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# Advisory Circular

**CAA-AC-AWS025A**

**July 2018**

## VERIFICATION OF OPERATIONS DERIVED EQUIPMENT NOT PART OF AIRCRAFT TYPE CERTIFICATION

### 1.0 OBJECTIVE

This Advisory Circular is issued to provide guidance and information to assess, evaluate and verify compliance of operations derived equipment, as applicable, including their installation with the provision of the Civil Aviation Regulations.

### 2.0 REFERENCES

2.1 The Civil Aviation (Instruments and equipment) Regulations 2018,
2.2 The Civil Aviation ( Surveillance and Collision Avoidance System ) Regulations 2018,
2.3 CAA-AC-AWS02(as Amended) C of A Issue
2.4 CAA-AC-AWS003(As Amended) C of A Renewal
2.5 Form: AC-AWS002C Record of Aircraft equipment and system installation.

### 3.0 GENERAL INFORMATION

3.1 The Authority may issue a Certificate of Airworthiness to an aircraft that is on the Kenyan aircraft register. A certificate of airworthiness must only be issued to a type certificated aircraft acceptable to the authority in compliance with regulation 4 of the Civil Aviation (Airworthiness) Regulations. Prior issuance of C of A, the Authority shall carry out a verification of operations derived equipment which are not part of the type certification of the aircraft to assess compliance of operations derived equipment as applicable, including their installation, as prescribed in the Civil Aviation (Instruments and equipment) Regulations.

3.2 The owner or operator shall submit an application form for issuance of C of A as prescribed by the Authority together with records of the aircraft equipment and systems installations (Form: AC-AWS002C ) and the Civil Aviation (Instruments and equipment) Regulations Statement of Compliance . Assessment will be carried out by Inspector in accordance with the regulatory requirements; and when is satisfied that all applicable requirements have been complied with, the Certificate of Airworthiness is issued. If there are discrepancies, the owner or operator will be notified and advised accordingly. When assessing for Compliance, the following guidelines as described below will be considered depending on the type of operation, aircraft maximum certificated take-off mass, year on which a certificate of airworthiness was first issued and type of equipment to be fitted;

## 4.0 PROCEDURE

### 4.1 AEROPLANE INSTRUMENTS & EQUIPMENT

In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed; shall be installed or carried, as appropriate, in aeroplanes according to the aeroplane used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the Authority.

### 4.2 All aeroplanes on all flights

An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvres and observe the operating limitations of the aeroplane in the expected operating conditions.

### 4.3 Flight recorders

4.3.1 Crash protected flight recorders comprise one or more of the following systems:

a. a flight data recorder (FDR),
b. a cockpit voice recorder (CVR),
c. an airborne image recorder (AIR) and/or
d. a data link recorder (DLR).

*Note; Image and data link information may be recorded on either the CVR or the FDR.*

4.3.2 Lightweight flight recorders comprise one or more of the following systems:

a. an aircraft data recording system (ADRS),
b. a cockpit audio recording system (CARS),
c. an airborne image recording system (AIRS) and/or
d. a data link recording system (DLRS).

*Note; Image and data link information may be recorded on either the CARS or the ADRS.*

### 4.4 Types

4.4. Types I and IA FDR shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation.

4.4.2 Types II and IIA FDRs shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

### 4.5 Operation

4.5.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less shall be equipped with:

a) a Type II FDR; or

b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

c) an ADRS capable of recording the essential parameters defined in The civil aviation (Instrument and Equipment) regulations.

***Note:*** *"The application for type certification is submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the aeroplane type, not the date of certification of particular aeroplane variants or derivative models.*

4.5.2 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type I FDR.

4.5.3 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, shall be equipped with a Type II FDR.

4.5.4 All multi-engined turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 1990 should be equipped with a Type IIA FDR.

4.5.5 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 5 700 kg, except those in 3.5.8, shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.

4.5.6 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 5 700 kg, except those in 3.5.8, should be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration, heading and such additional parameters as are necessary to determine pitch attitude, roll attitude, radio transmission keying and power on each engine.

4.5.7 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a Type II FDR.

4.5.8 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5 700 kg shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.

4.5.9 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should be equipped with an FDR which should record, in addition to time, altitude, airspeed, normal acceleration and heading, such additional parameters as are necessary to meet the objectives of determining:

a) the attitude of the aeroplane in achieving its flight path; and
b) the basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.

4.5.10 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with a Type IA FDR.

4.5.11 All aeroplanes which are required to record normal acceleration, lateral acceleration and longitudinal acceleration for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of **0.0625 seconds**.

4.5.12 All aeroplanes which are required to record pilot input and/or control surface position of primary controls (pitch, roll, yaw) for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of **0.125 seconds**.

***Note.*** *For aeroplanes with control systems in which movement of a control surface will back drive the pilot's control, "or "applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot's control, "and" applies. In aeroplanes with independent moveable surfaces, each surface needs to be recorded separately. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.*

**4.6 Discontinuation**

4.6.1 The use of engraving metal foil FDRs shall be discontinued.

4.6.2 The use of analogue FDRs using frequency modulation (FM) should be discontinued.

4.6.3The use of photographic film FDRs shall be discontinued.

4.6.4 The use of magnetic tape FDRs shall be discontinued.

**4.7 Duration**

All FDRs shall be capable of retaining the information recorded during at least the last **25 hours** of their operation, except for the Type IIA FDR which shall be capable of retaining the information recorded during at least the last **30 minutes** of its operation.

**5.0 Cockpit voice recorders and cockpit audio recording systems**

**5.1 Operation**

5.1.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 2 250 kg, up to and including 5 700 kg, for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

5.1.2 All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with either a CVR or a CARS.

5.1.3 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2003 shall be equipped with a CVR capable of retaining the information recorded during at least the last two hours of its operation.

5.1.4 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

5.1.5 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR.

5.1.6 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5 700 kg up to and including 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should
be equipped with a CVR.

### 5.2 Discontinuation

5.2.1 The use of magnetic tape and wire CVRs shall be discontinued.

### 5.3 Duration

5.3.1 All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.

5.3.2 From 1 January 2016, all CVRs shall be capable of retaining the information recorded during at least the last **two hours** of their operation.

5.3.3 All aeroplanes, for which the individual certificate of airworthiness is first issued on or after 1 January 1990, 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 their operation.

### 5.4 Cockpit voice recorder alternate power

5.4.1 An alternate power source shall automatically engage and provide **ten minutes,** plus or minus one minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power. The alternate power source shall power the CVR and its associated cockpit area microphone components. The CVR shall be located as close as practicable to the alternate power source.

***Note 1****: "Alternate" means separate from the power source that normally provides power to the CVR. The use of aeroplane batteries or other power sources is acceptable provided that the requirements above are met and electrical power to essential and critical loads is not compromised.*

*Note 2: When the CVR function is combined with other recording functions within the same unit, powering the other functions is allowed.*

5.4.2 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2018 shall be provided with an alternate power source, as defined in 5.4.1, that powers the forward CVR in the case of combination recorders.

5.4.3 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2018 should be provided with an alternate power source, as defined in 5.4.1, that powers at least one CVR.

## 6.0 Data link recorders

6.1 Applicability

6.1.1 All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in the Civil Aviation (Instrument and Equipment) Regulations and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

6.1.2 All aeroplanes which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in Civil Aviation (Instrument and Equipment) Regulations and are required to carry a CVR shall record on a flight recorder the data link communications messages.

*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 aeroplanes where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

**6.2 Duration**

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

**6.3 Correlation**

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

**7.0 Flight recorders — general**

7.1 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 1. Industry crashworthiness and fire protection specifications for FDR, CVR, AIR and DLR are as contained in the EUROCAE ED-112,* Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, *or equivalent documents.*

*Note 2. Industry crashworthiness and fire protection specifications for ADRS and CARS are as contained in the EUROCAE ED-155,* Minimum Operational Performance Specifications (MOPS) for Lightweight Flight Recording Systems, *or equivalent documents.*

**7.2 Operation**

7.2.1 Flight recorders shall not be switched off during flight time.

7.2.2 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 the Civil aviation (Aircraft Accident and Incident) regulations.

**7.4 Flight recorder electronic documentation**

The documentation requirement concerning FDR and ADRS 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.*

**7.5 Combination recorders**

7.5.1 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, and which are required to be equipped with both a CVR and an FDR, should be equipped with two combination recorders (FDR/CVR).

7.5.2 All aeroplanes of a maximum certificated take-off mass of over 15 000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

7.5.3 All aeroplanes of a maximum certificated take-off mass over 5 700 kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).

7.5.4 All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).

**7.6 RADIATION INDICATOR**

**All aeroplanes operated above 15 000 m (49 000 ft)**

All aeroplanes intended to be operated above 15 000 m (49 000 ft) shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e. the total of ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight. The display unit of the equipment shall be readily visible to a flight crew member.

*Note. The equipment is calibrated on the basis of assumptions acceptable to the appropriate national authorities.*

**7.7 GROUND PROXIMITY, WARNING SYSTEMS (GPWS)**

7.7.1 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of **5 700 kg** or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system.

7.7.2 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

7.7.3 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, for which the individual certificate of airworthiness is first issued on or after 1 January 2004, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

7.7.4 From 1 January 2007, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

7.7.5 All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers should be equipped with a ground proximity warning system which provides the warnings of 7.7.8 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function.

7.7.6 From 1 January 2007, all piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings in 7.7.8 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function.

7.7.7 A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

7.7.8 A ground proximity warning system shall provide, unless otherwise specified herein, warnings of the following circumstances:

a) excessive descent rate;

b) excessive terrain closure rate;

c) excessive altitude loss after take-off or go-around;

d) unsafe terrain clearance while not in landing configuration:

1) gear not locked down;

2) flaps not in a landing position; and

e) excessive descent below the instrument glide path.

## 7.8 EMERGENCY LOCATOR TRANSMITTER (ELT)

7.8.1 All aeroplanes should carry an automatic ELT.

7.8.2 Except as provided for in 7.8.3, from 1 July 2008, all aeroplanes authorized to carry more than 19 passengers shall be equipped with at least one automatic ELT or two ELTs of any type.

7.8.3 All aeroplanes authorized to carry more than 19 passengers for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least two ELTs, one of which shall be automatic.

7.8.4 Except as provided for in 7.8.5, from 1 July 2008, all aeroplanes authorized to carry 19 passengers or less shall be equipped with at least one ELT of any type.

7.8.5 All aeroplanes authorized to carry 19 passengers or less for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

7.8.6 ELT equipment carried to satisfy the requirements of 7.8.1, 7.8.2, 7.8.3, 7.8.4 and 7.8.5 shall operate in accordance with the relevant provisions of the Civil Aviation (Air Traffic ) Regulations

***Note.*** *The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and*

*their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.*

## 7.9 AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS II)

7.9.1 From 1 January 2003, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

7.9.2 From 1 January 2005, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

7.9.3 All aeroplanes should be equipped with an airborne collision avoidance system (ACAS II).

7.9.4 An airborne collision avoidance system shall meet the provisions of the Civil Aviation (Surveillance and Collision Avoidance System) Regulations.

*Note .— Compliance with this requirement can be achieved through the implementation of traffic alert and collision avoidance system (TCAS) Version 7.1 as specified in RTCA/DO-185B or EUROCAE/ED-143.*

## HELICOPTERS

## HELICOPTER INSTRUMENTS & EQUIPMENT

### 9.0 Flight recorders

**9.1** Crash protected flight recorders comprise one or more of the following systems:

a. a flight data recorder (FDR),
b. a cockpit voice recorder (CVR),
c. an airborne image recorder (AIR) and/or
d. a data link recorder (DLR).

*Note 1. Image and data link information may be recorded on either the CVR or the FDR.*

*Note 2. Combination recorders (FDR/CVR) may be used to meet the flight recorder equipage requirements in this Annex.*

*Note 3. Detailed guidance on flight recorders is contained in The Civil Aviation (Instrument and equipment) Regulations.*

*Note 4. Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.*

## 9.2 Flight data recorders and aircraft data recording systems

**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 3. ADRS performance requirements are as contained in the EUROCAE ED-155, Minimum Operational Performance Specification (MOPS) for Lightweight Flight Recorder Systems, or equivalent documents.

### 9.2 Types

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

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

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

### 9.3 Operation

9.3.1 All helicopters of a maximum certificated take-off mass of over 3180 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.

9.3.2 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.

9.3.3 All helicopters of a maximum certificated take-off mass of over 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.

9.3.4 All turbine-engined helicopters of a maximum certificated take-off mass of over 2 250 kg, up to and including 3 180 kg for which the application for type certification was submitted to a Contracting State on or after 1 January 2018 shall be equipped with:

a) a Type IV A FDR; or

b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

c) an ADRS capable of recording the essential parameters defined in Table A4-3 of Appendix 4.

*Note. The "application for type certification was submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the helicopter type, not the date of certification of particular helicopter variants or derivative models.*

9.3.5 All helicopters of a maximum certificated take-off mass of 3 175 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2018 should be equipped with:

a) a Type IV A FDR; or

b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

c) an ADRS capable of recording the essential parameters defined in the Civil aviation (Instrument and Equipment) Regulations.

**9.4 Discontinuation**

9.4.1 The use of engraving metal foil FDRs shall be discontinued.

9.4.2 The use of analogue FDRs using frequency modulation (FM) should be discontinued.

9.4.3 The use of photographic film FDRs shall be discontinued.

9.4.4 The use of analogue FDRs using frequency modulation (FM) shall be discontinued.

9.4.5 The use of magnetic tape FDRs shall be discontinued.

9.4.6 The use of magnetic tape FDRs shall be discontinued.

**9.5 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.

**10.0 Cockpit voice recorders**

**10.1 Operation**

10.1.1 All helicopters of a maximum certificated take-off mass of over 7000 kg for which the individual certificate of airworthiness is first issued on or after 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.

10.1.2 All helicopters of a maximum certificated take-off mass of over 3180 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.

10.1.3 All helicopters of a maximum certificated take-off mass of over 7000 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.

**10.2 Discontinuation**

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

10.2.2 The use of magnetic tape and wire CVRs should be discontinued by 1 January 2011.

**10.3 Duration**

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

10.3.2 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.

10.3.3 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, 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.

**11.0 Data link recorders**

**11.1 Applicability**

11.1.1 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in the Civil Aviation (Instrument and Equipment) Regulations and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

11.1.2 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 4 and are required to carry a CVR shall record on a flight recorder the data link communications messages.

*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.*

**11.2 Duration**

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

**11.3 Correlation**

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

**12.0 Flight recorders — general**

12.1 *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.

**12.2 Operation**

12.2.1 Flight recorders shall not be switched off during flight time.

12.2.2 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 The Civil Aviation (Aircraft Accident and Incident)Regulations .

***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.*

**12.4 Flight recorders electronic documentation**

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.

## 13.0 EMERGENCY LOCATOR TRANSMITTER (ELT)

13.1 From 1 July 2008, all helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water with at least one automatic ELT and one ELT(S) in a raft or life jacket.

13.2 From 1 July 2008, all helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water with at least one automatic ELT and one ELT(S) in a raft or life jacket.

13.3 ELT equipment carried shall operate in accordance with the relevant provisions of The civil Aviation (Communication) Regulations.

*Note.— The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.*

## 14.0 WEATHER RADAR

**Helicopters when carrying passengers —significant-weather detection**

*Helicopters when carrying passengers should be equipped with operative weather radar or other significant-weather detection equipment whenever such helicopters are being operated in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable, may be expected to exist along the route either at night or under instrument meteorological conditions.*

## 15.0 PRESSURE-ALTITUDE REPORTING TRANSPONDER

**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 The Civil Aviation (Surveillance and Collision Avoidance System) Regulations.

*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.*

## 16.0 VIBRATION HEALTH MONITORING SYSTEM

*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.*

**17.0 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 Authority.

**18.0** The Authority shall continue to communicate to the state of design or manufacturer where applicable for guidance, advice and or clarification on all matters related to the airworthiness of the aircraft.

**Kenya Civil Aviation Authority**