

## DEF STAN 00-970 NOTICE OF PROPOSED AMENDMENT (Def Stan 00-970-NPA)

**TITLE OF PROPOSAL:** Changes to Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) content in Def Stan 00-970

Stage of Amendment: Issue 1

Def Stan 00-970  
 NPA Serial No: 2015-003

Unsatisfactory  
 Report Serial No: N/A

MAA Originator: Grade Redacted Name Redacted Post MAA-Cert-ES1-AvSys

Affected Part: Def Stan 00-970 - Parts 1 (Fixed Wing), 7 (Rotorcraft) and 13  
 (including paragraphs) (Military Common Fit Equipment).

Cross-reference to other  
 relevant amendment N/A  
 proposals or documents:

### ADS Point of Contact details

Rank/Grade and Name:

Telephone Number mil/civ; 9679 35109 030 679 35109

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### Part 1 (for issue to User Community)

#### INTRODUCTION (*Not more than 250 words*)

The Service Inquiry (SI) into the air accident involving Puma HC1 XW211 recommended that the MAA provided regulation requiring all military registered aircraft to carry flight data recorders (FDRs). The requirement for all new military registered aircraft to be fitted with FDRs is already included in Def Stan 00-970. However, these design requirements have not always been complied with, in part because they are not clear. This proposed amendment will update the Def Stan to make the requirement clearer and to better reflect current civilian regulation. The new text is shown in Annex A.

The MAA has considered the merits of mandating the retrospective fitment of FDRs, but has concluded that the costs and complexity of fitting digital recording equipment into legacy aircraft to meet the full FDR requirement would be significant and quite probably fail the test of 'gross disproportionality' in a cost-benefit analysis.

To cover the retrospective question the 20141218\_Puma\_XW211\_FDR\_Fitm letter from MAA D

Tech to the Commands encouraged them to review the FDR capability of their existing platforms.

**Sonar Locator Beacons (SLB) and Emergency Locator Transmitters (ELT) are not part of this review or NPA. Those requirements are, therefore, unchanged.**

## SUMMARY OF PROPOSED AMENDMENT

**Change:** See Annex A

**Impact Assessment:**

**Objective:** Update and clarification of CVR/FDR Requirements

**Risk Assessment:** The impact of not incorporating the recommended changes is the continued absence of a clear requirement against which new platforms should comply. There would be resultant risk that causal and contributory factors to accidents cannot be identified and addressed.

**Courses of Action.**

1. **Do nothing:** The SI Recommendation could not be closed, and the regulated community would be left with sub-optimal direction regarding CVR/FDR requirements.
2. **Partial Amendment:** Consideration was given to amend the current content but leaving it in the current locations within DS 00-970 Part 7, not selected as this would not improve clarity.
3. **Full Amendment:** Amendment to the current content but also centralising it into Part 13 to provide clear direction and achieve compliance.

**Preferred Course of Action.** Full incorporation

**Costs and Benefits:**

1. ***Do nothing: MAA could not support such inaction. Not recommended***
2. ***Partial Amendment: Would offer improvements, but would miss an opportunity to collocate related direction within the DS. This may lead to confusion and misinterpretation. Not recommended.***
3. ***Full Amendment: This solution will meet the approval of the majority of stakeholders. Marginally more work than option 2 but not prohibitively so. Recommended.***

**Consultation period ends: 24/04/2015**

The consultation period for this proposed amendment ends on the stated date. Please send your feedback via email to [DSA-MAA-Cert-ADSGroup@mod.uk](mailto:DSA-MAA-Cert-ADSGroup@mod.uk).

**Part 2 (for MAA internal use)**

**Log of Comments** (to be completed once the consultation period has ended).

Comment reference	Date	From (name)	Post	Précis or Topic of Comment	MAA Response

**Recap of Proposal:** *A short summary of the proposal amendment including what changes were incorporated following the consultation period.*

**Recommendation.** *This section will be completed once all the comments have been received. The recommendation is for the relevant Head of Division to approve the proposal.*

**Approval.** *This section will detail exactly what has been approved and by whom, and confirm the date for the amendment to be incorporated as well as the date the NPA should be reviewed to determine what the effects of the amendment were in terms of meeting the objective of the change, if there were any unintended consequences and establishing whether the estimated costs were correct.*

Accepted changes will be authorised at the following levels:

- Changes requiring retrospective mandation: 2 \* Director Technical
- Changes not requiring retrospective mandating, but introduce novel or contentious requirements or resulting in major changes to requirements: 2 \* Director Technical
- Changes not requiring retrospective mandating but having a significant engineering impact: 1\* Head of Reg & Cert
- Changes not requiring retrospective mandating but having a Minor engineering impact: OF4/B2 Head of ADS
- Changes deemed as administrative only: OF3/C1.

Approved by:

Signature:	Signed on Original
Name:	Redacted
Rank/Grade:	Redacted
Post:	DSA-MAA-S and ADS
Date signed:	15 May 2015
Date for amendment to be incorporated:	13 July 2015

**Part 3 - NOTIFICATION OF AUTHORIZED AMENDMENT (Def Stan 00-970 NAA)**

Document Part:	<i>Part 1 Section 1 Part 7 Section 2 Part 13 Section 1.3</i>	Sub-Part:	<b><i>Clauses 1.2.4 &amp; 1.2.5 Clauses 21.1 &amp; 22.1 Clauses 1.3.1 &amp; 1.3.2</i></b>
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Unsatisfactory Report Reference:	<i>N/A</i>	NPA Reference:	<b><i>2015-003</i></b>
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Originator:		Date:	<b><i>19 May 2015</i></b>
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Amendment to be Incorporated on	<b><i>13 July 2015</i></b>
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**APPROVAL**

*This Def Stan 00-970 NPA has been approved by the 00-970 WG on behalf of Director MAA*

**INCORPORATION**

*The amendment will be incorporated in issue 16*

***Signed on original***

***Signed (IAW with part 2).***

**for D MAA**

**Annex A**

**NOTE 1 Rationale for deletion of Paras 1.2.4 and 1.2.5**

The elements of DS970 Part 1 (Clauses 1.2.4 and 1.2.5) which state that all normal cockpit and engine instruments should be fitted, together with an ADR are no longer required in DS970 for the following reasons:

1. These relate to the safe operation of flight test, which is a policy issue and is adequately covered within the MRP by RA5219.
2. The strategy to focus DS970 on certification requirements and the existence of the RAs which must be complied with for flight test activities means the requirements are not appropriate for DS970.

**NOTE 2: Rationale for wording change to ADR Marking Requirement**

NPA 2012-010 introduced requirements related to ADR marking on the airframe. These requirements will be retained and included in both Fixed Wing and Rotary Wing requirements (new Clauses Pt 13 1..3.1.1 and 1.3.2.1), however on review of NPA2012-010, a clarification to the requirement is necessary as the wording related to the reverse side of the panel is unclear. NPA 2012-010 refers to the need to be able to identify the ADR location when inspecting crash sites, therefore the wording has changed to reflect this.

**Current Text:**

Part 1 (Fixed Wing), Section 1, Issue 12

REQUIREMENT	COMPLIANCE	GUIDANCE
<b>EQUIPMENT</b>		
<b>INSTRUMENTATION</b>		
1.2.4 All normal flying and engine instruments shall be fitted for the tests.	a) Particular tests require special instruments, and these are detailed in the appropriate clauses. Obtaining, fitting and calibrating all instruments shall be the Contractor's responsibility.  (b) Unless dispensation is obtained from the	For some trials, particularly those which constitute a significant flight safety hazard or those where real time analysis would reduce the required flight time significantly (e.g. engine behaviour during armament firing trials); the use of telemetry shall also be considered.



	Project Team Leader, test instrumentation capable of making a continuous recording should be fitted for the tests.	
1.2.5 An Accident Data Recorder (ADR) shall be fitted in accordance with Part 13, Section 1.3 and MAP RA 5219.		

Part 7 (Rotorcraft), Section 2, Issue 5

DS970 Para No.	Mapping Module for CS-29 SUBPART A – GENERAL	DS970 Pt7 Acceptable Means of Compliance	DS970 Pt7 Guidance	Linked CS29 Refs
21	FLIGHT DATA RECORDERS DStan 00-970 Pt13 Clause 1.3			
21.1	All Rotorcraft, except primary training types, shall be fitted with an Accident Data Recorder (ADR). The ADR shall, unless otherwise stated in the Rotorcraft specification, comply with the European Organisation for Civil Aviation Equipment (EUROCAE) specification ED-55, Minimum Operational Performance Specification for Flight Data Recorder Systems.			29.1459 29.1459a 29.1459a1
22	<b>COCKPIT VOICE RECORDERS</b> DStan 00-970 Pt13 Clause 1.3			
22.1	All passenger carrying and multi-crew Rotorcraft shall be fitted with a Cockpit Voice Recorder (CVR). Where no ADR is fitted, there shall be at least 2 cockpit voice channels plus an area microphone channel, each of			29.1457 29.1457a 29.1457a1 29.1457a2 29.1457a3 29.1457a4



	30 minutes minimum duration, but preferably lasting for the whole flight period.			29.1457a5 29.1457b 29.1457b1 29.1457b2 29.1457b2 29.1457c 29.1457c1 29.1457c2 29.1457c3 29.1457c4 29.1457c4i 29.1457c4ii 29.1457c4iii 29.1457e
	The CVR shall be crash protected as required by the Rotorcraft specification or the Rotorcraft Project Director			

Part 13 (Military Common Fit Equipment), Section 1, Issue 10

REQUIREMENT	COMPLIANCE	GUIDANCE
<b>1.3 DATA RECORDING SYSTEMS</b>		
<b>A – Fixed Wing</b>		
1.3.1. COCKPIT VOICE AND FLIGHT DATA RECORDERS (CV/FDR). 1.3.1.1.  (a) All aircraft shall be fitted with a Cockpit Voice (CV) Recorder and a Flight Data Recorder (FDR).		This content provides requirements for Cockpit Voice/Flight Data Recorders (CVR/FDR) and Health and Usage Monitoring Systems (HUMS) and is similar to CS 25.1457 and CS 25.1459.  a) The CV Recorder may be part of an integrated CV/FDR or Health Usage Monitoring System (HUMS).

<p>(b) Each non-ejectable record container must be located and mounted so as to minimise the probability of container rupture resulting from crash impact and subsequent damage to the record from fire.</p> <p>(c) The letters "ADR" shall be painted on the reverse side of the panel on which the recording device is mounted.</p> <p>(d) The container shall remain attached to the local structure under normal, longitudinal and transverse accelerations of at least 10 g.</p>	<p>(b) In meeting this requirement the record container should be located as far aft as practicable, but need not be aft of the pressurised compartment, and may not be where aft mounted engines may crush the container upon impact.</p> <p>(c) Paint marking using heat resistant paint should be used. The marking should be as large and bright as practicable; see Part 1, Section 7 Clause 7.4 for operational colours and markings. Where the recording device is mounted on an external panel on a combat ac, paint that changes colour on heating may be used.</p>	<p>(c) Marking the reverse of the panel on which the recording device is mounted is intended to make it easier to locate the ADR in the event of a crash.</p>
<p>1.3.1.2. The CVR shall utilise at least 2 cockpit voice channels plus a cockpit area microphone channel, each of at least 30 minutes duration, but preferably lasting for the whole flight period.</p>	<p>(a) The duration of recording, the need for the attenuation of warning signals to avoid drowning out voice recordings during emergencies, and the need for a discrete CVR security declassification facility shall be as stated in the aircraft specification or agreed with the Project Team Leader (PTL).</p> <p>(b) The CVR shall, unless otherwise stated in the aircraft specification, comply with the European Organisation for Civil Aviation</p>	



	<p>Equipment (EUROCAE) Specification ED112, (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems).</p> <p>(c) The CVR shall not use data compression techniques for the storage of data.</p>	
<p>1.3.1.3. An FDR shall be provided for accident and incident investigation and to aid system fault diagnosis and engineering analysis.</p>	<p>a) The FDR shall, unless otherwise stated in the aircraft specification, comply with the European Organisation for Civil Aviation Equipment (EUROCAE) Specification ED112, (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems</p> <p>(b) The FDR shall not use data compression techniques for the storage of data.</p>	<p>(a) FDR were formally known as Accident Data Recorders.</p> <p>(b) The FDR may be part of an integrated Cockpit Voice/FDR or Health and Usage Monitoring System (HUMS).</p> <p>(c) Consideration should be given to the potential requirement to inhibit recording and, particularly, transmission of information which is often a feature of Commercial Off the Shelf (COTS) CV/FDR &amp; HUMS systems but which may conflict with military operational requirements.</p>
<p>1.3.1.4. The CVR/FDR must be supported by both routine sortie download/reading equipment and mishap sortie download /reading equipment. The latter shall</p>	<p>The output of this equipment shall, unless otherwise stated in the aircraft specification, be either compatible with, or able to interface with, current ADR data analysis equipment.</p>	<p>Appropriate data storage programmes, algorithms or schedules should be made available for use with the mishap download/reading equipment.</p>



be designed such that corrupt or damaged data has the maximum possibility of recovery.		
<b>B - Rotorcraft</b>		
1.3.1 Refer to Part 7, Leaflet 100-00, Leaflet 108, Leaflet 705, and leaflet 1000		



**Proposed Text:**

Part 1 (Fixed Wing), Section 1,

*Previous 1.2.4 and 1.2.5 can be deleted. Clause numbers will be retained, but include the word 'Reserved'*

*No new content is required. 1.1.32 already includes a reference out to Part 13 Section 1.3.*

Part 7 (Rotorcraft), Section 2

*21.1 and 22.1 can be deleted. 21 and 22 should be amended as shown below.*

DS970 Para No.	Mapping Module for CS-29 SUBPART A – GENERAL	DS970 Pt7 Acceptable Means of Compliance	DS970 Pt7 Guidance	Linked CS29 Refs
21	FLIGHT DATA RECORDERS  See DefStan 00-970 Part 13 Section 1.3			
22	COCKPIT VOICE RECORDERS  See DefStan 00-970 Part 13 Section 1.3			

Part 13 (Military Common Fit Equipment), Section 1

*The changes below are required in order to include rotorcraft direction into the same location as that for fixed wing.*

REQUIREMENT	COMPLIANCE	GUIDANCE
<b>1.3 DATA RECORDING SYSTEMS</b>		
<b>A – Fixed Wing</b>		

<p>1.3.1 COCKPIT VOICE AND FLIGHT DATA RECORDERS (CV/FDR).</p>		<p>This content provides requirements for Cockpit Voice/Flight Data Recorders (CVR/FDR) and Health and Usage Monitoring Systems (HUMS) and is similar to CS 25.1457 and CS 25.1459.</p>
<p>1.3.1.1. All fixed wing aircraft shall be fitted with a Cockpit Voice (CV) Recorder and a Flight Data Recorder (FDR) as itemised in Table XX.</p>	<p>The CVR and FDR shall be compliant with European Organisation for Civil Aviation Equipment (EUROCAE) specification ED-112, Minimum Operational Performance Specification for Crash-Protected Airborne Recorder Systems.</p>	<p>Consideration should be given to the potential requirement to inhibit recording and, particularly, transmission of information which is often a feature of Commercial Off the Shelf (COTS) CV/FDR &amp; HUMS systems but which may conflict with military operational requirements.</p>
<p>1.3.1.2 The letters "FDR" shall be painted on the external surface of the panel covering the structure to which the recording device is mounted.</p>	<p>Paint marking using heat resistant paint should be used. The marking should be as large and bright as practicable; see Part 1, Section 7 Clause 7.4 for operational colours and markings. Where the recording device is mounted on a combat ac, paint that changes colour on heating may be used. The marking should be as close as practicable to the recorder location.</p>	<p>Marking the external surface of the panel close to where the recording device is mounted is intended to make it easier to locate the FDR in the event of a crash.</p>
<p><b>B – Rotorcraft</b></p>		
<p>1.3.2. COCKPIT VOICE AND FLIGHT DATA RECORDERS (CV/FDR).</p>		<p>This content provides requirements for Cockpit Voice/Flight Data Recorders (CVR/FDR) and Health and Usage Monitoring Systems (HUMS) and is similar to CS 29.1457 and CS 29.1459.</p>
<p>1.3.2.1 All rotorcraft shall be fitted with a Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) as itemised in table YY.</p>	<p>As 1.3.1.1</p>	<p>As 1.3.1.1</p>
<p>1.3.2.2 The letters "FDR" shall be</p>	<p>As 1.3.1.2</p>	<p>As 1.3.1.2</p>

painted on the external surface of the panel covering the structure to which the recording device is mounted.		
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Fixed Wing FDR/CVR Requirements			
MCTOM <sup>1</sup> (X Kg)	MO <sup>2</sup>	FDR	CVR
X<5700	<9	ICAO Type II A FDR or EUROCAE Class 3 CVR Or Combined FDR/CVR	
	>9	ICAO Type II A FDR	EUROCAE Class 3
X>5700	N/A	EUROCAE FDR Class A	EUROCAE Class 1

Table **XX** Fixed Wing FDR/CVR Fitment Requirements

Rotary Wing FDR/CVR Requirements		
MCTOM (Kg)	FDR	CVR
X<3175	EUROCAE FDR Class B or EUROCAE Class 3 CVR or Combined FDR/CVR	
X>3175	EUROCAE FDR Class B	EUROCAE Class 3

Table **YY** Rotary Wing FDR/CVR Fitment Requirements

1. MCTOM - Maximum Certified Take-off Mass.

2. MO – Maximum Occupancy (includes crew).