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**Minimum Aviation System Performance  
Standards: Required Navigation Performance for  
Area Navigation**

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Supersedes DO-236A  
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## FOREWORD

This report was prepared by RTCA Special 181 and approved by the RTCA Program Management Committee (PMC) on October 28, 2003.

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- 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
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## TABLE OF CONTENTS

<b>1.0</b>	<b>PURPOSE AND SCOPE .....</b>	<b>1</b>
<b>1.1</b>	<b>Introduction .....</b>	<b>1</b>
<b>1.2</b>	<b>System Overview .....</b>	<b>2</b>
1.2.1	Position Estimation.....	2
1.2.2	Path Definition .....	3
1.2.3	Path Steering .....	4
1.2.3.1	Lateral Steering .....	4
1.2.3.2	Vertical Steering .....	4
1.2.3.3	Time of Arrival Control .....	4
1.2.4	User Interface .....	5
1.2.4.1	Controls, Displays and System Alerting .....	5
1.2.4.2	Reporting .....	5
1.2.5	Navigation System Controls and Features .....	5
<b>1.3</b>	<b>Operational Goals and Applications.....</b>	<b>5</b>
1.3.1	Path Definition .....	5
1.3.2	Containment Methodology .....	6
1.3.3	Contribution to Increased Capacity .....	6
1.3.4	Advanced Monitoring and Surveillance Techniques .....	6
1.3.5	User-Preferred Trajectories .....	6
<b>1.4</b>	<b>Required Navigation Performance (RNP) .....</b>	<b>7</b>
1.4.1	Area Navigation .....	7
1.4.2	RNP Concept.....	7
1.4.3	Application of RNP.....	7
1.4.4	RNP RNAV Types .....	8
1.4.5	Vertical Navigation (VNAV) .....	9
1.4.6	Time of Arrival Control (TOAC).....	9
<b>1.5</b>	<b>Assumptions .....</b>	<b>9</b>
1.5.1	Navigation Infrastructure .....	9
1.5.2	Definition of Airspace.....	10
1.5.2.1	RNP.....	10
1.5.2.2	RNP RNAV .....	10
1.5.2.3	VNAV.....	10
1.5.3	Navigation Error.....	10
1.5.4	Navigation Data.....	10
1.5.5	Reference Earth Model.....	10
1.5.6	Desired Path .....	10
1.5.6.1	Path Definition.....	10
1.5.6.2	Non-Standard Temperature Effects on Barometric Altimetry .....	11
1.5.6.3	Deceleration Paths .....	11
1.5.6.4	Time of Arrival Control Effects.....	11

1.5.7	Transitions Between Legs .....	11
1.5.7.1	Lateral .....	11
1.5.7.2	Vertical.....	12
1.5.8	Polar Navigation.....	12
1.5.9	Dispatch Assessment .....	12
<b>1.6</b>	<b>Verification Procedures .....</b>	<b>13</b>
<b>1.7</b>	<b>Definitions .....</b>	<b>13</b>
1.7.1	Required Navigation Performance .....	13
1.7.2	Error Terms.....	13
1.7.2.1	Lateral .....	13
1.7.2.2	Vertical .....	15
1.7.3	Lateral Containment Concept.....	15
1.7.4	Vertical Performance .....	19
1.7.4.1	Vertical Path Performance Limit (VPPL) .....	19
<b>2.0</b>	<b>SYSTEM PERFORMANCE REQUIREMENTS .....</b>	<b>21</b>
<b>2.1</b>	<b>Accuracy.....</b>	<b>21</b>
2.1.1	RNP RNAV .....	21
2.1.2	VNAV .....	21
<b>2.2</b>	<b>Containment Integrity.....</b>	<b>22</b>
2.2.1	RNP RNAV .....	22
2.2.2	VNAV .....	22
2.2.3	TOAC.....	22
<b>2.3</b>	<b>Containment Continuity .....</b>	<b>23</b>
2.3.1	RNP RNAV .....	23
2.3.2	VNAV .....	23
2.3.3	TOAC.....	23
<b>2.4</b>	<b>Estimated Time of Arrival .....</b>	<b>23</b>
<b>2.5</b>	<b>Time of Arrival Containment .....</b>	<b>24</b>
<b>3.0</b>	<b>FUNCTIONAL REQUIREMENTS .....</b>	<b>25</b>
<b>3.1</b>	<b>Position Estimation Requirements.....</b>	<b>25</b>
3.1.1	Estimate of Position.....	25
3.1.1.1	RNP RNAV .....	25
3.1.1.2	VNAV .....	25
3.1.2	Estimate of Position Uncertainty (EPU).....	25
3.1.3	Containment Radius .....	26
3.1.4	Position Estimation Effects on System Compliance .....	26
3.1.4.1	Effect on System Accuracy Compliance.....	26
3.1.4.2	Effect on System Containment Compliance .....	26
<b>3.2</b>	<b>Path Definition Requirements.....</b>	<b>27</b>

3.2.1	Flight Path Legs Developed from the Navigation Database .....	27
3.2.1.1	Navigation Database Flight Path Legs for Terminal Area Procedures .....	27
3.2.1.2	Navigation Database Flight Path Legs for Airways.....	28
3.2.2	Flight Path Legs Developed from User-Defined Data .....	28
3.2.2.1	Fix-by-Fix Entered Routes.....	28
3.2.2.2	Insertion of Along-Track Reference Points into an Existing Route .....	28
3.2.3	Leg Definition .....	28
3.2.3.1	Initial Fix (IF) .....	28
3.2.3.1.1	VNAV .....	28
3.2.3.2	Track to Fix (TF) .....	29
3.2.3.2.1	VNAV .....	29
3.2.3.3	Radius to Fix (RF) .....	29
3.2.3.3.1	VNAV .....	30
3.2.3.4	Hold to Altitude (HA).....	30
3.2.3.5	Hold for Clearance (HM).....	30
3.2.3.6	Hold to Fix (HF) .....	31
3.2.3.7	Fix to Altitude (FA).....	31
3.2.3.7.1	VNAV .....	31
3.2.3.8	Direct To Fix (DF).....	31
3.2.3.8.1	VNAV .....	32
3.2.3.9	Course To Fix (CF).....	32
3.2.3.9.1	VNAV .....	33
3.2.4	Special Operations.....	33
3.2.4.1	Holding .....	33
3.2.4.1.1	RNP Holding Area Dimension .....	33
3.2.4.1.2	RNP Holding Area Entry Procedures.....	36
3.2.4.1.3	RNP Holding Area Exit Procedures .....	37
3.2.4.2	Direct-To Function.....	37
3.2.4.3	Parallel Offsets.....	37
3.2.5	Error Terms .....	38
3.2.5.1	Earth Model .....	38
3.2.5.2	Magnetic Variation .....	38
3.2.5.3	Data Resolution .....	39
3.2.5.3.1	Coordinate Resolution .....	39
3.2.5.3.2	Turn Radius Resolution.....	39
3.2.5.3.3	Course Resolution .....	40
3.2.5.3.4	Magnetic Variation Resolution .....	40
3.2.5.3.5	Altitude/Height Resolution.....	40
3.2.5.4	Transitions Between Legs.....	40
3.2.5.4.1	Fly-By Transitions.....	41
3.2.5.4.2	Fixed-Radius Transitions .....	43
3.2.6	Applicable RNP RNAV Type .....	43
3.2.6.1	RNP RNAV Type Associated with a Flight Plan Leg .....	43
3.2.6.2	RNP-(x) RNAV Associated with a Transition.....	44
3.2.7	Prohibited Leg Types .....	44
3.2.8	Vertical Path Definition.....	45
3.2.8.1	Altitude Restrictions .....	45
3.2.8.2	Speed Restrictions.....	45
3.2.8.3	Climb .....	45
3.2.8.4	Descent and Approach .....	45

3.2.8.4.1	Descent Path Construction .....	46
3.2.8.4.2	Geometric Point to Point (GPP) Paths.....	47
3.2.8.4.3	Flight Path Angle Paths .....	48
3.2.8.5	VNAV Path Transitions .....	49
3.2.8.6	Temperature Compensation .....	51
<b>3.3</b>	<b>Path Steering Requirements .....</b>	<b>52</b>
3.3.1	RNP RNAV .....	52
3.3.2	VNAV .....	53
<b>3.4</b>	<b>Estimated Time of Arrival.....</b>	<b>53</b>
3.4.1	Equipment Requirements .....	53
3.4.2	Operational Considerations .....	54
<b>3.5</b>	<b>Time of Arrival Control.....</b>	<b>54</b>
3.5.1	Equipment Requirements .....	54
3.5.2	Operational Considerations .....	54
<b>3.6</b>	<b>User Interface Requirements.....</b>	<b>54</b>
3.6.1	General .....	54
3.6.2	Displays and Controls .....	54
<b>3.7</b>	<b>System Features and Capabilities .....</b>	<b>56</b>
3.7.1	Initialization Capability .....	56
3.7.1.1	Position Initialization .....	56
3.7.1.1.1	Equipment Requirements .....	56
3.7.1.1.2	Operational Considerations .....	56
3.7.1.2	Performance Initialization.....	56
3.7.1.2.1	Equipment Requirements .....	56
3.7.1.2.2	VNAV and TOAD Operational Considerations .....	56
3.7.1.3	Time Initialization.....	57
3.7.1.3.1	Equipment Requirements .....	57
3.7.1.3.2	Operational Considerations .....	57
3.7.2	Path Selection.....	57
3.7.2.1	Flight Planning.....	57
3.7.2.1.1	General Flight Planning.....	57
3.7.2.1.1.1	Equipment Requirements.....	57
3.7.2.1.1.2	VNAV Equipment Requirements .....	57
3.7.2.1.1.3	Operational Considerations .....	58
3.7.2.1.2	User-Defined Fixes.....	59
3.7.2.1.2.1	Equipment Requirements.....	59
3.7.2.1.2.2	Operational Considerations .....	59
3.7.2.1.3	Selection of RNP RNAV Type .....	59
3.7.2.1.3.1	Equipment Requirements.....	59
3.7.2.1.3.2	Operational Considerations .....	59
3.7.2.1.4	Fix Sequencing.....	59
3.7.2.1.4.1	Equipment Requirements.....	59
3.7.2.1.4.2	Operational Considerations .....	60
3.7.2.2	Special Operations .....	60
3.7.2.2.1	Direct-To .....	60
3.7.2.2.1.1	Equipment Requirements.....	60

3.7.2.2.1.2	VNAV Equipment Requirements .....	60
3.7.2.2.1.3	Operational Considerations .....	60
3.7.2.2.2	User-Defined Course-to-a-Fix .....	60
3.7.2.2.2.1	Equipment Requirements.....	60
3.7.2.2.2.2	Operational Considerations .....	60
3.7.2.2.3	Holding.....	60
3.7.2.2.3.1	Equipment Requirements.....	60
3.7.2.2.3.2	Operational Considerations .....	60
3.7.2.2.4	Parallel Offsets .....	61
3.7.2.2.4.1	Equipment Requirements.....	61
3.7.2.2.4.2	Operational Considerations .....	61
3.7.2.2.5	Temperature Compensation.....	62
3.7.2.2.5.1	VNAV Equipment Requirements .....	62
3.7.2.2.5.2	VNAV Operational Considerations .....	62
3.7.3	Navigation Aid Selection .....	62
3.7.3.1	Equipment Requirements .....	62
3.7.3.2	Operational Considerations.....	62
3.7.4	Path Steering .....	63
3.7.4.1	Equipment Requirements.....	63
3.7.4.2	Operational Considerations.....	63
3.7.5	Displays/Status .....	63
3.7.5.1	Flight Progress .....	63
3.7.5.1.1	Equipment Requirements .....	63
3.7.5.1.2	VNAV Equipment Requirements .....	64
3.7.5.1.3	Operational Considerations .....	65
3.7.5.1.4	VNAV Operational Considerations.....	65
3.7.5.2	Navigation Data .....	66
3.7.5.2.1	Equipment Requirements .....	66
3.7.5.2.2	VNAV Equipment Requirements.....	66
3.7.5.2.3	Operational Considerations .....	66
3.7.5.2.4	VNAV Operational Considerations.....	66
3.7.5.3	Navigation Modes and Performance.....	67
3.7.5.3.1	Equipment Requirements .....	67
3.7.5.3.2	VNAV Equipment Requirements.....	67
3.7.5.3.3	Operational Considerations .....	67
3.7.5.3.4	VNAV Operational Considerations.....	67
3.7.6	Alerting.....	67
3.7.6.1	Equipment Requirements.....	67
3.7.6.2	VNAV Equipment Requirements .....	68
3.7.6.3	Operational Considerations.....	68
3.7.6.4	VNAV Operational Considerations .....	68
3.7.7	Estimated Time of Arrival.....	69
3.7.7.1	Equipment Requirements.....	69
3.7.7.2	Operational Considerations.....	69
3.7.8	Time of Arrival Control .....	69
3.7.8.1	Equipment Requirements.....	69
3.7.8.2	Operational Considerations.....	69
3.8	<b>Navigation Database Requirements.....</b>	<b>69</b>
3.8.1	Content .....	69

3.8.2	Access.....	70
3.8.3	Database Standard .....	70
<b>3.9</b>	<b>Datalink Interface.....</b>	<b>70</b>
<b>3.10</b>	<b>Enhanced Navigation Display Interface.....</b>	<b>70</b>
<b>4.0</b>	<b>NAVIGATION SYSTEM PERFORMANCE EVALUATION.....</b>	<b>71</b>
<b>4.1</b>	<b>General .....</b>	<b>71</b>
4.1.1	Certification and Process Basis .....	71
4.1.2	Navigation Accuracy and Containment Compliance .....	71
<b>4.2</b>	<b>Performance Accuracy Compliance .....</b>	<b>74</b>
4.2.1	Lateral Performance .....	74
4.2.2	Vertical Performance.....	75
4.2.3	Time of Arrival Control Performance .....	75
<b>4.3</b>	<b>General Containment Compliance.....</b>	<b>76</b>
4.3.1	Containment Integrity.....	76
4.3.2	Containment Continuity .....	76
<b>4.4</b>	<b>Containment Integrity and Continuity Evaluation .....</b>	<b>77</b>
4.4.1	System Development Evaluation and System Monitoring.....	77
4.4.1.1	System Development .....	77
4.4.1.2	System Monitoring.....	78
4.4.2	Failure Analysis Description .....	78

## Membership

## Appendices

Appendix A	Glossary of Terms
Appendix B	Example System Compliance Analysis
Appendix C	Navigation System Requirements and Infrastructure Characteristics
Appendix D	RNP RNAV Assessment Criteria for Existing Aircraft
Appendix E	Holding Pattern Entry Example
Appendix F	CNS-ATM System Considerations
Appendix G	RNP RNAV/VNAV/TOAC Requirements Cross Reference
Appendix H	Temperature Compensation Information
Appendix I	RNP RNAV Less Than 0.3 NM

## Table of Figures

<u>FIGURE 1-1</u>	Navigation System Block Diagram .....	3
<u>FIGURE 1-2</u>	Lateral Components of Navigation Error Terms .....	14
<u>FIGURE 1-3</u>	Vertical Components of Navigation Error Terms .....	15
<u>FIGURE 1-4</u>	Cross-Track Containment Parameters .....	16
<u>FIGURE 1-5</u>	Navigation System Operational States .....	17
<u>FIGURE 1-6</u>	Position Estimation Performance Measures .....	18
<u>FIGURE 1-7</u>	Vertical Path Performance Limit .....	19
<u>FIGURE 3-1</u>	Track to Fix (TF) Leg.....	29
<u>FIGURE 3-2</u>	Radius to Fix (RF) Leg.....	30
<u>FIGURE 3-3</u>	Fix to Altitude (FA) Leg .....	31
<u>FIGURE 3-4</u>	Direct to Fix (DF) Leg.....	32
<u>FIGURE 3-5</u>	Course to Fix (CF) Leg .....	32
<u>FIGURE 3-6</u>	Holding Pattern Definition .....	35
<u>FIGURE 3-7</u>	Offset Path Definition .....	38
<u>FIGURE 3-8</u>	Fly-By Theoretical Transition Area .....	42
<u>FIGURE 3-9</u>	Fixed Radius Transition .....	43
<u>FIGURE 3-10</u>	Descent Path Permitted by Two "WINDOW" Constraints, Two "AT" Constraints and Cruise Altitude .....	46
<u>FIGURE 3-11</u>	Descent Path defined by AT constraints and a Cruise Altitude .....	48
<u>FIGURE 3-12</u>	Waypoint with Vertical Constraint.....	49
<u>FIGURE 3-13</u>	Fly-By Transition .....	49
<u>FIGURE 4.1-1</u>	System Development and Safety Assessment Processes.....	72
<u>FIGURE 4.1-2</u>	System Validation Processes .....	73
<u>FIGURE 4-2</u>	Top Level Navigation Fault Tree .....	80
<u>FIGURE B-1</u>	Single System Fault Diagram.....	B-7
<u>FIGURE B-2</u>	Dual System Fault Diagram .....	B-8
<u>FIGURE D-1</u>	Example of Fly-Over Transition Area (Low Altitude Only).....	D-11
<u>FIGURE E-1</u>	Holding Entry Sectors .....	E-2
<u>FIGURE E-2</u>	Sector 1 Entry Procedure.....	E-3
<u>FIGURE E-3</u>	Sector 2 Entry Procedure.....	E-4
<u>FIGURE E-4</u>	Sector 3 Entry Procedure.....	E-5
<u>FIGURE E-5</u>	Sector 4 Entry Procedure.....	E-6
<u>FIGURE H-1</u>	Example of Transition from Uncompensated Approach Transition to Compensated Final Approach Path .....	H-2
<u>FIGURE H-2</u>	Example of Transition from Uncompensated Altitude to Compensated Approach Path	H-3

## Table of Tables

<u>Table 1-1</u>	RNP RNAV Applicability.....	8
<u>Table 2-1</u>	Vertical Path Performance Limit for Vertical Navigation.....	21
<u>Table 3-1</u>	Maximum Holding Airspeeds (KIAS) .....	36
<u>Table 3-2</u>	Error Terms .....	38
<u>Table 3-3</u>	Example of Vertical Height Lost for Fly-By.....	50
<u>Table 3-4</u>	Display/Entry Resolutions.....	55
<u>Table 3-5</u>	Non-Numeric Display Requirements .....	64
<u>Table 4-1</u>	Containment Characterization of Navigation System .....	81
<u>Table B-1</u>	Assumptions .....	B-3
<u>Table B-2</u>	Analysis Results Summary.....	B-6
<u>Table C-1</u>	Maximum VOR Ranges .....	C-2
<u>Table C-2</u>	Maximum DME Ranges.....	C-2
<u>Table D-1</u>	System Accuracies .....	D-2
<u>Table D-2</u>	Vertical Total System Error .....	D-3
<u>Table D-3</u>	Current Required Features and Capabilities.....	D-6
<u>Table D-4</u>	Required in Existing Systems but not by MASPS .....	D-7
<u>Table D-5</u>	MASPS but not in Current Required Features and Capabilities .....	D-8

## **1.0 PURPOSE AND SCOPE**

### **1.1 Introduction**

The International Civil Aviation Organization (ICAO) has recognized a need for dramatic improvements to the existing air navigation system. An ICAO Special Committee of Future Air Navigation Systems (FANS) developed a new concept expressed in terms of communication, navigation, surveillance and air traffic management (CNS/ATM). It is intended to be an evolutionary means of achieving improvements in the global air navigation system. To obtain the benefits of the CNS/ATM concept, aircraft will need to achieve accurate, repeatable and predictable navigation performance. This is referred to as Required Navigation Performance (RNP).

This document contains Minimum Aviation System Performance Standards (MASPS) for area navigation systems operating in an RNP environment. These standards are intended for designers, manufacturers, and installers of avionics equipment, service providers and users of these systems for world-wide operations. The MASPS provides guidance for the development of airspace and operational procedures needed to obtain the benefits of improved navigation capability.

The requirements of this MASPS are intended to meet the definitions of RNP developed by the ICAO Review of the General Concept of Separation Panel (RGCSP) while providing increased integrity with repeatable and predictable navigation. In addition, barometric vertical navigation (VNAV) requirements are defined for aircraft that provide the capability to ensure accurate and predictable vertical paths. The VNAV requirements in this document are consistent with but may not be sufficient for instrument approach procedures with vertical guidance (IPV). Due to the wide disparity of climb performance of different aircraft types, this MASPS only addresses vertical path definition requirements for level flight and descent. Finally, optional requirements for estimated time of arrival (ETA) and time of arrival control (TOAC) functions are defined for systems that provide these functions.

Compliance with these standards is one means of ensuring that the system and each subsystem will perform its intended function(s) satisfactorily under conditions normally encountered in aeronautical operations. The MASPS, when applied by regulatory authorities, are expected to provide the benefits of the listed applications in section 1.3.

Section 1.0 of this document describes minimum navigation performance functions, operational goals, and applications needed to operate in RNP RNAV airspace. It also includes the assumptions made within the MASPS for defining the airborne requirements.

RNP RNAV airspace may be considered to apply to an area, route, procedure or operation using a particular RNP RNAV type. The functions are described for position estimation, path definition and steering, and user interface.

Section 2.0 describes the minimum system performance requirements.

Section 3.0 describes minimum performance standards for each subsystem/function that is a required element of minimum system performance.

Section 4.0 describes an acceptable method for demonstrating system performance compliance and subsystem performance to meet the minimum standards in Section 2.0.

The appendices in the MASPS include a glossary of terms and acronyms (A), an example of system compliance analysis (B), navigation system requirements and infrastructure characteristics