



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

TITLE OF PROPOSAL: Introduction of ADR Location Marking into Part 13 Section 1.3
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Stage of Amendment:	Issue 1
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Def Stan 00-970	2012-010
NPA Serial No:	
Unsatisfactory Report Serial No:	
MAA Originator:	C2/Grade R A Bennett-Jones MAA-Cert-ADS1a

Affected Part: (including paragraphs)	Part 13 Section 1.3 Clauses 1.3.1.1 leading to an amendment to Part 1 Section 4 Clause 4.22
Cross-reference to other relevant amendment proposals or documents:	
Proposed Issue Date	June 2013

Weblink of where this document can be accessed
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ADS Point of Contact details	
Rank/Grade and Name:	As above
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Part 1 (for issue to Regulated Community)
INTRODUCTION (Not more than 250 words)
<i>The new text will be clearly identifiable within Annex A.</i>
Incorporation of GEM FWOU 10/61 "ADR Highlighting"
1. The referenced GEM proposed that the location of the ADR is marked on the outside of the aircraft to aid recovery in the event of aircraft breakup on landing, where it may remain attached to the structure but hidden from view.
2. The proposal further suggest that the paint marking is made with a heat resistant paint which changes colour on heating to further aid identification.
3. It was decided that this GEM has merit and this NPA has been raised to consider the option. (Extracts at Annex B).

4. The opportunity to add the structural requirement as part of this NPA has been taken.

SUMMARY OF PROPOSED AMENDMENT

Change: See Annex A

Impact Assessment:

Objective: new requirement

Risk Assessment: The impact of not incorporating the recommended changes is the possibility of misinterpretation of the requirement

Courses of Action.

1. **Do nothing.** The option to do nothing is not desirable for the following reason. Not incorporating the changes will not assist with continual improvement.
2. **Partial Amendment** – Due to the nature of the change partial amendment is not considered.
3. **Full Amendment.** There is no reason that full implementation of all the changes should not be completely feasible. The changes will aid the recovery of the ADR and speed up the investigation process. Retrospective mandating would not be considered necessary, but may be of benefit.

Preferred Course of Action. Amendment

Benefits and Costs:

1. **Do nothing – No benefit**
2. **Partial Amendment – No benefit.**
3. **Full Amendment.** Full amendment will clarify the Def Stan 00-970 Part 13 reference. The changes proposed here represent current thinking and would have little economic impact.

Post Implementation Review:

Timing of post-implementation review.

The author will establish the impact of the implementation of the change and consider lessons learned from this implementation.

Consultation period ends: 08 Mar 2013

The consultation period for this proposed amendment ends on the stated date. Please send your feedback via email to MAA-Tech-Cert-ADS groupmailbox @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 mandate: 2 *
- Changes not requiring retrospective mandate but having an engineering impact: 1*
- Changes deemed as administrative only: C1 or Equivalent.

Approved by:

Signature	
Name	
Rank/Grade	
Post	
Date signed	
Date for amendment to be incorporated	
Date for NPA review to take place	



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

Document Part:		Sub-Part	
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Unsatisfactory Report Reference		NPA Reference	
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Originator		Date	
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Amendment to be Incorporated on	XX/XXX/XX
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INTRODUCTION

AUTHORIZED AMENDMENT

FURTHER ACTION

APPROVAL

This Def Stan 00-970 NPA has been approved by the xxxx on behalf of DG MAA

INCORPORATION

The amendment will be incorporated in....

Signed (IAW with part 2).

for DG MAA



Annex A.

Proposed change.

Existing Text		
1.3.1. COCKPIT VOICE AND FLIGHT DATA RECORDERS (CV/FDR).		
1.3.1.1. All aircraft shall be fitted with a Cockpit Voice (CV) Recorder and a Flight Data Recorder (FDR).	The Project Team Leader (PTL) may determine that the design and role of the aircraft (e.g. glider or basic primary trainer) do not merit fitment.	The CV Recorder may be part of an integrated CV/FDR or Health Usage Monitoring System (HUMS).
DESIGN FOR CRASH LANDING		
EQUIPMENT AND COMPONENTS OF SYSTEMS		
4.22.47 Where fixed or removable equipment, or components of systems, are located in such a manner that the requirements of 4.22.44 and 4.22.45 do not apply, then the installation shall have the normal in-flight and ground load factors, the factors shown by trade-off studies (see Leaflet 75 Para. 6) or the ultimate factors of See also 4.8 and Part 1, Section 3, Clause 3.1 whichever are the greater.		

Proposed new Text		
<p>1.3.1. COCKPIT VOICE AND FLIGHT DATA RECORDERS (CV/FDR).</p>		
<p>1.3.1.1.</p> <p>(a) All aircraft shall be fitted with a Cockpit Voice (CV) Recorder and a Flight Data Recorder (FDR).</p> <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>(a) The CV Recorder may be part of an integrated CV/FDR or Health Usage Monitoring System (HUMS).</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>



DESIGN FOR CRASH LANDING		
EQUIPMENT AND COMPONENTS OF SYSTEMS		
4.22.47 Where fixed or removable equipment, or components of systems, are located in such a manner that the requirements of 4.22.44 and 4.22.45 do not apply, then the installation shall have the normal in-flight and ground load factors, the factors shown by trade-off studies (see Leaflet 75 Para. 6) or the ultimate factors of See also 4.8 and Part 1, Section 3, Clause 3.1 whichever are the greater.		
4.22.48 Aircraft Data Recorders shall remain attached to the local structure under the normal, longitudinal and transverse accelerations stated in Part 13 Section 1, Clause 1.3.1.1		
Introduction of new clause; remaining clauses within 4.22 to be re-numbered accordingly		



Annex B.

Suggestion Details

Suggestion Title	ADR Highlighting
Type of Suggestion	
(Life Saving / Improved Usability / Business Improvement etc)	
Equipment / Process suggestion relates to	

Problem, Issue or Opportunity

I am an aircraft technician mechanical, currently employed on the Joint Aircraft Recovery and Transportation Squadron (JARTS) based at MoD St Athan. I have been on this section for 2+year and have made the following observation in the way we operate.

When an aircraft that carries an ADR (Accident Data Recorder) crashes the first few days of the recovery are aimed on the location and recovery of the ADR.

During a recent Tornado crash, the call was given to find the ADR and a search was carried out for the orange box. Subsequently the box was found on the second day of searching for it, not as an orange box but still contained in the panel it sits in. Although this seems like a silly and obvious place to look, when an aircraft of this size and speed is broken up it can be very hard to identify certain areas of the aircraft such as panels and equipment. The many types of aircraft that carry such devices means that any personnel searching for the ADR may not be familiar with its location within the aircraft. Therefore if a means of identification that would speed up the recovery of the ADR to prevent further damage to it and less time spent finding it then we would all benefit.

Solution

The ADR is notoriously difficult to locate in the event an aircraft (ac) breaks-up on crashing. Knowing where the ADR sits in the ac is a good starting point but even when it remains in place on impact identifying the ADR amongst wreckage can be time consuming as it is often difficult to differentiate from other wreckage.

My proposed solution focuses on identifying the area of the aircraft structure in which the ADR is mounted. If the panel, behind which the ADR sits, were to have ADR stencilled on it then the task of sifting through wreckage to 'find the right spot' would probably be much easier. If the stencilling were done using a heat resistant paint, preferably one that changes colour on heating (such as the Alsa Corporation 'Eclipse' product (see http://www.alsacorp.com/products/eclipse/eclipse_proinfo.htm)) the task might be even more straightforward.

Benefits of Implementation (Cost / Time etc)

Benefits would include shortening the time spent at the location cutting the cost of hotels, food claims, man power, and time spent searching for the device which could be spent recovering the aircraft.

Assessment

Please provide a full evaluation of the suggestion in the box below. If the suggestion is not to be implemented please provide an explanation as this will help the Award Group to supply feedback to the suggestor.

Recommendation.

It is recommended that MAA regulatory tech authority mandate all new platforms to apply suitable fire resistant external markings to identify the location of CVR/FDRs. Legacy platforms should not be mandated but should be encouraged to meet this new standard.

Summary.

The GEMS suggestion has merit since it can provide additional signposting to the location of CVR/FDRs not currently mandated by regulation, policy or guidance. It could expedite recovery and exploitation of the CVR/FDR, however there is no evidence to suggest this would have a safety or cost benefit. For legacy platforms, the costs associated with drawing changes and paint/decals application could be considerable. The GEMS suggestion should therefore only be mandated for new platforms.

Evaluation.

The GEMS suggestion, received on 22 Aug 11, has merit and may provide additional assistance in CVR/FDR location and for ultimate recovery and exploitation, however detailed evaluation notes the following:

1. The delay in locating the CVR/FDR was not considered excessive in the case identified, given the size of the wreckage trail. No additional personnel were drafted in to locate the CVR/FDR and no additional time was spent at the accident site as a result. The time delay did not have an impact on flight or platform safety and did not hinder the release of initial or subsequent progress reports by the Service Inquiry Panel. A review of other accidents has not revealed an overall problem of locating intact CVR/FDRs in similar circumstances. Whilst it is important to locate the CVR/FDR promptly in order to exploit the data, thorough wreckage examination is an equally important aspect of any investigation; this necessarily takes time. The GEMS suggestion does not therefore provide any cost benefits to manpower or time spent on-site.
2. The level of damage sustained through heat and fire is a far greater threat to CVR/FDR integrity and ease of locating; something this suggestion only partially addresses with the use of fire resistant paint. The use of highly experienced investigators (MAAIB and AAIB), specialist OEM support (BAES etc) and investigation support personnel (personnel from ac type) provides adequate mitigation against any immediate need for external markings. This suggestion may assist in accident investigation evidence gathering.
3. Aircraft external marking for CVR/FDR are sometimes used on civil aircraft for use by ground staff for maintenance purposes, but they not mandated by ICAO or EASA/FAA; the CVR/FDR itself is adequately marked and mandated by regulation. I have consulted with civil air accident investigation colleagues (AAIB) who are of the same opinion; it is a good idea but has little cost benefit and would not necessarily enhance flight safety.
4. If a mandated regulation, policy or voluntary code were adopted, each platform would require drawing amendments to be sponsored by Project Teams and OEMs and subsequent paint scheme/decals applied. The approximate cost for this work has not been sought since the benefits do not outweigh the limitations mentioned and current mitigating practices used during accident investigation. Notwithstanding, the suggestion has merit since it will undoubtedly assist the process and therefore could be applied at minimal cost to new projects and, where appropriate, to legacy platforms (refurbishment programmes).
5. This is not an urgent safety requirement nor has any work been conducted to identify savings. Nevertheless, the submission has merits for accident evidence gathering and should not be discounted solely on grounds of cost and safety. It is a good idea that if implemented at an early production or refurbishment stage would have minimal impact on cost; the cost benefits however remain less tangible.



Degree of Innovation / Closeness to Duty

Please comment on the originality of the suggestion and your understanding of the relationship between the suggestion and the suggestor's official duties.

The marking of CVR/FDRs is currently mandated; their location relative to the external aircraft skin is not. CVR/FDR markings have been applied to some aircraft for maintenance purposes, but this GEMS submission, for accident investigation purposes, appears to be an original thought.

The GEMS initiator works for JARTS; its primary role is transportation of aircraft. Accident recovery and support to the MAAIB/AAIB at accident sites is a subset of this role. Whilst the individual has knowledge of the accident investigation process it is not his official duty. His idea therefore demonstrates a good overall awareness and reasoning which should be commended.