between the ~~FDR and CVR~~ flight recorder systems functions.

~~2.3~~ 1.5 ~~Additional information~~ The manufacturer usually provides the ~~national~~ appropriate certificating authority with the following information in respect of the ~~CVR~~ flight recorder systems:

a) manufacturer's operating instructions, equipment limitations and installation procedures; and

b) manufacturer's test reports.

2. Flight data recorder (FDR)

Editorial Note.— Paragraph 2.1 was previously paragraph 1.1.1.

~~1.1.1~~ 2.1 The ~~FDR is to~~ flight data recorder shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power ~~record continuously during flight time~~.

~~1.2~~ 2.2 Parameters to be recorded

2.2.1 Flight data recorders for helicopters shall be classified as Type IV, IVA and V depending upon the number of parameters to be recorded.

~~1.2.1~~ 2.2.2 ~~*Type IVA FDR.* This FDR will be capable of recording, as appropriate to the helicopter, at least the forty-eight parameters in Table B-1. The parameters without an asterisk (*) are mandatory parameters which should be recorded. In addition, the parameters designated by an asterisk (*) should be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter.~~ The parameters that satisfy the requirements for Types IV, IVA and V FDRs, are listed in the paragraphs below. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of helicopter complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

2.2.3 The following parameters shall satisfy the requirements for flight path and speed:

– Pressure altitude
– Indicated airspeed
– Outside air temperature

– Heading
– Normal acceleration
– Lateral acceleration
– Longitudinal acceleration (body axis)
– Time or relative time count
– Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
– Radio altitude*

2.2.4 The following parameters shall satisfy the requirements for attitude:

– Pitch attitude
– Roll attitude
– Yaw rate

2.2.5 The following parameters shall satisfy the requirements for engine power:

– Power on each engine: free power turbine speed (Nf), engine torque, engine gas generator speed (Ng), cockpit power control position
– Rotor: main rotor speed, rotor brake
– Main gearbox oil pressure*
– Gearbox oil temperature*: main gearbox oil temperature, intermediate gearbox oil temperature, tail rotor gearbox oil temperature
– Engine exhaust gas temperature (T4)*
– Turbine inlet temperature (TIT)*

2.2.6 The following parameters shall satisfy the requirements for operation:

– Hydraulics low pressure
– Warnings
– Primary flight controls — pilot input and/or control output position: collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal, controllable stabilator, hydraulic selection
– Marker beacon passage
– Each navigation receiver frequency selection
– AFCS mode and engagement status*
– Stability augmentation system engagement*
– Indicated sling load force*
– Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path
– Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path
– DME 1 and 2 distances*
– Altitude rate*
– Ice detector liquid water content*
– Helicopter health and usage monitor system (HUMS)*: engine data, chip detectors, channel timing, exceedance discretes, broadband average engine vibration

2.2.7 The following parameters shall satisfy the requirements for configuration:

– Landing gear or gear selector position*
– Fuel contents*
– Ice detector liquid water content*

Note.— Parameter guidance for range, sampling, accuracy and resolution are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

2.2.8 *Type IVA FDR.* This FDR will be capable of recording, as appropriate to the helicopter, at least the 48 parameters in Table A5-1.

~~1.2.2~~ 2.2.9 *Type IV FDR.* This FDR ~~will~~ shall be capable of recording, as appropriate to the helicopter, at least the first ~~thirty~~ 30 parameters in ~~Table B-1~~ Table A5-1. ~~However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.~~

~~1.2.3~~ 2.2.10 *Type V FDR.* This FDR ~~will~~ shall be capable of recording, as appropriate to the helicopter, at least the first ~~fifteen~~ 15 parameters in ~~Table B-1~~ Table A5-1. ~~However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.~~

~~1.2.4~~ 2.2.11 If further recording capacity is available, recording of the following additional information ~~should~~ shall be considered:

a) additional operational information from electronic displays, such as electronic flight ~~information~~ instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS); and

b) additional engine parameters (EPR, N_1, fuel flow, etc.).

~~1.3~~ 2.3 Additional information

~~1.3.1~~ 2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.

~~1.3.2 The manufacturer usually provides the national certificating authority with the following information in respect of the FDR:~~

~~a) manufacturer's operating instructions, equipment limitations and installation procedures;~~

~~b) parameter origin or source and equations which relate counts to units of measurement; and~~

~~c) manufacturer's test reports.~~

~~1.3.3~~ 2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information ~~should~~ shall be maintained by the operator/owner. The documentation ~~must~~ shall be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

~~2.~~ 3. Cockpit voice recorder (CVR)

~~2.1 General requirements~~

3.1 Signals to be recorded

3.1.1 The CVR shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

~~2.1.1~~ 3.1.2 The CVR ~~is to be designed so that it will record~~ shall record on four separate channels, or more, at least the following:

a) voice communication transmitted from or received in the aircraft by radio;

b) aural environment on the flight deck;

c) voice communication of flight crew members on the flight deck using the interphone system, if installed;

d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and

e) voice communication of flight crew members using the passenger address system, if installed~~; and~~

~~f) digital communications with ATS, unless recorded by the FDR~~.

~~2.1.2 The CVR container is to:~~

~~a) be painted a distinctive orange or yellow colour;~~

~~b) carry reflective material to facilitate its location; and~~

~~c) have securely attached an automatically activated underwater locating device.~~

~~2.1.3 To aid in voice and sound discrimination, microphones in the cockpit are to be located in the best position for recording voice communications originating at the pilot and co-pilot stations and voice communications of other crew members on the flight deck when directed to those stations. This can best be achieved by wiring suitable boom microphones to record continuously on separate channels.~~

~~2.1.4 The CVR is to be installed so that:~~

~~a) the probability of damage to the recording is minimized;~~

~~b) it receives its electrical power from a bus that provides the maximum reliability for operation of the CVR without jeopardizing service to essential or emergency loads;~~

~~c) there is an aural or visual means for pre-flight checking of the CVR for proper operation; and~~

Editorial Note.— Sub-paragraph d) has been *relocated* to paragraph 1.2 d).

~~d) if the CVR has a bulk erasure device, the installation should be designed to prevent operation of the device during flight time or crash impact.~~

~~2.2 Performance requirements~~

~~2.2.1~~ 3.1.3 The CVR ~~will~~ shall be capable of recording on at least four ~~tracks~~ channels simultaneously. ~~To~~ On tape-based CVR, to ensure accurate time correlation between ~~tracks~~ channels, the CVR ~~is to~~ shall record in an in-line format. If a bi-directional configuration is used, the in-line format and ~~track~~ channel allocation ~~should~~ shall be retained in both directions.

~~2.2.2~~ 3.1.4 The preferred ~~track~~ channel allocation ~~is~~ shall be as follows:

~~Track~~ Channel 1 — co-pilot headphones and live boom microphone

~~Track~~ Channel 2 — pilot headphones and live boom microphone

~~Track~~ Channel 3 — area microphone

~~Track~~ Channel 4 — time reference, main rotor speed or the flight deck vibration environment, the third and fourth crew member's headphone and live microphone, if applicable.

Note 1.— ~~Track~~ Channel 1 is located closest to the base of the recording head.

Note 2.— The preferred ~~track~~ channel allocation presumes use of current conventional magnetic tape transport mechanisms and is specified because the outer edges of the tape have a higher risk of damage than the middle. It is not intended to preclude use of alternative recording media where such constraints may not apply.

Editorial Note.— Paragraphs 2.2.3, 2.2.4 and 2.3 have been *relocated* to paragraphs 1.3, 1.4 and 1.5 respectively.

~~2.2.3 The CVR, when tested by methods approved by the appropriate certificating authority, will be demonstrated to be suitable for the environmental extremes over which it is designed to operate.~~

~~2.2.4 Means will be provided for an accurate time correlation between the FDR and CVR.~~

~~*Note. — One method of achieving this is by superimposing the FDR time signal on the CVR.*~~

~~2.3 Additional information~~

~~The manufacturer usually provides the national certificating authority with the following information in respect of the CVR:~~

~~a) manufacturer's operating instructions, equipment limitations and installation procedures; and~~

~~b) manufacturer's test reports.~~

4. Airborne image recorder (AIR)

4.1 Classes

4.1.1 A Class A AIR captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1.— To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2.— There are no provisions for Class A AIRs in this document.

4.1.2 A Class B AIR captures data link message displays.

4.1.3 A Class C AIR captures instruments and control panels.

Note.— It may be considered as a means for recording flight data where it is not practical or prohibitively expensive to record on an FDR, or where an FDR is not required.

4.2 Operation

The AIR will start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR will start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

5. Data link recorder (DLR)

5.1 Applications to be recorded

5.1.1 Where the helicopter flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the helicopter) and downlinks (from the helicopter), shall be recorded on the helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall to be recorded.

Editorial Note.— The note below was previously paragraph 4.3.1.5.2.

~~4.3.1.5.2 *Note.— Sufficient information to derive the content of the data link communications message and, whenever practical, the time the message was displayed to or generated b the crew shall be recorded.*~~ *Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.*

5.1.2 Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) are to be recorded only as far as is practicable given the architecture of the system.

– Data link initiation capability
– Controller – pilot data link communications
– Data link – flight information services
– Automatic dependent surveillance – contract
– Automatic dependent surveillance – broadcast*
– Aeronautical operational control*

Note.— Descriptions of the applications are contained in Table A5-2.

~~3.~~ 6. Inspections of ~~FDR and CVR~~ flight recorder systems

~~3.1~~ 6.1 Prior to the first flight of the day the built-in test features ~~on the flight deck for the CVR, FDR~~ for the flight recorders and flight data acquisition unit (FDAU), when installed, ~~should~~ shall be monitored by manual and/or automatic checks.

~~3.2~~ 6.2 Annual inspections ~~should~~ shall be carried out as follows:

a) ~~the readout~~ an analysis of the recorded data from the ~~FDR and CVR should~~ flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;

b) the analysis of the FDR shall evaluate the quality of the recorded data to determine if the bit error rate (including those introduced by recorder, the acquisition unit, the source of the data on the helicopter and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;

c) a complete flight from the FDR ~~should~~ shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention ~~should~~ shall be given to parameters from sensors dedicated to the FDR. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

d) the readout facility ~~should~~ shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;

e) an annual examination of the recorded signal on the CVR ~~should~~ shall be carried out by replay of the CVR recording. While installed in the aircraft, the CVR ~~should~~ shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards; ~~and~~

f) where practicable, during the annual examination, a sample of in-flight recordings of the CVR shall be examined for evidence that the intelligibility of the signal is acceptable ~~.~~; and

g) an annual examination of the recorded images on the AIR shall be carried out by replay of the AIR recording. While installed in the aircraft, the AIR shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

~~3.3~~ 6.3 Flight recorder systems ~~should~~ shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

~~3.4~~ 6.4 A report of the annual inspection ~~should~~ shall be made available on request to ~~the State's~~ regulatory ~~authority~~ authorities for monitoring purposes.

~~3.5~~ 6.5 Calibration of the FDR system:

a) ~~the FDR system should be re-calibrated at least~~ for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and

b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there ~~should~~ shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

Table ~~B–1~~A5-1
~~Helicopters — Parameters~~ Parameter Guidance for Flight Data Recorders

Serial number	*Parameter*	*Measurement range*	*Maximum sampling and recording interval (seconds)*	*Accuracy limits (sensor input compared to FDR readout)*	*Recording resolution*	*~~Remarks~~*
1	Time (UTC when available, otherwise ~~elapsed time~~relative time count or GPS time sync)	24 hours ~~(UTC) or 0 to 4095 (elapsed time)~~	4	±0.125% per hour	1 s	~~Elapsed time counter increments every 4 seconds of system operation.~~
2	Pressure altitude	–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)	
3	Indicated airspeed	As the installed pilot display measuring system	1	±3%	1 kt	
4	Heading	360°	1	±2°	0.5°	
5	Normal acceleration	–3 g to +6 g	0.125	±0.09 g excluding a datum error of ±0.045 g	0.004 g	
6	Pitch attitude	±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°	
7	Roll attitude	±180°	0.5	±2°	0.5°	
8	Radio transmission keying	On-off (one discrete)	1	—	—	
9	Power on each engine	Full range	1 (per engine)	±2%	0.1% of full range	~~Sufficient parameters should be recorded to enable engine power to be determined.~~
10	Main rotor:					
	Main rotor speed	50–130%	0.51	±2%	0.3% of full range	~~If signals readily available.~~
	Rotor brake	Discrete		—	—	
11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)	Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range	~~For helicopters with conventional control systems "or" applies. For helicopters with non-mechanical control systems "and" applies.~~
12	Hydraulics, each system (low pressure and selection)	Discrete	1	—	—	
13	Outside air temperature	Sensor range	2	±2°C	0.3°C	

Serial number	*Parameter*	*Measurement range*	*Maximum sampling and recording interval (seconds)*	*Accuracy limits (sensor input compared to FDR readout)*	*Recording resolution*	~~*Remarks*~~
14*	Autopilot/ autothrottle/AFCS mode and engagement status	A suitable combination of discretes	1	—	—	~~Discretes should show which systems are engaged.~~
15*	Stability augmentation system engagement	Discrete	1	—	—	~~Discretes should show which systems are engaged.~~
Note.— The preceding 15 parameters satisfy the requirements for a Type V FDR.						
16*	Main gearbox oil pressure	As installed	1	As installed	6.895 kN/m^2 (1 psi)	
17*	Main gearbox oil temperature	As installed	2	As installed	1°C	
18	Yaw rate	±400°/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2°/s	~~An equivalent yaw acceleration is an acceptable alternative.~~
19*	Sling load force	0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load	~~If signals readily available.~~
20	Longitudinal acceleration	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g	
21	Lateral acceleration	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g	
22*	Radio altitude	–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)	
23*	Vertical beam deviation	Signal range	1	±3%	0.3% of full range	
24*	Horizontal beam deviation	Signal range	1	±3%	0.3% of full range	
25	Marker beacon passage	Discrete	1	—	—	~~One discrete is acceptable for all markers.~~
26	Warnings	Discrete(s)	1	—	—	~~A discrete should be recorded for the master warning, gearbox low oil pressure and SAS failure. Other "red" warnings should be recorded where the warning condition cannot be determined from other parameters or from the cockpit voice recorder.~~
27	Each navigation receiver frequency selection	Sufficient to determine selected frequency	4	As installed	—	~~If signal available in digital form.~~

Serial number	*Parameter*	*Measurement range*	*Maximum sampling and recording interval (seconds)*	*Accuracy limits (sensor input compared to FDR readout)*	*Recording resolution*	~~*Remarks*~~
28*	DME 1 and 2 distances	0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)	~~If signal available in digital form. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.~~
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)	As installed	2	As installed	As installed	
30*	Landing gear ~~or~~ and gear selector position	Discrete	4	—	—	
Note.— The preceding 30 parameters satisfy the requirements for a Type IV FDR.						
31*	Engine exhaust gas temperature (T_4)	As installed	1	As installed		
32*	Turbine inlet temperature (TIT/ITT)	As installed	1	As installed		
33*	Fuel contents	As installed	4	As installed		
34*	Altitude rate	As installed	1	As installed		~~Only necessary when available from cockpit instruments.~~
35*	Ice detection	As installed	4	As installed		~~A suitable combination of discretes to determine the status of each sensor.~~
36*	Helicopter health and usage monitor system	As installed	—	As installed	—	
37	Engine control modes	Discrete	1	—	—	
38*	Selected barometric setting (pilot and ~~first officer~~ co-pilot)	As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)	~~To be recorded for helicopters where electronic displays are fitted.~~
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~

Serial number	*Parameter*	*Measurement range*	*Maximum sampling and recording interval (seconds)*	*Accuracy limits (sensor input compared to FDR readout)*	*Recording resolution*	~~*Remarks*~~
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~
44*	Selected flight path (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~
45*	Selected decision height	As installed	4	As installed	Sufficient to determine crew selection	~~To be recorded for helicopters where electronic displays are fitted.~~
46*	EFIS display format (pilot and ~~first officer~~ co-pilot)	Discrete(s)	4	—	—	~~Discretes should show the display system status, e.g. off, normal, fail, composite, sector, plan, rose, navaids, WXR, range, copy.~~
47*	Multi-function/engine/ alerts display format	Discrete(s)	4	—	—	~~Discretes should show the display system status, e.g. off, normal, fail and the identity of display pages for emergency procedures, checklists. Information in checklists and procedures need not be recorded.~~
48*	Event marker	Discrete	1	—	—	

Note.— The preceding 48 parameters satisfy the requirements for a Type IVA FDR.

Insert new Table A5-2 as follows:

Table A5-2
Description of Applications for Data Link Recorders

Item No.	Application Type	Application Description	Recording Content
1	Data link Initiation	This includes any applications used to logon to or initiate data link service. In FANS-1/A and ATN, these are ATS Facilities Notification (AFN) and Context Management (CM) respectively.	C
2	Controller/Pilot Communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed Surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the Automatic Dependent Surveillance (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight Information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, D-METAR, D-ATIS, D-NOTAM and other textual data link services.	C
5	Aircraft Broadcast Surveillance	This includes Elementary and Enhanced Surveillance Systems, as well as ADS-B output data. Where parametric data sent by the helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M *
6	Aeronautical Operational Control Data	This includes any application transmitting or receiving data used for AOC purposes (per the ICAO definition of AOC).	M *

Key:
C: Complete contents recorded.
M: Information that enables correlation to any associated records stored separately from the helicopter.
*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

End of new text.

. . .

ATTACHMENT H. CONTENTS OF AN OPERATIONS MANUAL

. . .

2. Contents

. . .

2.1 General

. . .

2.1.31 Instructions and training requirements for the use of head-up displays (HUD) or enhanced vision systems (EVS) equipment as applicable.

. . .

2.3 Routes, ~~and~~ aerodromes and heliports

. . .

2.3.4 The increase of heliport operating minima in case of degradation of approach or heliport facilities.

2.3.5 Instructions for the use of aerodrome operating minima for instrument approaches applicable to the use of HUD and EVS.

. . .

— END —