Postal Address: P.O. Box 3000
2130 KA Hoofddorp
Visiting Address: Saturnusstraat 40-44
The Netherlands
Tel.: 31 (0)23 - 5679790
Fax: 31 (0)23 – 5657731
**www.jaa.nl**

May 2008

**JAR-FSTD A: AEROPLANE FLIGHT SIMULATION TRAINING DEVICES**

Please find attached the initial issue of JAR-FSTD A dated 1 May 2008, with an effectivity date of 1 August 2008.

JAR-FSTD A is an amalgamation of JAR-STD 1A, 2A, 3A and 4A into one document. Please note that this process has not changed the actual requirements, however, the regulatory processes for qualifying each different type of device have been harmonized.
As a result of this process, JAR-STD 1A, 2A, 3A and 4A will be superseded by JAR-FSTD A as of 1 August 2008.

Instructions on how to incorporate the affected pages are available at the end of this letter.

Customers who have purchased copies of JAR-STD A/JAR-FSTD A and wish to receive future amendments, should ensure that they have made suitable arrangements with IHS Inc., to whom any queries regarding the sale and distribution of JAA documents can be directed. Addresses of the worldwide IHS offices are listed on the JAA website (www.jaa.nl) and IHS's website (www.global.ihs.com).

Queries related to the technical contents of the code should be made to JAA via e-mail address: publications@jaat.eu.

Andre Auer
Chief Executive

**JAR-FSTD A, Initial issue, 01 May 2008**

*Please replace and insert the following pages included in this package as follows:*

**Remove** complete JAR-STD 1A, 2A, 3A and 4A (valid until 01 August 2008)
**Insert** complete JAR-FSTD A, initial issue of 01 May 2008 (effective 01 August 2008)

## LIST OF JAR DOCUMENTS

| | | |
|---|---|---|
| **[**LIST OF JAR DOCUMENTS | Issue 99 | May 2008**]** |
| JAR-1, DEFINITIONS AND ABBREVIATIONS<br>(No Basic Code) | Amendment 6 | 1 November 2004 |
| JAR 11, JAA REGULATORY AND RELATED PROCEDURES<br>(No Basic Code) | Amendment 1 | 1November 2004 |
| JAR-21, CERTIFICATION PROCEDURES FOR AIRCRAFT AND RELATED PRODUCTS AND PARTS<br>(No Basic Code) | Amendment 7 | 1 February 2007 |
| JAR-22, SAILPLANES AND POWERED SAILPLANES<br>(Basic Code Luftüchtigkeitsforderungen für Segelflugzeuge und Motorsegler (LFSM))† | Amendment 9 | 1 February 2007 |
| JAR-23, NORMAL, UTILITY, AEROBATIC, AND COMMUTER CATEGORY AEROPLANES<br>(Basic Code FAR Part 23) | Amendment 3 | 1 February 2007 |
| JAR-25, LARGE AEROPLANES<br>(Basic Code FAR Part 25) | Amendment 20 | 1 December 2007 |
| JAR-26, ADDITIONAL AIRWORTHINESS REQUIREMENTS FOR OPERATIONS<br>(No Basic Code) | Amendment 3 | 1 December 2005 |
| JAR-27, SMALL ROTORCRAFT<br>(Basic Code FAR Part 27) | Amendment 6 | 1 December 2007 |
| JAR-29, LARGE ROTORCRAFT<br>(Basic Code FAR Part 29) | Amendment 6 | 1 December 2007 |
| JAR-36, AIRCRAFT NOISE<br>(Basic Code ICAO Annex 16, vol. I) | Amendment 2 | 1 February 2007 |
| JAR-39, AIRWORTHINESS DIRECTIVES<br>(No Basic Code) | Issued | 1 January 2003 |
| JAR-66, CERTIFYING STAFF MAINTENANCE<br>(No Basic Code) | Amendment 2 | 1 February 2007 |
| JAR-145, APPROVED MAINTENANCE ORGANISATIONS<br>(No Basic Code) | Amendment 7 | 1 February 2007 |
| JAR-147, APPROVED MAINTENANCE TRAINING/ EXAMINATIONS<br>(No Basic Code) | Amendment 3 | 1 February 2007 |
| JAR-APU, AUXILIARY POWER UNITS<br>(Basic Code TSO c77A dated 20th July, 1981) | Amendment 5 | 1 February 2007 |
| JAR-E, ENGINES<br>(Basic Code BCAR Section C)† | Amendment 14 | 1 February 2007 |
| JAR-M CONTINUING AIRWORTHINESS | Initial Issue | 1 December 2007 |
| JAR-P, PROPELLERS<br>(Basic Code BCAR Section C)† | Amendment 9 | 1 February 2007 |
| JAR-TSO, JOINT TECHNICAL STANDARD ORDERS<br>(No Basic Code) | Amendment 8 | 1 February 2007 |

†No amendments are now produced for these Basic Codes as the JAR Codes have been accepted in their own right and therefore they will be the only documents which are updated periodically.

| | | |
|---|---|---|
| JAR-AWO, ALL WEATHER OPERATIONS<br>(No Basic Code) | Amendment 4 | 1 February 2007 |
| JAR-VLA, VERY LIGHT AEROPLANES<br>(No Basic Code) | Amendment 2 | 1 February 2007 |
| **[**JAR-OPS 1, COMMERCIAL AIR TRANSPORTATION (AEROPLANES)<br>(Basic Code ICAO Annex 6, Part 1) **[Effective 16 July 2008]** | Amendment 14 | 1 May 2008**]** |
| JAR-OPS 3, COMMERCIAL AIR TRANSPORTATION (HELICOPTERS)<br>(Basic Code ICAO Annex 6, Part III) | Amendment 5 | 1 July 2007 |
| JAR-FCL 1, FLIGHT CREW LICENSING (AEROPLANE)<br>(Basic Code ICAO Annex 1) | Amendment 7 | 1 December 2006 |
| JAR-FCL 2, FLIGHT CREW LICENSING (HELICOPTER)<br>(Basic Code ICAO Annex 1) | Amendment 6 | 1 February 2007 |
| JAR-FCL 3, FLIGHT CREW LICENSING (MEDICAL)<br>(Basic Code ICAO Annex 1) | Amendment 5 | 1 December 2006 |
| JAR-FCL 4, FLIGHT CREW LICENSING (FLIGHT ENGINEERS)<br>(Basic Code ICAO Annex 1) | Amendment 3 | 1 September 2005 |
| **[**JAR-FSTD A, AEROPLANE FLIGHT SIMULATION TRAINING DEVICES **[Effective 1 August 2008]** | Issued | 1 May 2008**]** |
| JAR-STD 1A, AEROPLANE FLIGHT SIMULATORS<br>(No Basic Code) **[Expires 1 August 2008]** | Amendment 3 | 1 July 2003 |
| JAR-STD 2A, AEROPLANE FLIGHT TRAINING DEVICES<br>(No Basic Code) **[Expires 1 August 2008]** | Issued | 1 July 1999 |
| JAR-STD 3A, FLIGHT & NAVIGATION PROCEDURES TRAINERS<br>(No Basic Code) **[Expires 1 August 2008]** | Change 1 | 1 June 1999 |
| JAR-STD 4A, BASIC INSTRUMENT TRAINING DEVICES<br>(No Basic Code) **[Expires 1 August 2008]** | Issued | 1 May 2002 |
| **[**JAR-FSTD H, HELICOPTER FLIGHT SIMULATION TRAINING DEVICES **[Effective 1 August 2008]** | Issued | 1 May 2008**]** |
| JAR-STD 1H, HELICOPTER FLIGHT SIMULATORS<br>(No Basic Code) **[Expires 1 August 2008]** | Issued | 1 April 2001 |
| JAR-STD 2H, HELICOPTER FLIGHT TRAINING DEVICES<br>(No Basic Code) **[Expires 1 August 2008]** | Issued | 1 September 2003 |
| JAR-STD 3H, HELICOPTER FLIGHT & NAVIGATION PROCEDURES TRAINERS<br>(No Basic Code) **[Expires 1 August 2008]** | Issued | 1 May 2002 |
| JAR-MMEL/MEL, MASTER MINIMUM EQUIPMENT LIST / MINIMUM EQUIPMENT LIST<br>(No Basic Code) | Amendment 1 | 1 August 2005 |
| GAI-20, JOINT ADVISORY MATERIAL – ADVISORY CIRCULAR JOINT<br>(No Basic Code) | Amendment 3 | 1 February 2007 |
| JAR-34, AIRCRAFT ENGINE EMISSIONS<br>(ICAO Annex 16 Volume II) | Amendment 2 | 1 February 2007 |
| JAR-VLR, VERY LIGHT HELICOPTERS<br>(No Basic Code) | Amendment 2 | 1 February 2007 |

†No amendments are now produced for these Basic Codes as the JAR Codes have been accepted in their own right and therefore they will be the only documents which are updated periodically.

Printed and distributed by Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado 80112, U S A on behalf of the Joint Aviation Authorities Committee.

# Joint Aviation Requirements

## JAR–FSTD A

## Aeroplane Flight Simulation Training Devices

**Joint Aviation Authorities**

# Joint Aviation Requirements

# JAR–FSTD A

## Aeroplane Flight Simulation Training Devices

Initial issue
1 May 2008



Printed and distributed by Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado 80112, U S A on behalf of the Joint Aviation Authorities Committee.

The members of the Joint Aviation Authorities Committee are representatives of the Civil Aviation Authorities of the countries that have signed the 'Arrangements Concerning the Development and the Acceptance of Joint Aviation Requirements'. A list of these countries is kept by European Civil Aviation Conference, 3 bis Villa Emile Bergerat, 92522 NEUILLY SUR SEINE Cedex, France.*

Further copies of the Joint Aviation Requirements can be purchased from Information Handling Services (IHS), whose world-wide offices are listed on the JAA website (www.jaa.nl) and IHS website (www.global.ihs.com)

For electronic versions of Joint Aviation Authorities Documents please refer to the website of Information Handling Services (IHS) on www.ihsaviation.com, where you will find information on how to order.

Enquiries regarding the contents should be addressed to the JAA, Saturnusstraat 40-44, PO Box 3000, 2130 KA HOOFDDORP, The Netherlands (publications@jaat.eu).

*These countries are:

Albania, Armenia, Austria, [Azerbaijan], Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Aviation Safety Agency, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Republic of Moldova, **[**Republic of Georgia**]**, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, & United Kingdom

**CONTENTS (general layout)**

**JAR–FSTD A**

**AEROPLANE FLIGHT SIMULATION TRAINING DEVICES**

INTENTIONALLY LEFT BLANK

**CONTENTS (details)**

**JAR–FSTD A**

**AEROPLANE FLIGHT SIMULATION TRAINING DEVICES**

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

## FOREWORD

1 The Civil Aviation Authorities of certain European countries have agreed common comprehensive and detailed aviation requirements, referred to as Joint Aviation Requirements (JARs), with a view to minimising Type Certification problems on joint ventures, to facilitate the export and import of aviation products, to make it easier for maintenance carried out in one European country to be accepted by the Civil Aviation Authority in another European country and to regulate commercial air transport operations.

2 JARs are recognised by the Civil Aviation Authorities of participating countries as an acceptable basis for showing compliance with their national codes.

3 The content has been prepared using the expertise available in this field as well as the ICAO Document 9625, the 'Manual for the Qualification of Flight Simulators' and added to where necessary by making use of existing European regulations and the Federal Aviation Requirements of the United States of America where acceptable.

4 JAR–FSTD A is issued with no National Variants. It may be felt that the document does not contain all of the detailed compliance and interpretative information which some Civil Aviation Authorities and Industry organisations would like to see. However, it is accepted that JAR–FSTD A should be applied in practice and the lessons learned embodied in future amendments. The Civil Aviation Authorities of the JAA are therefore committed to early amendment in the light of experience.

5 Future development of the requirements of JAR–FSTD A, including the commitment in Paragraph 4, will be in accordance with the JAA's Notice of Proposed Amendment (NPA) procedures. These procedures allow for the amendment of JAR–FSTD A to be proposed by any organisation or person.

6 The Civil Aviation Authorities have agreed they should not unilaterally initiate amendment of their national codes without having made a proposal for amendment of JAR–FSTD A in accordance with the agreed procedure.

7 Definitions and abbreviations of terms used in JAR–FSTD A that are considered generally applicable are contained in JAR–1, Definitions and Abbreviations. However, definitions and abbreviations of terms used in JAR–FSTD A that are specific to a Subpart of JAR–FSTD A are normally given in the Subpart concerned or, exceptionally, in the associated compliance or interpretative material.

8 Amendments to the text in JAR–FSTD A are issued as Replacement Pages. These show an effective date and have the same status and applicability as JAR–FSTD A from that date.

9 New, amended and corrected text will be enclosed within heavy brackets until a subsequent 'Amendment' is issued.

10 Comment/Response documents developed following Notices of Proposed Amendment (NPA) consultation have been produced by the JAA and are published on the JAA Internet Site: www.jaa.nl. Readers can also apply to JAA for copies of specific Comment/Response Documents as required.

INTENTIONALLY LEFT BLANK

**JOINT AVIATION REQUIREMENTS**

**CHECK LIST OF PAGES**

**JAR-FSTD A - AEROPLANE FLIGHT SIMULATION TRAINING DEVICES**

Initial issue dated 01 May 2008

The following pages of JAR-FSTD A are now current:

| *Page No* | *Legend* | *Date* |
|---|---|---|
| Title Page | Initial issue | 01.05.08 |
| ii | Initial issue | 01.05.08 |
| C-1 | Initial Issue | 01.05.08 |
| C-2 | Initial Issue | 01.05.08 |
| C-3 | Initial Issue | 01.05.08 |
| C-4 | Initial Issue | 01.05.08 |
| C-5 | Initial Issue | 01.05.08 |
| C-6 | Initial Issue | 01.05.08 |
| F-1 | Initial Issue | 01.05.08 |
| F-2 | Initial Issue | 01.05.08 |
| CL-1 | Initial Issue | 01.05.08 |
| CL-2 | Initial Issue | 01.05.08 |
| CL-3 | Initial Issue | 01.05.08 |
| CL-4 | Initial Issue | 01.05.08 |
| P-1 | Initial Issue | 01.05.08 |
| P-2 | Initial Issue | 01.05.08 |
| 1-0-1 | Initial Issue | 01.05.08 |
| 1-0-2 | Initial Issue | 01.05.08 |
| 1-A-1 | Initial Issue | 01.05.08 |
| 1-A-2 | Initial Issue | 01.05.08 |
| 1-B-1 | Initial Issue | 01.05.08 |
| 1-B-2 | Initial Issue | 01.05.08 |
| 1-C-1 | Initial Issue | 01.05.08 |
| 1-C-2 | Initial Issue | 01.05.08 |
| 1-C-3 | Initial Issue | 01.05.08 |
| 1-C-4 | Initial Issue | 01.05.08 |
| 1-C-5 | Initial Issue | 01.05.08 |
| 1-C-6 | Initial Issue | 01.05.08 |
| 1-C-7 | Initial Issue | 01.05.08 |
| 1-C-8 | Initial Issue | 01.05.08 |
| 1-C-9 | Initial Issue | 01.05.08 |
| 1-C-10 | Initial Issue | 01.05.08 |
| 1-C-11 | Initial Issue | 01.05.08 |
| 1-C-12 | Initial Issue | 01.05.08 |
| 1-C-13 | Initial Issue | 01.05.08 |
| 1-C-14 | Initial Issue | 01.05.08 |
| 1-C-15 | Initial Issue | 01.05.08 |
| 1-C-16 | Initial Issue | 01.05.08 |
| 1-C-17 | Initial Issue | 01.05.08 |
| 1-C-18 | Initial Issue | 01.05.08 |

| *Paragraph* | *Legend* | *Page* |
|---|---|---|
| 1-C-19 | Initial Issue | 01.05.08 |
| 1-C-20 | Initial Issue | 01.05.08 |
| 1-C-21 | Initial Issue | 01.05.08 |
| 1-C-22 | Initial Issue | 01.05.08 |
| 1-C-23 | Initial Issue | 01.05.08 |
| 1-C-24 | Initial Issue | 01.05.08 |
| 1-C-25 | Initial Issue | 01.05.08 |
| 1-C-26 | Initial Issue | 01.05.08 |
| 1-C-27 | Initial Issue | 01.05.08 |
| 1-C-28 | Initial Issue | 01.05.08 |
| 1-C-29 | Initial Issue | 01.05.08 |
| 1-C-30 | Initial Issue | 01.05.08 |
| 2-0-1 | Initial Issue | 01.05.08 |
| 2-0-2 | Initial Issue | 01.05.08 |
| 2-B-1 | Initial Issue | 01.05.08 |
| 2-B-2 | Initial Issue | 01.05.08 |
| 2-B-3 | Initial Issue | 01.05.08 |
| 2-B-4 | Initial Issue | 01.05.08 |
| 2-B-5 | Initial Issue | 01.05.08 |
| 2-B-6 | Initial Issue | 01.05.08 |
| 2-B-7 | Initial Issue | 01.05.08 |
| 2-B-8 | Initial Issue | 01.05.08 |
| 2-C-1 | Initial Issue | 01.05.08 |
| 2-C-2 | Initial Issue | 01.05.08 |
| 2-C-3 | Initial Issue | 01.05.08 |
| 2-C-4 | Initial Issue | 01.05.08 |
| 2-C-5 | Initial Issue | 01.05.08 |
| 2-C-6 | Initial Issue | 01.05.08 |
| 2-C-7 | Initial Issue | 01.05.08 |
| 2-C-8 | Initial Issue | 01.05.08 |
| 2-C-9 | Initial Issue | 01.05.08 |
| 2-C-10 | Initial Issue | 01.05.08 |
| 2-C-11 | Initial Issue | 01.05.08 |
| 2-C-12 | Initial Issue | 01.05.08 |
| 2-C-13 | Initial Issue | 01.05.08 |
| 2-C-14 | Initial Issue | 01.05.08 |
| 2-C-15 | Initial Issue | 01.05.08 |
| 2-C-16 | Initial Issue | 01.05.08 |
| 2-C-17 | Initial Issue | 01.05.08 |
| 2-C-18 | Initial Issue | 01.05.08 |
| 2-C-19 | Initial Issue | 01.05.08 |
| 2-C-20 | Initial Issue | 01.05.08 |
| 2-C-21 | Initial Issue | 01.05.08 |
| 2-C-22 | Initial Issue | 01.05.08 |
| 2-C-23 | Initial Issue | 01.05.08 |
| 2-C-24 | Initial Issue | 01.05.08 |
| 2-C-25 | Initial Issue | 01.05.08 |
| 2-C-26 | Initial Issue | 01.05.08 |
| 2-C-27 | Initial Issue | 01.05.08 |
| 2-C-28 | Initial Issue | 01.05.08 |
| 2-C-29 | Initial Issue | 01.05.08 |
| 2-C-30 | Initial Issue | 01.05.08 |
| 2-C-31 | Initial Issue | 01.05.08 |
| 2-C-32 | Initial Issue | 01.05.08 |
| 2-C-33 | Initial Issue | 01.05.08 |
| 2-C-34 | Initial Issue | 01.05.08 |
| 2-C-35 | Initial Issue | 01.05.08 |
| 2-C-36 | Initial Issue | 01.05.08 |
| 2-C-37 | Initial Issue | 01.05.08 |
| 2-C-38 | Initial Issue | 01.05.08 |

| *Paragraph* | *Legend* | *Page* |
|---|---|---|
| 2-C-39 | Initial Issue | 01.05.08 |
| 2-C-40 | Initial Issue | 01.05.08 |
| 2-C-41 | Initial Issue | 01.05.08 |
| 2-C-42 | Initial Issue | 01.05.08 |
| 2-C-43 | Initial Issue | 01.05.08 |
| 2-C-44 | Initial Issue | 01.05.08 |
| 2-C-45 | Initial Issue | 01.05.08 |
| 2-C-46 | Initial Issue | 01.05.08 |
| 2-C-47 | Initial Issue | 01.05.08 |
| 2-C-48 | Initial Issue | 01.05.08 |
| 2-C-49 | Initial Issue | 01.05.08 |
| 2-C-50 | Initial Issue | 01.05.08 |
| 2-C-51 | Initial Issue | 01.05.08 |
| 2-C-52 | Initial Issue | 01.05.08 |
| 2-C-53 | Initial Issue | 01.05.08 |
| 2-C-54 | Initial Issue | 01.05.08 |
| 2-C-55 | Initial Issue | 01.05.08 |
| 2-C-56 | Initial Issue | 01.05.08 |
| 2-C-57 | Initial Issue | 01.05.08 |
| 2-C-58 | Initial Issue | 01.05.08 |
| 2-C-59 | Initial Issue | 01.05.08 |
| 2-C-60 | Initial Issue | 01.05.08 |
| 2-C-61 | Initial Issue | 01.05.08 |
| 2-C-62 | Initial Issue | 01.05.08 |
| 2-C-63 | Initial Issue | 01.05.08 |
| 2-C-64 | Initial Issue | 01.05.08 |
| 2-C-65 | Initial Issue | 01.05.08 |
| 2-C-66 | Initial Issue | 01.05.08 |
| 2-C-67 | Initial Issue | 01.05.08 |
| 2-C-68 | Initial Issue | 01.05.08 |
| 2-C-69 | Initial Issue | 01.05.08 |
| 2-C-70 | Initial Issue | 01.05.08 |
| 2-C-71 | Initial Issue | 01.05.08 |
| 2-C-72 | Initial Issue | 01.05.08 |
| 2-C-73 | Initial Issue | 01.05.08 |
| 2-C-74 | Initial Issue | 01.05.08 |
| 2-C-75 | Initial Issue | 01.05.08 |
| 2-C-76 | Initial Issue | 01.05.08 |
| 2-C-77 | Initial Issue | 01.05.08 |
| 2-C-78 | Initial Issue | 01.05.08 |
| 2-C-79 | Initial Issue | 01.05.08 |
| 2-C-80 | Initial Issue | 01.05.08 |
| 2-C-81 | Initial Issue | 01.05.08 |
| 2-C-82 | Initial Issue | 01.05.08 |
| 2-C-83 | Initial Issue | 01.05.08 |
| 2-C-84 | Initial Issue | 01.05.08 |
| 2-C-85 | Initial Issue | 01.05.08 |
| 2-C-86 | Initial Issue | 01.05.08 |
| 2-C-87 | Initial Issue | 01.05.08 |
| 2-C-88 | Initial Issue | 01.05.08 |
| 2-C-89 | Initial Issue | 01.05.08 |
| 2-C-90 | Initial Issue | 01.05.08 |
| 2-C-91 | Initial Issue | 01.05.08 |
| 2-C-92 | Initial Issue | 01.05.08 |
| 2-C-93 | Initial Issue | 01.05.08 |
| 2-C-94 | Initial Issue | 01.05.08 |
| 2-C-95 | Initial Issue | 01.05.08 |
| 2-C-96 | Initial Issue | 01.05.08 |
| 2-C-97 | Initial Issue | 01.05.08 |
| 2-C-98 | Initial Issue | 01.05.08 |
| 2-C-99 | Initial Issue | 01.05.08 |
| 2-C-100 | Initial Issue | 01.05.08 |
| 2-C-101 | Initial Issue | 01.05.08 |

| *Paragraph* | *Legend* | *Page* |
|---|---|---|
| 2-C-102 | Initial Issue | 01.05.08 |
| 2-C-103 | Initial Issue | 01.05.08 |
| 2-C-104 | Initial Issue | 01.05.08 |
| 2-C-105 | Initial Issue | 01.05.08 |
| 2-C-106 | Initial Issue | 01.05.08 |
| 2-C-107 | Initial Issue | 01.05.08 |
| 2-C-108 | Initial Issue | 01.05.08 |
| 2-C-109 | Initial Issue | 01.05.08 |
| 2-C-110 | Initial Issue | 01.05.08 |
| 2-C-111 | Initial Issue | 01.05.08 |
| 2-C-112 | Initial Issue | 01.05.08 |
| 2-C-113 | Initial Issue | 01.05.08 |
| 2-C-114 | Initial Issue | 01.05.08 |
| 2-C-115 | Initial Issue | 01.05.08 |
| 2-C-116 | Initial Issue | 01.05.08 |
| 2-C-117 | Initial Issue | 01.05.08 |
| 2-C-118 | Initial Issue | 01.05.08 |
| 2-C-119 | Initial Issue | 01.05.08 |
| 2-C-120 | Initial Issue | 01.05.08 |
| 2-C-121 | Initial Issue | 01.05.08 |
| 2-C-122 | Initial Issue | 01.05.08 |
| 2-C-123 | Initial Issue | 01.05.08 |
| 2-C-124 | Initial Issue | 01.05.08 |
| 2-C-125 | Initial Issue | 01.05.08 |
| 2-C-126 | Initial Issue | 01.05.08 |
| 2-C-127 | Initial Issue | 01.05.08 |
| 2-C-128 | Initial Issue | 01.05.08 |
| 2-C-129 | Initial Issue | 01.05.08 |
| 2-C-130 | Initial Issue | 01.05.08 |
| 2-C-131 | Initial Issue | 01.05.08 |
| 2-C-132 | Initial Issue | 01.05.08 |
| 2-C-133 | Initial Issue | 01.05.08 |
| 2-C-134 | Initial Issue | 01.05.08 |
| 2-C-135 | Initial Issue | 01.05.08 |
| 2-C-136 | Initial Issue | 01.05.08 |
| 2-C-137 | Initial Issue | 01.05.08 |
| 2-C-138 | Initial Issue | 01.05.08 |
| 2-C-139 | Initial Issue | 01.05.08 |
| 2-C-140 | Initial Issue | 01.05.08 |
| 2-C-141 | Initial Issue | 01.05.08 |
| 2-C-142 | Initial Issue | 01.05.08 |
| 2-C-143 | Initial Issue | 01.05.08 |
| 2-C-144 | Initial Issue | 01.05.08 |
| 2-C-145 | Initial Issue | 01.05.08 |
| 2-C-146 | Initial Issue | 01.05.08 |
| 2-C-147 | Initial Issue | 01.05.08 |
| 2-C-148 | Initial Issue | 01.05.08 |

# PREAMBLE

**JAR–FSTD A**

Initial Issue

JAR–FSTD A comprises 3 Subparts (A, B and C) in Section 1, and 2 Subparts (B and C) in Section 2.

JAR-FSTD A is a simple amalgamation of JAR STD 1A, 2A, 3A and 4A into one document.

**Section 1**

Subpart C

Terminology and basic regulatory processes combined
Table of Standards in Appendix 1 to JAR-FSTD A.030 contains the standard for all devices

**Section 2**

Subpart B

Terminology and Abbreviations rationalised and harmonised with Aircraft STD standards documents.

Subpart C

Regulatory Processes combined.
Table of Objective Tests (ACJ to JAR-FSTD A.030) contains the testing requirements for all devices.
Table of Functions and Subjective Tests (ACJ to JAR-FSTD A.030) contains the testing requirements for all devices.

INTENTIONALLY LEFT BLANK

## SECTION 1 – REQUIREMENTS

1 GENERAL

1.1 This Section contains the requirements for aeroplane Flight Simulation Training Devices.

2 PRESENTATION

2.1 The requirements of JAR–FSTD A are presented in two columns on loose pages, each page being identified by the date of issue and the Amendment number under which it is amended or reissued.

2.2 Sub-headings are in italic typeface.

2.3 Explanatory Notes not forming part of the requirements appear in smaller typeface.

2.4 New, amended and corrected text will be enclosed within heavy brackets until a subsequent 'Amendment' is issued.

2.5 After each paragraph, the various changes and amendments, if any since the initial issue, are indicated together with their date of issue.

INTENTIONALLY LEFT BLANK

## SUBPART A – APPLICABILITY

### JAR–FSTD A.001 Applicability

JAR–FSTD A as amended applies to those persons, organisations or enterprises (Flight Simulation Training Devices (FSTD) operators) or, in the case of BITDs only, manufacturers seeking initial qualification of FSTDs.

The version of JAR-FSTD A agreed by the Authority and used for issue of the initial qualification shall be applicable for future recurrent qualifications of the FSTD unless recategorised.

FSTD users shall also gain approval to use the FSTD as part of their approved training programmes despite the fact that the FSTD has been previously qualified.

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

## SUBPART B - GENERAL

### JAR–FSTD A.005 Terminology
(See ACJ to FSTD A.005)

Because of the technical complexity of FSTD qualification, it is essential that standard terminology is used throughout. The following principal terms and abbreviations shall be used in order to comply with JAR–FSTD (A). Further terms and abbreviations are contained in ACJ to FSTD A.005.

(a) *Flight Simulation Training Device (FSTD)*. A training device which is a Full Flight Simulator (FFS), a Flight Training Device (FTD), a Flight & Navigation Procedures Trainer (FNPT) , or a Basic Instrument Training Device (BITD).

(b) *Full Flight Simulator (FFS)*. A full size replica of a specific type or make, model and series aeroplane flight deck, including the assemblage of all equipment and computer programmes necessary to represent the aeroplane in ground and flight operations, a visual system providing an out of the flight deck view, and a force cueing motion system. It is in compliance with the minimum standards for FFS Qualification.

(c) *Flight Training Device (FTD)*. A full size replica of a specific aeroplane type's instruments, equipment, panels and controls in an open flight deck area or an enclosed aeroplane flight deck, including the assemblage of equipment and computer software programmes necessary to represent the aeroplane in ground and flight conditions to the extent of the systems installed in the device. It does not require a force cueing motion or visual system. It is in compliance with the minimum standards for a specific FTD Level of Qualification.

(d) Flight and Navigation Procedures Trainer (FNPT). A training device which represents the flight deck or cockpit environment including the assemblage of equipment and computer programmes necessary to represent an aeroplane or class of aeroplane in flight operations to the extent that the systems appear to function as in an aeroplane. It is in compliance with the minimum standards for a specific FNPT Level of Qualification.

(e) *Basic Instrument Training Device (BITD)*. A ground based training device which represents the student pilot's station of a class of aeroplanes. It may use screen based instrument panels and springloaded flight controls, providing a training platform for at least the procedural aspects of instrument flight.

(f) *Other Training Device (OTD)*. A training aid other than FFS, FTD, FNPT or BITD which provides

(JAR-FSTD A.005 continued)

for training where a complete flight deck environment is not necessary.

(g) *Flight Simulation Training Device User Approval (FSTD User Approval)*. The extent to which an FSTD of a specified Qualification Level may be used by persons, organisations or enterprises as approved by the Authority. It takes account of aeroplane to FSTD differences and the operating and training ability of the organisation.

(h) *Flight Simulation Training Device Operator (FSTD operator)*. That person, organisation or enterprise directly responsible to the Authority for requesting and maintaining the qualification of a particular FSTD.

(i) *Flight Simulation Training Device User (FSTD User)*. The person, organisation or enterprise requesting training, checking and testing credits through the use of an FSTD.

(j) *Flight Simulation Training Device Qualification (FSTD Qualification)*. The level of technical ability of an FSTD as defined in the compliance document.

(k) *BITD Manufacturer*. That organisation or enterprise being directly responsible to the Authority for requesting the initial BITD model qualification.

(l) *BITD Model*. A defined hardware and software combination, which has obtained a qualification. Each BITD will equate to a specific model and be a serial numbered unit.

(m) *Qualification Test Guide (QTG)*. A document designed to demonstrate that the performance and handling qualities of an FSTD agree within prescribed limits with those of the aeroplane and that all applicable regulatory requirements have been met. The QTG includes both the aeroplane and FSTD data used to support the validation.

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

## SUBPART C – AEROPLANE FLIGHT SIMULATION TRAINING DEVICES

### JAR–FSTD A.015 Application for FSTD Qualification

(See ACJ No. 1 to JAR-FSTD A.015)
(See ACJ No. 2 to JAR-FSTD A.015)

(a) The FSTD operator requiring evaluation of a FFS, FTD or FNPT shall apply to the Authority giving 3 months notice. In exceptional cases this period may be reduced to one month at the discretion of the Authority.

(b) An FSTD Qualification Certificate will be issued following satisfactory completion of an evaluation of the FFS, FTD or FNPT by the Authority.

(c) For BITDs the manufacturer of a new BITD model which requires evaluation shall apply to the Authority giving 3 months notice. In exceptional cases this period may be reduced to one month at the discretion of the Authority.

(d) A BITD Qualification Certificate will be issued for the BITD model to the manufacturer following satisfactory completion of an initial evaluation by the Authority. This qualification certificate is valid for any devices manufactured to this standard without the need for the device to be subjected to further technical evaluation. The BITD model must clearly be identified by a BITD model number.

(e) The numbering of the BITD model must clearly define the hardware and software configuration of the qualified BITD model. A running serial number shall follow the BITD model identification number.

### JAR–FSTD A.020 Validity of FSTD Qualification

(See ACJ to JAR-FSTD A.020)

(a) An FSTD qualification is valid for 12 months unless otherwise specified by the Authority.

(b) An FSTD qualification revalidation can take place at any time within the 60 days prior to the expiry of the validity of the qualification document. The new period of validity shall continue from the expiry date of the previous qualification document.

(c) The Authority shall refuse, revoke, suspend or vary an FSTD qualification, if the provisions of JAR–FSTD A are not satisfied.

JAR-FSTD A.020(d) (continued)

(d) The qualification of each BITD model serial number is valid for 36 months from the commencement of operation, unless reduced by the Authority. It is the operator‘s responsibility to apply for the revalidation of the qualification.

### JAR–FSTD A.025 Rules Governing FSTD Operators

(See ACJ No. 1 to JAR-FSTD A.025)
(See ACJ No. 2 to JAR-FSTD A.025)
(See ACJ No. 3 to JAR-FSTD A.025)

The FSTD operator shall demonstrate his capability to maintain the performance, functions and other characteristics specified for the FSTD Qualification Level as follows:

(a) Quality System

(1) A Quality System shall be established and a Quality Manager designated to monitor compliance with, and the adequacy of, procedures required to ensure the maintenance of the Qualification Level of FSTDs. Compliance monitoring shall include a feedback system to the Accountable Manager to ensure corrective action as necessary.

(2) The Quality System shall include a Quality Assurance Programme that contains procedures designed to verify that the specified performance, functions and characteristics are being conducted in accordance with all applicable requirements, standards and procedures.

(3) The Quality System and the Quality Manager shall be acceptable to the Authority.

(4) The Quality System shall be described in relevant documentation.

(b) Updating. A link shall be maintained between the operator’s organization, the Authority and the relevant manufacturers to incorporate important modifications, especially:

(1) Aeroplane modifications that are essential for training and checking shall be introduced into all affected FSTDs whether or not enforced by an airworthiness directive.

(2) Modification of FSTDs, including motion and visual systems (where applicable):

JAR-FSTD A.025(b) (continued)

(i) When essential for training and checking, FSTD operators shall update their FSTDs (for example in the light of data revisions). Modifications of the FSTD hardware and software that affect handling, performance and systems operation or any major modifications of the motion or visual system shall be evaluated to determine the impact on the original qualification criteria. FSTD operators shall prepare amendments for any affected validation tests. The FSTD operator shall test the FSTD to the new criteria.

(ii) The Authority shall be advised in advance of any major changes to determine if the tests carried out by the FSTD operator are satisfactory. A special evaluation of the FSTD may be necessary prior to returning it to training following the modification.

(3) BITD operators shall maintain a link between their own organisation, the Authority and the BITD manufacturer to incorporate important modifications.

(c) Installations. Ensure that the FSTD is housed in a suitable environment that supports safe and reliable operation.

(1) The FSTD operator shall ensure that the FSTD and its installation comply with the local regulations for health and safety. However, as a minimum all FSTD occupants and maintenance personnel shall be briefed on FSTD safety to ensure that they are aware of all safety equipment and procedures in the FSTD in case of emergency.

(2) The FSTD safety features such as emergency stops and emergency lighting shall be checked at least annually and recorded by the FSTD operator.

(d) Additional Equipment. Where additional equipment has been added to the FSTD, even though not required for qualification, it will be assessed to ensure that it does not adversely affect the quality of training. Therefore any subsequent modification, removal or unserviceability could affect the qualification of the device.

**JAR–FSTD A.030 Requirements for FSTD qualified on or after 1 August 2008**

(See Appendix 1 to JAR–FSTD A.030)
(See ACJ No. 1 to JAR-FSTD A.030)
(See ACJ No. 2 to JAR-FSTD A.030)
(See ACJ No. 3 to JAR-FSTD A.030)
(See ACJ No. 4 to JAR-FSTD A.030)
(See ACJ No. 1 to JAR-FSTD A.030(c)(1))
(See ACJ No. 2 to JAR-FSTD A.030(c)(1))

(a) Any FSTD submitted for initial evaluation on or after 1 August 2008 will be evaluated against applicable JAR–FSTD A criteria for the Qualification Levels applied for. Recurrent evaluations of a FSTD will be based on the same version of JAR-FSTD A that was applicable for its initial evaluation. An upgrade will be based on the currently applicable version of JAR-FSTD A.

(b) A FSTD shall be assessed in those areas that are essential to completing the flight crewmember training and checking process as applicable.

(c) The FSTD shall be subjected to:

(1) Validation tests and

(2) Functions & subjective tests

(d) Data shall be of a standard that satisfies the Authority before the FSTD can gain a Qualification Level.

(e) The FSTD operator shall submit a QTG in a form and manner that is acceptable to the Authority.

(f) The QTG will only be approved after completion of an initial or upgrade evaluation, and when all the discrepancies in the QTG have been addressed to the satisfaction of the Authority. After inclusion of the results of the tests witnessed by the Authority, the approved QTG becomes the Master QTG (MQTG), which is the basis for the FSTD qualification and subsequent recurrent FSTD evaluations. A copy of the MQTG shall be delivered by the BITD manufacteurer together with any BITD model delivered to an Operator.

(g) The FSTD operator shall:

(1) Run the complete set of tests contained within the MQTG progressively between each annual evaluation by the Authority. Results shall be dated and retained in

JAR-FSTD A.030(g) (continued)

order to satisfy both the FSTD operator and the Authority that FSTD standards are being maintained; and

(2) Establish a Configuration Control System to ensure the continued integrity of the hardware and software of the qualified FSTD.

### JAR-FSTD A.031 Requirements for FFS qualified on or after 1 April 1998 and before 1 August 2008

Any FFS submitted for initial evaluation on or after 1 April 1998 and before 1 August 2008, shall automatically be granted an equivalent qualification under JAR-FSTD A with effect from the re-evaluation conducted at the end of the current validity period. This re-evaluation, and all future re-evaluations, will be conducted in accordance with the requirements of the same version of JAR-STD 1A, which was applicable for its last evaluation prior to implementation of JAR-FSTD A. Any upgrade will be based on the currently applicable version of JAR-FSTD A.

### JAR-FSTD A.032 Requirements for Flight Training Devices (FTD) qualified on or after 1 July 2000 and before 1 August 2008

Any FTD submitted for initial evaluation on or after 1 January 2000 and before 1 August 2008, shall automatically be granted an equivalent qualification under JAR-FSTD A with effect from the re-evaluation conducted at the end of the current validity period. This re-evaluation, and all future re-evaluations, will be conducted in accordance with of the same version of JAR-STD 2A, which was applicable for its last evaluation prior to implementation of JAR-FSTD A. Any upgrade will be based on the currently applicable version of JAR-FSTD A.

### JAR-FSTD A.033 Requirements for Flight & Navigation Procedures Trainers (FNPT) qualified on or after 1 July 1999 and before 1August 2008

Any FNPT submitted for initial evaluation on or after 1 July 1999 and before 1 August 2008, shall automatically be granted an equivalent qualification under JAR-FSTD A with effect from the re-evaluation conducted at the end of the current validity period. This re-evaluation, and all future re-evaluations, will be conducted in accordance with the requirements of the same version of JAR-STD 3A, which was applicable for its last evaluation prior to implementation of JAR-FSTD A. Any upgrade will be based on the currently applicable version of JAR-FSTD A.

JAR-FSTD A.033 (continued)

### JAR-FSTD A.034 Requirements for Basic Instrument Training Devices (BITD) qualified on or after 1 January 2003 and before 1 August 2008

Any BITD submitted for initial evaluation on or after 1 January 2003 and before 1 August 2008, shall automatically be granted an equivalent qualification under JAR-FSTD A with effect from the re-evaluation conducted at the end of the current validity period. This re-evaluation, and all future re-evaluations, will be conducted in accordance with the requirements of the same version of JAR-STD 4A, which was applicable for its last evaluation prior to implementation of JAR-FSTD A. Any upgrade will be based on the currently applicable version of JAR-FSTD A.

### JAR–FSTD A.035 Requirements for Full Flight Simulators approved or qualified before 1 April 1998

(See ACJ to JAR-FSTD A.035)

(a) FFS approved or qualified in accordance with national regulations of JAA Member States before 1 April 1998 will either be recategorised or will continue to maintain their approval under the Grandfather Rights provision, in accordance with sub-paragraphs (c) and (d) below. For FFS that are not re-categorized, maximum credit shall under no circumstances exceed originally issued National credits.

(b) FFS's, neither previously recategorised nor with an approval maintained under the Grandfather Rights provision, will be qualified in accordance with JAR–FSTD A.030.

(c) FFS that are not recategorised but that have a primary reference document used for their testing, may be qualified by the Authority to an equivalent JAR–FSTD A Qualification Level, either AG, BG, CG or DG. An upgrade requires the recategorisation of the FFS.

(1) To gain and maintain an equivalent Qualification Level, these FFS shall be assessed

JAR-FSTD A.035(c) (continued)

in those areas that are essential to completing the flight crewmember training and checking process, as applicable.

(2) The FFS shall be subjected to:

(i) Validation tests; and

(ii) Functions and subjective tests.

(d) FFS that are not recategorised and that do not have a primary reference document used for their testing shall be qualified by special arrangement. Such FFS will be issued with a Special Category and shall be subjected to functions and subjective tests corresponding to those detailed in this document. In addition any previously recognised validation test shall be used.

**JAR–FSTD A.036 Requirements for Flight Training Devices approved or qualified before 1 July 2000**
(See ACJ to JAR-FSTD A.036)

(a) FTDs approved or qualified in accordance with national regulations of JAA Members States before 1 July 2000 either will be recategorised or will continue to maintain their approval under the Grandfather Rights provision, in accordance with JAR–FSTD A.036(c) and JAR–FSTD A.036 (d).

(b) FTDs, neither previously recategorised nor with an approval maintained under the Grandfather Rights provision, will be qualified in accordance with JAR–FSTD A.030.

(c) FTDs that are not recategorised but that have a primary reference document used for their testing may be qualified by the Authority to an equivalent JAR–FSTD Qualification Level, either 1G or 2G. These Qualification Levels refer to similar credits achieved by JAR–FSTD A Level 1 and 2.

(1) To gain and maintain an equivalent Qualification Level, these FTDs shall be assessed in those areas which are essential to completing the flight crew member training and checking process, including:

(i) Longitudinal, lateral and directional handling qualities (where applicable);

(ii) Performance on the ground and in the air;

(iii) Specific operations where applicable;

(iv) Flight deck configuration;

JAR-FSTD A.036 (continued)

(v) Functioning during normal, abnormal, emergency and, where applicable non normal operation;

(vi) Instructor station function and FTD control, and

(vii) Certain additional requirements depending on the Qualification Level and the installed equipment.

(2) The FTD shall be subjected to:

(i) Validation Tests, and

(ii) Functions and Subjective Tests.

(d) FTDs that are not recategorised and that do not have a primary reference document used for their testing shall be qualified by special arrangement.

(1) Such FTDs will be issued with Special Categories.

(2) These FTDs shall be subjected to the same Functions and Subjective Tests referred to in JAR–FSTD A.036(c) (2) (ii).

(3) In addition any previously recognised Validation Test shall be used.

**JAR–FSTD A.037 Requirements for Flight Navigation and Procedures Trainers approved or qualified before 1 July 1999**
(See ACJ to JAR-FSTD A.037)

(No Longer Applicable)

**JAR–FSTD A.040 Changes to qualified FSTD**

(a) *Requirement to notify major changes to a FSTD.* The operator of a qualified FSTD shall inform the Authority of proposed major changes such as:

(1) Aeroplane modifications, which could affect FSTD qualification.

(2) FSTD hardware and or software modifications that could affect the handling qualities, performances or system representations.

(3) Relocation of the FSTD; and

(4) Any deactivation of the FSTD.

JAR-FSTD A.040 (continued)

The Authority may complete a special evaluation following major changes or when a FSTD appears not to be performing at its initial Qualification Level.

(b) *Upgrade of a FSTD.* A FSTD may be upgraded to a higher Qualification Level. Special evaluation is required before the award of a higher Level of Qualification.

(1) If an upgrade is proposed the FSTD operator shall seek the advice of the Authority and give full details of the modifications. If the upgrade evaluation does not fall upon the anniversary of the original qualification date, a special evaluation is required to permit the FSTD to continue to qualify even at the previous Qualification Level.

(2) In the case of a FSTD upgrade, an FSTD operator shall run all validation tests for the requested Qualification Level. Results from previous evaluations shall not be used to validate FSTD performance for the current upgrade.

(c) Relocation of a FSTD

(1) In instances where a FSTD is moved to a new location, the Authority shall be advised before the planned activity along with a schedule of related events.

(2) Prior to returning the FSTD to service at the new location, the FSTD operator shall perform at least one third of the validation tests and, functions and subjective tests to ensure that the FSTD performance meets its original qualification standard. A copy of the test documentation shall be retained together with the FSTD records for review by the Authority.

(3) An evaluation of the FSTD in accordance with its original JAA qualification criteria shall be at the discretion of the Authority.

(d) Deactivation of a currently qualified FSTD

(1) If a FSTD operator plans to remove a FSTD from active status for prolonged periods, the Authority shall be notified and suitable controls established for the period during which the FSTD is inactive.

(2) The FSTD operator shall agree a procedure with the Authority to ensure that the FSTD can be restored to active status at its original Qualification Level.

**JAR–FSTD A.045 Interim FSTD Qualification**
(See ACJ to FSTD A.045)

(a) In case of new aeroplane programmes, special arrangements shall be made to enable an interim Qualification Level to be achieved.

(b) For Full Flight Simulators, an Interim Qualification Level will only be granted at levels A, B or C.

(c) Requirements, details relating to the issue, and the period of validity of an interim Qualification Level will be decided by the Authority.

**JAR–FSTD A.050 Transferability of FSTD Qualification**

When there is a change of FSTD operator:

(a) The new FSTD operator shall advise the Authority in advance in order to agree upon a plan of transfer of the FSTD.

(b) At the discretion of the Authority, the FSTD shall be subject to an evaluation in accordance with its original JAA qualification criteria.

(c) Provided that the FSTD performs to its original standard, its original Qualification Level shall be restored. Revised user approval(s) may also be required.

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

**Appendix 1 to JAR-FSTD A.030**
**Flight Simulation Training Device Standards**

This appendix describes the minimum Full Flight Simulator (FFS), Flight Training Device (FTD), Flight and Navigation Procedures Trainer (FNPT) and Basic Instrument Training Devices (BITD) requirements for qualifying devices to the required Qualification Levels. Certain requirements included in this section shall be supported with a statement of compliance (SOC) and, in some designated cases, an objective test. The SOC will describe how the requirement was met. The test results shall show that the requirement has been attained. In the following tabular listing of FSTD standards, statements of compliance are indicated in the compliance column.

For FNPT use in Multi-Crew Co-operation (MCC) training the general technical requirement are expressed in the MCC column with additional systems, instrumentation and indicators as required for MCC training and operation.

For MCC (Multi Crew Co-operation) minimum technical requirements are as for Level II, with the following additions or amendments:

| | |
|---|---|
| 1 | Turbo-jet or turbo-prop engines. |
| 2 | Performance reserves, in case of an engine failure, to be in accordance with JAR-25. These may be simulated by a reduction in the aeroplane gross mass. |
| 3 | Retractable landing gear. |
| 4 | Pressurisation system. |
| 5 | De-icing systems |
| 6 | Fire detection / suppression system |
| 7 | Dual controls |
| 8 | Autopilot with automatic approach mode |
| 9 | 2 VHF transceivers including oxygen masks intercom system |
| 10 | 2 VHF NAV receivers (VOR, ILS, DME) |
| 11 | 1 ADF receiver |
| 12 | 1 Marker receiver |
| 13 | 1 transponder |
| The following indicators shall be located in the same positions on the instrument panels of both pilots: | |
| 1 | Airspeed |
| 2 | Flight attitude with flight director |
| 3 | Altimeter |
| 4 | Flight director with ILS (HSI) |
| 5 | Vertical speed |
| 6 | ADF |
| 7 | VOR |
| 8 | Marker indication (as appropriate) |
| 9 | Stop watch (as appropriate) |

INTENTIONALLY LEFT BLANK

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| a.1 | A fully enclosed flight deck | ✓ | ✓ | ✓ | ✓ | | | | | | | |
| a.2 | A cockpit/flight deck sufficiently enclosed to exclude distraction, which will replicate that of the aeroplane or class of aeroplane simulated | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| a.3 | Flight deck, a full scale replica of the aeroplane simulated.<br><br>Equipment for operation of the cockpit windows shall be included in the FSTD, but the actual windows need not be operable.<br><br>The flight deck, for FSTD purposes, consists of all that space forward of a cross section of the fuselage at the most extreme aft setting of the pilots' seats. Additional required flight crewmember duty stations and those required bulkheads aft of the pilot seats are also considered part of the flight deck and shall replicate the aeroplane. | ✓ | ✓ | ✓ | ✓ | | | | | | | Flight deck observer seats are not considered to be additional flight crewmember duty stations and may be omitted.<br><br>Bulkheads containing items such as switches, circuit breakers, supplementary radio panels, etc. to which the flight crew may require access during any event after pre-flight cockpit preparation is complete are considered essential and may not be omitted.<br><br>Bulkheads containing only items such as landing gear pin storage compartments, fire axes or extinguishers, spare light bulbs, aircraft document pouches etc. are not considered essential and may be omitted. Such items, or reasonable facsimile, shall still be available in the FSTD but may be relocated to a suitable location as near as practical to the original position. Fire axes and any similar purpose instruments need only be represented in silhouette. |
| a.4 | Direction of movement of controls and switches identical to that in the aeroplane. | ✓ | ✓ | ✓ | ✓ | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| a.5 | A full size panel of replicated system(s) which will have actuation of controls and switches that replicate those of the aeroplane simulated. | | | | | ✓ | ✓ | | | | | The use of electronically displayed images with physical overlay incorporating operable switches, knobs, buttons replicating aeroplane instruments panels may be acceptable. |
| a.6 | Cockpit/flight deck switches, instruments, equipment, panels, systems, primary and secondary flight controls sufficient for the training events to be accomplished shall be located in a spatially correct flight deck area and will operate as, and represent those in, that aeroplane or class of aeroplane. | | | | | | | ✓ | ✓ | ✓ | ✓ | For Multi-Crew Co-operation (MCC) qualification additional instrumentation and indicators may be required. See table at start of this appendix..<br><br>For BITDs the switches and controls size and shape and their location in the cockpit shall be representative. |
| a.7 | Crew members seats shall be provided with sufficient adjustment to allow the occupant to achieve the design eye reference position appropriate to the aeroplane or class of aeroplane and for the visual system to be installed to align with that eye position. | | | | | | ✓ | | ✓ | ✓ | | |
| b.1 | Circuit breakers that affect procedures and/or result in observable cockpit indications properly located and functionally accurate. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| c.1 Flight dynamics model that accounts for various combinations of drag and thrust normally encountered in flight corresponding to actual flight conditions, including the effect of change in aeroplane attitude, sideslip, thrust, drag, altitude, temperature, gross weight, moments of inertia, centre of gravity location, and configuration. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | For FTD Levels 1 and 2 aerodynamic modelling sufficient to permit accurate systems operation and indication is acceptable.<br><br>For FNPTs and BITDs class specific modelling is acceptable. |
| d.1 All relevant instrument indications involved in the simulation of the applicable aeroplane shall automatically respond to control movement by a flight crewmember or induced disturbance to the simulated aeroplane; e.g., turbulence or wind shear. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | For FNPTs instrument indications sufficient for the training events to be accomplished. Reference ACJ No. 3 to JAR-FSTD A.030.<br><br>For BITDs instrument indications sufficient for the training events to be accomplished. Reference ACJ No. 4 to JAR-FSTD A.030. |
| d.2 Lighting environment for panels and instruments shall be sufficient for the operation being conducted. | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | For FTD Level 2 lighting environment shall be as per aeroplane. |
| e.1 Communications, navigation, and caution and warning equipment corresponding to that installed in the applicant's aeroplane with operation within the tolerances prescribed for the applicable airborne equipment. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | For FTD 1 applies where the appropriate systems are replicated. |
| e.2 Navigation equipment corresponding to that of the replicated aeroplane or class of aeroplanes, with operation within the tolerances prescribed for the actual airborne equipment. This shall include communication equipment (interphone and air/ground communications systems). | | | | | | | ✓ | ✓ | ✓ | ✓ | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| e.3 Navigational data with the corresponding approach facilities. Navigation aids should be usable within range without restriction. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | For FTD 1 applies where navigation equipment is replicated.<br><br>For all FFSs and FTDs 2 where used for area or airfield competence training or checking, navigation data should be updated within 28 days.<br><br>For FNPTs and BITDs complete navigational data for at least 5 different European airports with corresponding precision and non-precision approach procedures including current updating within a period of 3 months. |
| f.1 In addition to the flight crewmember duty stations, three suitable seats for the instructor, delegated examiner and Authority inspector. The Authority will consider options to this standard based on unique cockpit configurations. These seats shall provide adequate vision to the pilot's panel and forward windows. Observer seats need not represent those found in the aeroplane but in the case of FSTDs fitted with a motion system, the seats shall be adequately secured to the floor of the FSTD, fitted with positive restraint devices and be of sufficient integrity to safely restrain the occupant during any known or predicted motion system excursion. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | For FTDs and FNPT's suitable seating arrangements for the Instructor and Examiner or Authority's Inspector should be provided.<br><br>For BITDs suitable viewing arrangements for the Instructor should be provided. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| g.1 FSTD systems shall simulate applicable aeroplane system operation, both on the ground and in flight. Systems shall be operative to the extent that all normal, abnormal, and emergency operating procedures can be accomplished. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | For FTD Level 1, applies where system is simulated. For FNPTs systems shall be operative to the extent that it shall be possible to perform all normal, abnormal and emergency operations as may be appropriate to the aeroplane or class of aeroplanes being simulated and as required for the training. |
| h.1 Instructor controls shall enable the operator to control all required system variables and insert abnormal or emergency conditions into the aeroplane systems. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Where applicable and as required for training the following shall be available :<br>- Position and flight freeze.<br>- A facility to enable the dynamic plotting of the flight path on approaches, commencing at the final approach fix, including the vertical profile<br>- Hard copy of map and approach plot |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| i.1 Control forces and control travel shall correspond to that of the replicated aeroplane. Control forces shall react in the same manner as in the aeroplane under the same flight conditions. | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | For FTD Level 2 Control forces and control travel should correspond to that of the replicated aeroplane with CT&M. It is not intended that the device should be flown manually other than for short periods when the autopilot is temporarily disengaged.<br><br>For FNPT Level I and BITDs control forces and control travel shall broadly correspond to that of the replicated aeroplane or class of aeroplane. Control force changes due to an increase/decrease in aircraft speed are not necessary.<br><br>In addition for FNPT Level II and MCC control forces and control travels shall respond in the same manner under the same flight conditions as in the aeroplane or class of aeroplane being simulated. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| j.1 Ground handling and aerodynamic programming shall include: | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | Statement of Compliance required. Tests required.<br><br>For Level 'A' FFS, generic ground handling to the extent that allows turns within the confines of the runway, adequate control on flare, touchdown and roll-out (including from a cross -wind landing) only is acceptable.<br><br>For FNPTs a generic ground handling model need only be provided to enable representative flare and touch down effects. |
| (1) Ground Effect. For example: round-out, flare, and touchdown. This requires data on lift, drag, pitching moment, trim, and power ground effect. | | | | | | | | | | | |
| (2) Ground reaction – reaction of the aeroplane upon contact with the runway during landing to include strut deflections, tyre friction, side forces, and other appropriate data, such as weight and speed, necessary to identify the flight condition and configuration. | | | | | | | | | | | |
| (3) Ground handling characteristics – steering inputs to include crosswind, braking, thrust reversing, deceleration and turning radius. | | | | | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**1.1 General** | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| k.1 Windshear models shall provide training in the specific skills required for recognition of wind shear phenomena and execution of recovery manoeuvres. Such models shall be representative of measured or accident derived winds, but may include simplifications which ensure repeatable encounters. For example, models may consist of independent variable winds in multiple simultaneous components. Wind models shall be available for the following critical phases of flight:<br><br>(1) Prior to take-off rotation<br><br>(2) At lift-off<br><br>(3) During initial climb<br><br>(4) Short final approach | | | ✓ | ✓ | | | | | | | Tests required.<br><br>See ACJ No 1 to JAR-FSTD A.030, Para 2.3, g. |
| l.1 Instructor controls for environmental effects including wind speed and direction shall be provided. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | For FTDs environment modelling sufficient to permit accurate systems operation and indication. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| m.1 Stopping and directional control forces shall be representative for at least the following runway conditions based on aeroplane related data:<br>(1) Dry<br>(2) Wet<br>(3) Icy<br>(4) Patchy wet<br>(5) Patchy icy<br>(6) Wet on rubber residue in touchdown zone. | | | ✓ | ✓ | | | | | | | Statement of Compliance required.<br>Objective Tests required for (1), (2), (3), Subjective check for (4), (5), (6). |
| n.1 Brake and tyre failure dynamics (including antiskid) and decreased brake efficiency due to brake temperatures shall be representative and based on aeroplane related data. | | | ✓ | ✓ | | | | | | | Statement of Compliance required.<br>Subjective test is required for decreased braking efficiency due to brake temperature, if applicable. |
| o.1 A means for quickly and effectively conducting daily testing of FSTD programming and hardware shall be available. | | | ✓ | ✓ | | | | | | | Statement of Compliance required. |
| p.1 Computer capacity, accuracy, resolution, and dynamic response shall be sufficient to fully support the overall fidelity, including its evaluation and testing. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | Statement of Compliance required. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| q.1 Control feel dynamics shall replicate the aeroplane simulated.<br><br>Free response of the controls shall match that of the aeroplane within the tolerances specified. Initial and upgrade evaluations will include control free response (pitch, roll and yaw controller) measurements recorded at the controls. The measured responses shall correspond to those of the aeroplane in take-off, cruise, and landing configurations.<br><br>(1) For aeroplanes with irreversible control systems, measurements may be obtained on the ground if proper pitot static inputs are provided to represent conditions typical of those encountered in flight. Engineering validation or aeroplane manufacturer rationale will be submitted as justification to ground test or omit a configuration.<br><br>(2) For FSTDs requiring static and dynamic tests at the controls, special test fixtures will not be required during initial evaluation if the FSTD operator's MQTG shows both text fixture results and alternate test method results such as computer data plots, which were obtained concurrently. Repetition of the alternate method during initial evaluation may then satisfy this requirement. | | | ✓ | ✓ | | | | | | | Tests required. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | COMPLIANCE |
| r.1 One of the following two methods is acceptable as a means to prove compliance:<br><br>(1) Transport Delay: A transport delay test may be used to demonstrate that the FSTD system response does not exceed 150 milliseconds. This test shall measure all the delay encountered by a step signal migrating from the pilot's control through the control loading electronics and interfacing through all the simulation software modules in the correct order, using a handshaking protocol, finally through the normal output interfaces to the motion system, to the visual system and instrument displays.<br><br>(see next page) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Tests required.<br><br>For Level 'A' & 'B' FFSs, and applicable systems for FTDs, FNPTs and BITDs the maximum permissible delay is 300 milliseconds. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| **1.1 General** | | | | | | | | | | | |
| (continued)<br>(2) Latency: The visual system, flight deck instruments and initial motion system response shall respond to abrupt pitch, roll and yaw inputs from the pilot's position within 150 milliseconds of the time, but not before the time, when the aeroplane would respond under the same conditions. | | | | | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | |
| s.1 Aerodynamic modelling shall be provided. This shall include, for aeroplanes issued an original type certificate after June 1980, low altitude level flight ground effect, Mach effect at high altitude, normal and reverse dynamic thrust effect on control surfaces, aeroelastic representations, and representations of non-linearities due to sideslip based on aeroplane flight test data provided by the manufacturer. | | | ✓ | ✓ | | | | | | | Statement of Compliance required. Mach effect, aeroelastic representations, and non-linearities due to sideslip are normally included in the FSTD aerodynamic model. The Statement of Compliance shall address each of these items. Separate tests for thrust effects and a Statement of Compliance are required. |
| t.1 Modelling that includes the effects of airframe and engine icing. | | | ✓ | ✓ | | | | ✓ | ✓ | | Statement of Compliance required.<br><br>SOC shall describe the effects that provide training in the specific skills required for recognition of icing phenomena and execution of recovery. |
| u.1 Aerodynamic and ground reaction modelling for the effects of reverse thrust on directional control shall be provided. | | ✓ | ✓ | ✓ | | | | | | | Statement of Compliance required.<br><br>(page 2–C–44). |
| v.1 Realistic aeroplane mass properties, including mass, centre of gravity and moments of inertia as a function of payload and fuel loading shall be implemented. | ✓ | ✓ | ✓ | ✓ | | | | | | | Statement of Compliance required at initial evaluation. SOC shall include a range of tabulated target values to enable a demonstration of the mass properties model to be conducted from the instructor's station. |
| w.1 Self-testing for FSTD hardware and programming to determine compliance with the FSTD performance tests shall be provided. Evidence of testing shall include FSTD number, date, time, conditions, tolerances, and the appropriate dependent variables portrayed in comparison with the aeroplane standard. | | | ✓ | ✓ | | | | | | | Statement of Compliance required. Tests required. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1 General** | A | B | C | D | 1 | 2 | I | II | MCC | | |
| x.1 Timely and permanent update of hardware and programming subsequent to aeroplane modification sufficient for the Qualification Level sought. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | |
| y.1 Daily pre-flight documentation either in the daily log or in a location easily accessible for review is required. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**2. Motion system** | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| a.1 Motion cues as perceived by the pilot shall be representative of the aeroplane, e.g. touchdown cues shall be a function of the simulated rate of descent. | ✓ | ✓ | ✓ | ✓ | | | | | | | For FSTDs where motion systems are not specifically required, but have been added, they will be assessed to ensure that they do not adversely affect the qualification of the FSTD. |
| b.1 A motion system shall: | | | | | | | | | | | Statement of Compliance required. |
| (1) Provide sufficient cueing, which may be of a generic nature to accomplish the required tasks. | ✓ | | | | | | | | | | Tests required. |
| (2) Have a minimum of 3 degrees of freedom (pitch, roll & heave). | | ✓ | | | | | | | | | |
| (3) Produce cues at least equivalent to those of a six-degrees-of-freedom synergistic platform motion system. | | | ✓ | ✓ | | | | | | | |
| c.1 A means of recording the motion response time as required. | ✓ | ✓ | ✓ | ✓ | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**2. Motion system** | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| d.1 Motion effects programming shall include:<br><br>(1) Effects of runway rumble, oleo deflections, groundspeed, uneven runway, centreline lights and taxiway characteristics.<br><br>(2) Buffets on the ground due to spoiler/speedbrake extension and thrust reversal.<br><br>(3) Bumps associated with the landing gear.<br><br>(4) Buffet during extension and retraction of landing gear.<br><br>(5) Buffet in the air due to flap and spoiler/speedbrake extension.<br><br>(6) Approach to stall buffet.<br><br>(7) Touchdown cues for main and nose gear.<br><br>(8) Nose wheel scuffing.<br><br>(9) Thrust effect with brakes set.<br><br>(See next page) | ✓ | ✓ | ✓ | ✓ | | | | | | | For Level 'A'FFS: Effects may be of a generic nature sufficient to accomplish the required tasks. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**2. Motion system** | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| d.1 (continued)<br><br>(10) Mach and manoeuvre buffet.<br><br>(11) Tyre failure dynamics.<br><br>(12) Engine malfunction and engine damage.<br><br>(13) Tail and pod strike. | ✓ | ✓ | ✓ | ✓ | | | | | | | |
| e.1 Motion vibrations: Tests with recorded results that allow the comparison of relative amplitudes versus frequency are required.<br><br>Characteristic motion vibrations that result from operation of the aeroplane in so far as vibration marks an event or aeroplane state that can be sensed at the flight deck shall be present. The FSTD shall be programmed and instrumented in such a manner that the characteristic vibration modes can be measured and compared with aeroplane data. | | | | ✓ | | | | | | | Statement of Compliance required.<br><br>Tests required. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**3 Visual System** | FS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| a.1 The visual system shall meet all the standards enumerated as applicable to the level of qualification requested by the applicant. | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | For FTDs, FNPT 1s and BITDs, when visual systems have been added by the FSTD operator even though not attracting specific credits, they will be assessed to ensure that they do not adversely affect the qualification of the FSTD.<br><br>For FTDs if the visual system is to be used for the training of manoeuvring by visual reference (such as route and airfield competence) then the visual system should at least comply with that required for level A FFS. |
| b.1 Continuous minimum collimated visual field-of-view of 45 degrees horizontal and 30 degrees vertical field of view simultaneously for each pilot. | ✓ | ✓ | | | | | | | | | SOC is acceptable in place of this test. |
| b.2 Continuous, cross-cockpit, minimum collimated visual field of view providing each pilot with 180 degrees horizontal and 40 degrees vertical field of view. Application of tolerances require the field of view to be not less than a total of 176 measured degrees horizontal field of view (including not less than ±88 measured degrees either side of the centre of the design eye point) and not less than a total of 36 measured degrees vertical field of view from the pilot's and co-pilot's eye points. | | | ✓ | ✓ | | | | | | | Consideration shall be given to optimising the vertical field of view for the respective aeroplane cut-off angle.<br><br>SOC is acceptable in place of this test. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **3 Visual System** | A | B | C | D | 1 | 2 | I | II | MCC | | |
| b.3 A visual system (night/dusk or day) capable of providing a field-of-view of a minimum of 45 degrees horizontally and 30 degrees vertically, unless restricted by the type of aeroplane, simultaneously for each pilot, including adjustable cloud base and visibility. | | | | | | | | ✓ | ✓ | | The visual system need not be collimated but shall be capable of meeting the standards laid down in Part 3 and 4 (Validation, Functions and Subjective Tests - See ACJ No.1 to JAR-FSTD A.030).<br><br>SOC is acceptable in place of this test. |
| c.1 A means of recording the visual response time for visual systems. | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | |
| d.1 System Geometry. The system fitted shall be free from optical discontinuities and artefacts that create non-realistic cues. | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | Test required. A Statement of Compliance is acceptable in place of this test. |
| e.1 Visual textural cues to assess sink rate and depth perception during take-off and landing shall be provided. | ✓ | ✓ | ✓ | ✓ | | | | | | | For Level 'A' FFS visual cueing shall be sufficient to support changes in approach path by using runway perspective. |
| f.1 Horizon, and attitude shall correlate to the simulated attitude indicator. | ✓ | ✓ | ✓ | ✓ | | | | | | | Statement of Compliance required. |
| g.1 Occulting - A minimum of ten levels shall be available. | ✓ | ✓ | ✓ | ✓ | | | | | | | Occulting shall be demonstrated.<br><br>Statement of Compliance required. |
| h.1 Surface (Vernier) resolution shall occupy a visual angle of not greater than 2 arc minutes in the visual display used on a scene from the pilot's eyepoint. | | | ✓ | ✓ | | | | | | | Test and Statement of Compliance required containing calculations confirming resolution. |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**3 Visual System** | FS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| i.1 Surface contrast ratio shall be demonstrated by a raster drawn test pattern showing a contrast ratio of not less than 5:1 | | | ✓ | ✓ | | | | | | | Test and Statement of Compliance required. |
| j.1 Highlight brightness shall be demonstrated using a raster drawn test pattern. The highlight brightness shall not be less than 20 cd/m$^2$ (6ft-lamberts). | | | ✓ | ✓ | | | | | | | Test and Statement of Compliance required. Use of calligraphic lights to enhance raster brightness is acceptable. |
| k.1 Light point size – not greater than 5 arc minutes. | | | ✓ | ✓ | | | | | | | Test and Statement of Compliance required. This is equivalent to a light point resolution of 2.5 arc minutes. |
| l.1 Light point contrast ratio – not less than 10:1 | ✓ | ✓ | | | | | | | | | Test and Statement of compliance required. |
| l.2 Light point contrast ratio – not less than 25:1. | | | ✓ | ✓ | | | | | | | Test and Statement of compliance required. |
| m.1 Daylight, twilight and night visual capability as applicable for level of qualification sought. | ✓ | ✓ | ✓ | ✓ | | | | | | | Statement of Compliance required for system capability.<br><br>System objective and scene content tests are required. |
| m.2 The visual system shall be capable of meeting, as a minimum, the system brightness and contrast ratio criteria as applicable for level of qualification sought | ✓ | ✓ | ✓ | ✓ | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS | FS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **3 Visual System** | A | B | C | D | 1 | 2 | I | II | MCC | | |
| m.3 Total scene content shall be comparable in detail to that produced by 10000 visible textured surfaces and (in day) 6000 visible lights or (in twilight or night) 15000 visible lights, and sufficient system capacity to display 16 simultaneously moving objects. | | | ✓ | ✓ | | | | | | | |
| m.4 The system, when used in training, shall provide in daylight, full colour presentations and sufficient surfaces with appropriate textural cues to conduct a visual approach, landing and airport movement (taxi). Surface shading effects shall be consistent with simulated (static) sun position. | | | ✓ | ✓ | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**3 Visual System** | FS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | 1 | 2 | I | II | MCC | | |
| m.5 The system, when used in training, shall provide at twilight, as a minimum, full colour presentations of reduced ambient intensity, sufficient surfaces with appropriate textural cues that include self-illuminated objects such as road networks, ramp lighting and airport signage, to conduct a visual approach, landing and airport movement (taxi). Scenes shall include a definable horizon and typical terrain characteristics such as fields, roads and bodies of water and surfaces illuminated by representative ownship lighting (e.g. landing lights). If provided, directional horizon lighting shall have correct orientation and be consistent with surface shading effects. | | | ✓ | ✓ | | | | | | | |
| m.6 The system, when used in training, shall provide at night, as a minimum, all features applicable to the twilight scene, as defined above, with the exception of the need to portray reduced ambient intensity that removes ground cues that are not self-illuminating or illuminated by ownship lights (e.g. landing lights). | ✓ | ✓ | ✓ | ✓ | | | | | | | |

| FLIGHT SIMULATOR TRAINING DEVICE STANDARDS<br><br>**4 Sound System** | | FFS LEVEL | | | | FTD LEVEL | | FNPT LEVEL | | | BITD | COMPLIANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | 1 | 2 | I | II | MCC | | |
| a.1 | Significant flight deck sounds which result from pilot actions corresponding to those of the aeroplane or class of aeroplane. | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | For FNPT Level I and BITD engine sounds only need be available |
| b.1 | Sound of precipitation, rain removal equipment and other significant aeroplane noises perceptible to the pilot during normal and abnormal operations and the sound of a crash when the FSTD is landed in excess of limitations. | | | ✓ | ✓ | | | | | | | Statement of Compliance required. |
| c.1 | Comparable amplitude and frequency of flight deck noises, including engine and airframe sounds. The sounds shall be co-ordinated with the required weather. | | | | ✓ | | | | | | | Tests required. |
| d.1 | The volume control shall have an indication of sound level setting which meets all qualification requirements. | ✓ | ✓ | ✓ | ✓ | | | | | | | |