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Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment

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FOREWORD

This report was prepared by Special Committee 212 (SC-212) and approved by the RTCA Program Management Committee (PMC) on March 13, 2008.

RTCA, Incorporated is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization functions as a Federal Advisory Committee and develops consensus based recommendations on contemporary aviation issues. RTCA's objectives include but are not limited to:

- coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;

- analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;

- developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation; and

- assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization and the International Telecommunication Union and other appropriate international organizations can be based.

The organization's recommendations are often used as the basis for government and private sector decisions as well as the foundation for many Federal Aviation Administration Technical Standard Orders.

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EXECUTIVE SUMMARY

A review of a ten-year period (1994 thru 2004) of data has indicated that controlled flight into terrain (CFIT) has been a major contributor of helicopter accidents, especially those resulting in fatalities. The data suggests that CFIT accidents can happen during day and night under both visual meteorological conditions (VMC) and instrument meteorological conditions (IMC).

The application of a Terrain Avoidance and Warning System (TAWS) (originally developed for fixed-wing aircraft) in helicopter operations offers great promise in reducing the number of CFIT accidents. However, helicopters operate in widely diverse environments, including under visual and instrument flight rules (VFR and IFR) and in both on- and off-airport operations, often with significant low altitude exposure. Existing TAWS performance standards are insufficient to support these diverse operations.

Subsequently, the United States Federal Aviation Administration (FAA) requested that RTCA Inc. form a committee to develop a Minimum Operational Performance Standard (MOPS) for a Helicopter Terrain Awareness and Warning System (HTAWS) in an effort to reduce the helicopter accident rate. RTCA created the Special Committee SC- 212 to meet this goal.

In order to develop a MOPS with the most beneficial alert/warning functions that support the unique helicopter VFR/IFR operational conditions, a ten-year period of existing helicopter CFIT accident data was analyzed to provide a basis for testing and to aid in the development of the MOPS. Emphasis was placed on helicopter VFR operations into and out of remote and/or unimproved locations without runways, lighting, or navigational aids. Nine representative test scenarios were extracted from the CFIT accident cases as representative examples. Appendix A of this document contains summaries of these accident cases. Emphasis was also placed on minimizing nuisance alerts during normal helicopter operations.

With collective experience from across the helicopter industry, RTCA SC-212 developed this Minimum Operational Performance Standard (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS). The CFIT accident cases were used as a basis to develop the test scenarios. This MOPS defines the most beneficial alert/warning functions that support the unique flight characteristics of helicopters while at the same time attempting to minimize nuisance alerting.

TABLE OF CONTENTS

1 PURPOSE AND SCOPE 1
1.1 Introduction 1
1.1.1 Compliance 1
1.1.2 Document Contents 1
1.2 System Overview 2
1.3 Operational Application(s) 2
1.4 Intended Function 3
1.5 Operational Goals 3
1.6 Assumptions 3
1.7 Test Procedures 3
1.7.1 Environmental Tests 4
1.7.2 Bench Tests 4
1.7.3 Installed Equipment Tests 4
1.7.4 Operational Tests 4
1.8 Definitions of Terms 5
1.9 References 6
2 EQUIPMENT PERFORMANCE REQUIREMENTS AND TEST PROCEDURES 9
2.1 General Requirements 9
2.1.1 Airworthiness 9
2.1.2 Intended Function 9
2.1.3 Fire Protection 9
2.1.4 Equipment Interfaces 9
2.1.5 Effects of Test 9
2.1.6 Design Assurance 10
2.1.6.1 Hardware Compliance 10
2.1.6.2 Software Compliance 10
2.2 Equipment Performance – Standard Conditions 10
2.2.1 Display 10
2.2.1.1 Terrain and Obstacle Data Depiction 10
2.2.1.2 Auto Display Functions 11
2.2.2 Alerts 12
2.2.2.1 Aural Terrain and Obstacle Alert 12
2.2.2.2 Visual Terrain and Obstacle Alert 12
2.2.2.3 Alert Prioritization 13
2.2.2.4 Alert Envelope 13
2.2.3 Horizontal and Vertical Position Source 14
2.2.4 Terrain and Obstacle Databases 15
2.2.5 System Inhibit 15
2.2.6 System Status Indications 15

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2.3 Equipment Performance – Environmental Conditions 16

2.4 Equipment Test Procedures 16
2.4.1 Definitions of Terms and Conditions of Test 16
2.4.2 Required Test Equipment 17
2.4.3 Detailed Test Procedures 17
2.4.3.1 Display 17
2.4.3.1.1 Terrain and Obstacle Data Depiction 17
2.4.3.1.2 Auto Display Functions 18
2.4.3.2 Alerts 18
2.4.3.2.1 Aural Terrain and Obstacle Alert 18
2.4.3.2.2 Visual Terrain and Obstacle Alert 18
2.4.3.2.3 Alert Prioritization 19
2.4.3.2.4 Alert Envelope 19
2.4.3.2.5 Known Accident Cases 20
2.4.3.3 Horizontal and Vertical Position Source 20
2.4.3.4 Terrain and Obstacle Databases 20
2.4.3.5 System Status Indications 20

3 INSTALLED EQUIPMENT PERFORMANCE 23

3.1 Equipment Installation 23
3.1.1 Accessibility 23
3.1.2 Aircraft Environment 23
3.1.3 Display Visibility 23
3.1.4 Failure Protection 24
3.1.5 Interference Effects 24
3.1.6 Function and Documentation 24

3.2 Installed Equipment Performance Requirements 24
3.2.1 Display Readability 24
3.2.2 Audio Level 25
3.2.3 Equipment Operation 25

3.3 Conditions of Test 25
3.3.1 Power Input 25
3.3.2 Associated Equipment or Systems 25
3.3.3 Environment 25
3.3.4 Adjustment of Equipment 25
3.3.5 Warm-up Period 25

3.4 Test Procedures for Installed Equipment Performance 26
3.4.1 Ground Test Procedures 26
3.4.1.1 Conformity Inspection 26
3.4.1.2 Display Luminance 26
3.4.1.3 Audio Level 26
3.4.1.4 Equipment Function 26
3.4.1.5 Interference Effects 26
3.4.1.6 Power Supply Fluctuations 27
3.4.1.7 Equipment Accessibility 27
3.4.2 Flight Test Procedures 27
3.4.2.1 Displayed Data Readability 27
3.4.2.2 Audio Level 27
3.4.2.3 Interference Effects 27

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3.4.2.4 Equipment Accessibility 28
3.4.2.5 HTAWS Functionality Test 28

4 EQUIPMENT OPERATIONAL PERFORMANCE CHARACTERISTICS 29

4.1 Required Operational Performance Requirements 29
4.1.1 Power Inputs 29
4.1.2 Equipment Operating Modes 29

4.2 Test Procedures for Operational Performance Requirements 29
4.2.1 Power Inputs 29
4.2.2 Equipment Operating Modes 29

5 MEMBERSHIP 31

APPENDIX A DESCRIPTION OF FLIGHT PATHS FOR SELECTED CONTROLLED FLIGHT INTO TERRAIN (CFIT) HELICOPTER ACCIDENTS 1994-2004 35

A.1 Introduction 35
A.1.1 Purpose of Study 35
A.1.2 Controlled Flight Into Terrain 35
A.1.3 Contents of this Report 36

A.2 Study Methodology 36
A.2.1 Data Sources 36
A.2.2 Selection of Accidents for Study 36
A.2.3 Flight Path Plotting Process 37

A.3 CFIT ACCIDENT DESCRIPTIONS / FLIGHT PATH PLOTS 38
A.3.1 CFIT Accident – April 22, 1994 – Bluefield, West Virginia, USA 38
A.3.1.1 Description of Flight 38
A.3.1.2 Probable Flight Path 39
A.3.1.3 Additional Notes 40
A.3.2 CFIT Accident – May 14, 1997 – Ludieres, France 40
A.3.2.1 Description of Flight 40
A.3.2.2 Probable Flight Path 41
A.3.2.3 Additional Notes 42
A.3.3 CFIT Accident – July 4, 1997 – Puivert, France 43
A.3.3.1 Description of Flight 43
A.3.3.2 Probable Flight Path 44
A.3.3.3 Additional Notes 45
A.3.4 CFIT Accident – December 20, 1997 – North Sea 45
A.3.4.1 Description of Flight 45
A.3.4.2 Probable Flight Path 47
A.3.4.3 Additional Notes 48
A.3.5 CFIT Accident – April 25, 2000 – St. Petersburg, Florida, USA 49
A.3.5.1 Description of Flight 49
A.3.5.2 Probable Flight Path 50
A.3.5.3 Additional Notes 51
A.3.6 CFIT Accident – February 20, 2003 – Clyde, TX, USA 51
A.3.6.1 Description of Flight 51
A.3.6.2 Probable Flight Path 53
A.3.6.3 Additional Notes 54
A.3.7 CFIT Accident – March 23, 2004 – Gulf of Mexico, USA 54
A.3.7.1 Description of Flight 54
A.3.7.2 Probable Flight Path 56

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A.3.7.3 Additional Notes 57
A.3.8 CFIT Accident – April 20, 2004 – Boonville, IN, USA 57
A.3.8.1 Description of Flight 57
A.3.8.2 Probable Flight Path 59
A.3.8.3 Additional Notes 60
A.3.9 CFIT Accident – August 21, 2004 - Battle Mountain, Nevada, USA 61
A.3.9.1 Description of Flight 61
A.3.9.2 Probable Flight Path 62
A.3.9.3 Additional Notes 63
A.4 References 63

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LIST OF FIGURES

Figure 1-1 HTAWS System Overview 2
Figure A-2 Bluefield, WV – BH-412 – N70AM – 4/22/94 (Plan) 39
Figure A-3 Bluefield, WV – BH-412 – N70AM – 4/22/94 (Profile) 39
Figure A-4 Ludieres, France – AS-350B – F-GKHP – 5/14/97 (Plan) 41
Figure A-5 Ludieres, France – AS-350B – F-GKHP – 5/14/97 (Profile) 42
Figure A-6 Puivert, France – AS-350 – F-GDFG – 7/4/97 (Plan) 44
Figure A-7 Puivert, France – AS-350 – F-GDFG – 7/4/97 (Profile) 44
Figure A-8 North Sea – SK-76B – PH-KHB – 12/20/97 (Plan) 47
Figure A-9 North Sea – SK-76B – PH-KHB – 12/20/97 (Profile) 48
Figure A-10 St. Petersburg, FL – BK-117 – N428MB – 4/25/00 (Plan) 50
Figure A-11 St. Petersburg, FL – BK-117 – N428MB – 4/25/00 (Profile) 51
Figure A-12 Clyde, TX – AS-350-B3 – N439AE – 2/20/03 (Plan) 53
Figure A-13 Clyde, TX – AS-350-B3 – N439AE – 2/20/03 (Profile) 53
Figure A-14 Gulf of Mexico, USA – SK-76A++ – N579EH – 3/23/04 (Plan) 56
Figure A-15 Gulf of Mexico, USA – SK-76A++ – N579EH – 3/23/04 (Profile) 56
Figure A-16 Boonville, Indiana – BH-206L-1 – N137AE – 4/20/04 (Plan) 59
Figure A-17 Boonville, Indiana – BH-206L-1 – N137AE – 4/20/04 (Profile) 60
Figure A-18 Battle Mountain, Nevada – BH-407 – N2YN – 8/21/04 (Plan) 62
Figure A-19 Battle Mountain, Nevada – BH-407 – N2YN – 8/21/04 (Profile) 63

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LIST OF TABLES

Table 2-1 Caution and Warning Alert Colors 13
Table 2-2 Recommended HTAWS Alert Prioritization Scheme 13
Table 2-3 Descent Warning Criteria 14
Table A-5-1 Accidents Selected for Study 37
Table A-5-2 Probable Flight Path, Bluefield, WV CFIT Accident 40
Table A-5-3 Probable Flight Path, Ludieres, France CFIT Accident 42
Table A-5-4 Probable Flight Path, Puivert, France CFIT Accident 45
Table A-5-5 Probable Flight Path, North Sea CFIT Accident 48
Table A-5-6 Probable Flight Path, St. Petersburg, FL CFIT Accident 51
Table A-5-7 Probable Flight Path, Clyde, TX CFIT Accident 54
Table A-5-8 Probable Flight Path, Gulf of Mexico, USA CFIT Accident 57
Table A-5-9 Probable Flight Path, Boonville, IN CFIT Accident 60
Table A-5-10 Probable Flight Path, Battle Mountain, NV CFIT Accident 63

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1 PURPOSE AND SCOPE

1.1 Introduction

This document defines the Minimum Operational Performance Standards (MOPS) for a Helicopter Terrain Awareness and Warning System (HTAWS). These standards specify system characteristics that should be useful to designers, manufactures, installers and users of the equipment.

The word "equipment", as used within this document, includes all components and units necessary (as determined by the manufacturer or installer) for the system to properly perform its intended function(s). For example, the "equipment" may include: sensor(s), a computer unit, an input/output unit that interfaces with other aircraft displays and/or systems, a control unit, and a display unit. In the case of this example, all of the foregoing components and units comprise the "equipment." It should not be inferred from this example that each HTAWS equipment design will necessarily include all of the foregoing components or units. This will depend on the specific design chosen by the manufacturer.

1.1.1 Compliance

In this document, the term "shall" is used to indicate a requirement of the HTAWS equipment. The term "should" is used to denote a recommendation that would improve the HTAWS equipment, but does not constitute a requirement. The term "may" is used to denote a permissive situation. An approved design should comply with every requirement which shall be verifiable by inspection, test, analysis, or demonstration.

Compliance with these standards is recommended as one means of assuring that the equipment will perform its intended functions(s) satisfactorily under all conditions normally encountered in routine aeronautical operation. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Operation performance standards for functions or components that refer to equipment capabilities that exceed the stated minimum requirements shall be identified as optional features. Performance requirements and associated test procedures should be developed for these optional features.

1.1.2 Document Contents

Section 1 of this document provides information needed to understand the rationale for equipment characteristics and requirements stated in the remaining sections. It describes typical equipment applications and operation goals, as envisioned by the members of Special Committee 212, and establishes the basis for the standards stated in Sections 2 through 4. Definitions and assumptions essential to proper understanding of this document are also provided in this section.

Section 2 contains the minimum performance standards for the equipment. These standards specify the required performance under standard and environmental conditions.

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