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USA

Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment

**(Change 1, Appendix V,
Integrated and Highlighted)**

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FOREWORD

This document was prepared by Special Committee 159 (SC-159) and approved by the RTCA Program Management Committee on February 1, 2013.

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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

1.0	PURPOSE AND SCOPE	1
1.1	Introduction	1
1.2	System Overview	3
1.2.1	Wide Area Augmentation System.....	3
1.2.2	GNSS Satellite Signal Characteristics.....	4
1.2.2.1	GPS Signal Characteristics.....	4
1.2.2.2	WAAS Signal Characteristics.....	5
1.3	Operational Goals	6
1.3.1	Intended Operational Applications.....	6
1.3.2	Operational Environment.....	6
1.3.3	International Compatibility.....	7
1.4	Equipment Classes	8
1.4.1	Functional Classes.....	8
1.4.2	Operational Classes.....	9
1.4.3	Relation of Classes to Document Organization.....	10
1.5	Aiding and Barometric Vertical Navigation	11
1.5.1	SBAS and Barometric Vertical Navigation.....	11
1.5.2	Aiding of Fault Detection and Exclusion.....	12
1.6	Test Considerations	12
1.6.1	Environmental Tests.....	12
1.6.2	Bench Tests.....	12
1.7	Definition of Key Terms	13
1.7.1	General Terms.....	13
1.7.2	Alert Limits and Protection Levels.....	14
1.7.3	Fault Detection and Exclusion (FDE) Terms.....	15
1.8	Assumptions and Approach to Selected Issues	20
1.8.1	General.....	20
1.8.1.1	GPS Constellation and WAAS/SBAS Ground/Space Segments.....	20
1.8.1.2	GPS/SBAS Performance.....	20
1.8.1.3	Applicability.....	21
1.8.1.4	Interoperability.....	21
1.8.1.5	Integrity Monitoring.....	21
1.8.1.6	Navigational Waypoints.....	21
1.8.1.7	RF Interference.....	22
1.8.1.8	Time of Applicability of Information in the SBAS Signal-in-Space.....	22
1.8.1.9	Change of Broadcast Ephemeris.....	22
1.8.1.10	SBAS Regional Message Type (Message Type 27 and 28).....	22
1.8.2	Approach Applications.....	22
1.8.2.1	SBAS Performance for Approaches.....	22
1.8.2.2	Approach Path-in-Space.....	23
1.8.2.3	LNAV/VNAV, LP, LPV Approach Position Integrity.....	23
1.8.2.4	Vector-to-Final (VTF) Approach.....	24
2.0	EQUIPMENT PERFORMANCE AND TEST PROCEDURES	25
2.1	General Requirements	25
2.1.1	Requirements Applicable to Beta, Gamma, and Delta Equipment.....	25
2.1.1.1	General Requirements for All Navigation Modes.....	25
2.1.1.1.1	Airworthiness.....	25

2.1.1.1.2	General Performance	25
2.1.1.1.3	Fire Resistance	25
2.1.1.1.4	Equipment Interfaces	25
2.1.1.1.5	Effects of Test	25
2.1.1.2	GPS Signal Processing Requirements	26
2.1.1.3	SBAS Signal Processing Requirements	26
2.1.1.3.1	Acquisition and Track	26
2.1.1.3.2	Demodulation and Forward Error Correction (FEC) Decoding	27
2.1.1.3.3	SBAS Satellite Pseudorange Determination	27
2.1.1.4	SBAS Message Processing	27
2.1.1.4.1	Message Type 0 - Don't Use for Safety Applications	28
2.1.1.4.2	Message Type 1 - PRN Mask Assignments	28
2.1.1.4.3	Message Types 2-5 and 24 - Fast Corrections	28
2.1.1.4.4	Message Type 6 - Integrity Information	29
2.1.1.4.5	Message Type 7 - Fast Correction Degradation	30
2.1.1.4.6	Message Type 9 - SBAS Satellite Navigation Message	30
2.1.1.4.7	Message Type 17 - SBAS Satellite Almanac	30
2.1.1.4.8	Message Type 27 - SBAS Service Message	30
2.1.1.4.9	Message Timeout Periods	30
2.1.1.4.10	Combining Data from Separate Broadcasts	32
2.1.1.4.11	Message Type 24 and 25 Long-Term Corrections	32
2.1.1.4.12	Application of Differential Corrections	33
2.1.1.4.13	Message Type 28 - Clock-Ephemeris Covariance Matrix Message	34
2.1.1.5	Satellite Integrity Status	34
2.1.1.5.1	Step Detector	34
2.1.1.5.2	SBAS UNHEALTHY Designation	35
2.1.1.5.3	SBAS UNMONITORED Designation	35
2.1.1.5.4	SBAS HEALTHY Designation	35
2.1.1.5.5	GPS UNHEALTHY Designation	36
2.1.1.5.6	GPS HEALTHY Designation	36
2.1.1.6	Satellite Selection	36
2.1.1.7	Initial Acquisition Time	37
2.1.1.8	Satellite Acquisition Time	38
2.1.1.8.1	GPS Satellite Acquisition Time	38
2.1.1.8.2	SBAS Satellite Acquisition Time	38
2.1.1.9	Satellite Reacquisition Time	38
2.1.1.10	Sensitivity and Dynamic Range	39
2.1.1.11	Equipment Burnout Protection	40
2.1.1.12	Integrity in the Presence of Interference	41
2.1.1.13	Alerts/Outputs	41
2.1.1.13.1	Protection Level	41
2.1.1.13.2	Navigation Alert	42
2.1.2	Requirements for En Route and Terminal Mode	42
2.1.2.1	Accuracy	42
2.1.2.2	Integrity Requirements	42
2.1.2.2.1	Development Assurance	42
2.1.2.2.1.1	Hardware Compliance	43
2.1.2.2.1.2	Software Compliance	43
2.1.2.2.2	Integrity Monitoring	43
2.1.2.2.2.1	SBAS-Provided Integrity Monitoring	43
2.1.2.2.2.2	FDE-Provided Integrity Monitoring	43
2.1.2.2.2.2.1	Time-to-Alert	45
2.1.2.2.2.2.2	Missed Alert Probability	45
2.1.2.2.2.2.3	False Alert Probability	45
2.1.2.2.2.2.4	Failed Exclusion Probability	45
2.1.2.2.2.2.5	Availability	46

2.1.2.3	Equipment Reliability	46
2.1.2.4	Satellite Tracking Capability.....	46
2.1.2.5	Dynamic Tracking.....	46
2.1.2.6	Position Output	47
2.1.2.6.1	Position Output Data Update Rate	47
2.1.2.6.2	Position Output Data Latency	47
2.1.3	Requirements for LNAV	47
2.1.3.1	Accuracy	47
2.1.3.2	Integrity Requirements	47
2.1.3.2.1	Development Assurance	47
2.1.3.2.1.1	Hardware Compliance	47
2.1.3.2.1.2	Software Compliance.....	48
2.1.3.2.2	Integrity Monitoring.....	48
2.1.3.2.2.1	SBAS-Provided Integrity Monitoring.....	48
2.1.3.2.2.2	FDE-Provided Integrity Monitoring	48
2.1.3.2.2.2.1	Time-to-Alert	48
2.1.3.2.2.2.2	Missed Alert Probability	48
2.1.3.2.2.2.3	False Alert Probability	48
2.1.3.2.2.2.4	Failed Exclusion Probability	48
2.1.3.2.2.2.5	Availability.....	48
2.1.3.2.2.3	FD Prediction	49
2.1.3.3	Equipment Reliability	49
2.1.3.4	Satellite Tracking Capability.....	49
2.1.3.5	Dynamic Tracking.....	49
2.1.3.6	Position Output	50
2.1.3.6.1	Position Output Update Rate	50
2.1.3.6.2	Position Output Latency.....	50
2.1.3.7	SBAS Message Processing.....	50
2.1.3.8	Application of Differential Correction Terms	50
2.1.3.9	Satellite Selection.....	50
2.1.4	Requirements for LNAV/VNAV Operations	50
2.1.4.1	Accuracy	50
2.1.4.1.1	Smoothing.....	50
2.1.4.1.2	Measurement Quality Monitoring	51
2.1.4.1.3	Accuracy	52
2.1.4.1.4	GPS Satellites	52
2.1.4.1.5	SBAS Satellites.....	53
2.1.4.1.6	Position Solution.....	53
2.1.4.2	Integrity Requirements	53
2.1.4.2.1	Development Assurance	53
2.1.4.2.1.1	Hardware Compliance	53
2.1.4.2.1.2	Software Compliance.....	53
2.1.4.2.2	Integrity Monitoring.....	53
2.1.4.2.2.1	SBAS-Provided Integrity Monitoring.....	54
2.1.4.2.2.2	Fault Detection-Provided Integrity Monitoring	54
2.1.4.2.2.2.1	Frequency of Fault Detection	54
2.1.4.2.2.2.2	Missed Alert.....	54
2.1.4.2.2.2.3	False Alert.....	54
2.1.4.2.2.2.4	Availability.....	54
2.1.4.3	Equipment Reliability	54
2.1.4.4	Satellite Tracking Capability.....	55
2.1.4.5	Tracking Constraints	55
2.1.4.5.1	GPS Tracking Constraints.....	55
2.1.4.5.2	SBAS Tracking Constraints	57
2.1.4.6	Correlation Peak Validation.....	58
2.1.4.7	Dynamic Tracking.....	58

2.1.4.8	Position Output	59
2.1.4.8.1	Position Output Update Rate	59
2.1.4.8.2	Position Output Latency.....	59
2.1.4.9	SBAS Message Processing.....	59
2.1.4.9.1	Message Type 2-5, 6 and 24 Fast Corrections	59
2.1.4.9.2	Message Types 24 and 25 Long-Term Corrections	59
2.1.4.9.3	Message Type 18 - Ionospheric Grid Point Masks	59
2.1.4.9.4	Message Type 26 - Ionospheric Grid Point Delays.....	59
2.1.4.9.5	Message Types 7 and 10 - Degradation Parameters	59
2.1.4.10	Application of Differential Correction Terms	60
2.1.4.10.1	Application of Clock and Ephemeris Corrections.....	60
2.1.4.10.2	Application of Ionospheric Corrections	60
2.1.4.10.3	Application of Tropospheric Corrections	60
2.1.4.11	Satellite Selection.....	60
2.1.4.12	Alerts/Outputs/Inputs	61
2.1.4.12.1	Protection Level.....	61
2.1.4.12.2	Navigation Alert	61
2.1.5	Requirements for LPV and LP Approach Operations	62
2.1.5.1	Accuracy	62
2.1.5.2	Integrity Requirements	62
2.1.5.2.1	Development Assurance	62
2.1.5.2.1.1	Hardware Compliance	62
2.1.5.2.1.2	Software Compliance.....	62
2.1.5.2.2	Integrity Monitoring.....	62
2.1.5.2.2.1	SBAS-Provided Integrity Monitoring.....	63
2.1.5.2.2.2	Fault Detection-Provided Integrity Monitoring	63
2.1.5.2.2.2.1	Frequency of Fault Detection	63
2.1.5.2.2.2.2	Missed Alert.....	63
2.1.5.2.2.2.3	False Alert.....	63
2.1.5.2.2.2.4	Availability.....	63
2.1.5.3	Equipment Reliability	63
2.1.5.4	Satellite Tracking Capability.....	64
2.1.5.5	Tracking Constraints	64
2.1.5.5.1	GPS Tracking Constraints.....	64
2.1.5.5.2	SBAS Tracking Constraints	64
2.1.5.6	Correlation Peak Validation	64
2.1.5.7	Dynamic Tracking.....	64
2.1.5.8	Position Output	64
2.1.5.8.1	Position Output Update Rate	64
2.1.5.8.2	Position Output Latency.....	64
2.1.5.9	SBAS Message Processing.....	65
2.1.5.9.1	Message Type 2-5, 6 and 24 Fast Corrections	65
2.1.5.9.2	Message Types 24 and 25 Long-Term Corrections	65
2.1.5.9.3	Message Type 18 - Ionospheric Grid Point Masks	65
2.1.5.9.4	Message Type 26 - Ionospheric Grid Point Delays.....	65
2.1.5.9.5	Message Types 7 and 10 - Degradation Parameters	65
2.1.5.10	Application of Differential Correction Terms	65
2.1.5.11	Satellite Selection.....	65
2.1.5.12	Alerts/Outputs/Inputs	65
2.1.5.12.1	Protection Level.....	65
2.1.5.12.2	Navigation Alert	66
2.1.5.13	HPL and VPL Prediction	66
2.2	Class Gamma Requirements.....	67
2.2.1	Class Gamma General Requirements.....	67
2.2.1.1	General Human Factors Requirements and Applicable Documents	67
2.2.1.1.1	Controls	68

2.2.1.1.1.1	Operation	68
2.2.1.1.1.2	Control Labels	68
2.2.1.1.2	Equipment Operating Procedures	68
2.2.1.1.3	Minimum Workload Functions	68
2.2.1.1.4	Displays	70
2.2.1.1.4.1	Discernability	70
2.2.1.1.4.2	Brightness, Contrast, and Color	71
2.2.1.1.4.3	Angle of Regard	71
2.2.1.1.4.4	Symbology	71
2.2.1.1.4.5	Alphanumerics	71
2.2.1.1.4.6	Moving Map	73
2.2.1.1.4.7	Primary Navigation Display	73
2.2.1.1.4.8	Bearing Labels	73
2.2.1.1.5	Annunciations	73
2.2.1.1.5.1	Annunciators	74
2.2.1.1.5.2	Messages	74
2.2.1.1.6	Set of Standard Function Labels	74
2.2.1.1.7	Set of Standard Abbreviations and Acronyms	75
2.2.1.2	Path Selection	78
2.2.1.2.1	Flight Plan Selection	78
2.2.1.2.2	Flight Plan Review	78
2.2.1.2.3	Flight Plan Activation	79
2.2.1.2.4	Waypoint Sequencing	79
2.2.1.2.5	Manually-Selected Active Waypoint	79
2.2.1.2.5.1	Direct To	79
2.2.1.2.5.2	TO/FROM Course Selection	79
2.2.1.2.5.3	Manually-Selected Waypoint and Waypoint Sequencing	80
2.2.1.2.6	User-Defined Waypoints	80
2.2.1.2.7	Emergency Procedures	80
2.2.1.3	Path Definition	80
2.2.1.3.1	Initial Fix (IF)	81
2.2.1.3.2	Fixed Waypoint to a Fixed Waypoint (TF)	81
2.2.1.3.3	DME Arcs (AF) and Constant Radius to a Fix (RF)	81
2.2.1.3.4	Direct To (DF)	82
2.2.1.3.5	Course to a Fix Waypoint (CF)	83
2.2.1.3.6	FROM Leg	83
2.2.1.3.7	Fly-By Turns	83
2.2.1.3.7.1	Fly-By Turn Indications	84
2.2.1.3.7.2	Fly-By Theoretical Transition Area	84
2.2.1.3.7.3	Acceptable Means of Defining Fly-By Turns	85
2.2.1.3.8	Fly Over Turns	86
2.2.1.3.9	Fixed Radius Turns	86
2.2.1.3.10	Waypoint Sequencing	86
2.2.1.3.11	Holding Patterns / Procedure Turns	87
2.2.1.3.12	Magnetic Course	88
2.2.1.3.13	Dead Reckoning	88
2.2.1.3.14	Fuel Management and Alerting	88
2.2.1.3.15	Geodesic Path Computation Accuracy	89
2.2.1.3.16	Parallel Offsets	89
2.2.1.4	Navigation Displays	90
2.2.1.4.1	Primary Navigation Display	90
2.2.1.4.2	Non-Numeric Display/Output Characteristics	90
2.2.1.4.2.1	Electrical Output	90
2.2.1.4.2.2	Display	91
2.2.1.4.3	Active Waypoint Distance Display	91
2.2.1.4.4	Active Waypoint Bearing Display	91

2.2.1.4.5	Track Displays	92
2.2.1.4.5.1	Desired Track	92
2.2.1.4.5.2	Track Angle	92
2.2.1.4.5.3	Track Angle Error	92
2.2.1.4.6	Display of TO or FROM Operation	92
2.2.1.4.7	Waypoint Bearing/Distance Display	92
2.2.1.4.8	Estimate of Position Uncertainty	92
2.2.1.4.9	Magnetic Course	92
2.2.1.4.10	Ground Speed	92
2.2.1.4.11	Aircraft Present Position	93
2.2.1.5	Database Requirements	93
2.2.1.5.1	Access	93
2.2.1.5.2	Content	93
2.2.1.5.3	Database Standard	94
2.2.1.5.4	Reference Coordinate System	94
2.2.1.5.4.1	Incorporation of Conversion Algorithms	94
2.2.1.5.4.2	Operational Approval	94
2.2.1.6	Alerts/Outputs	95
2.2.1.6.1	Caution Associated with Loss of Integrity Monitoring	95
2.2.1.6.2	Caution Associated with Loss of Navigation	95
2.2.1.7	Mode Switching Requirements	95
2.2.2	Class Gamma Requirements for En Route / Terminal Operation	99
2.2.2.1	General Human Factors Requirements	99
2.2.2.2	Path Selection	99
2.2.2.3	Path Definition	99
2.2.2.4	Navigation Displays	99
2.2.2.4.1	Primary Navigation Displays	99
2.2.2.4.2	Non-Numeric Cross-Track Deviation	100
2.2.2.4.3	Numeric Cross-Track Deviation	100
2.2.2.4.4	Displayed Data Update Rate	100
2.2.2.4.5	Display Update Latency	100
2.2.2.5	Database Requirements	100
2.2.2.6	Alerts	100
2.2.2.6.1	Alert Limits	100
2.2.2.6.2	Caution Associated with Loss of Integrity Monitoring	100
2.2.2.6.3	Caution Associated with Loss of Navigation	101
2.2.2.7	En Route / Terminal Mode Switching Requirements	101
2.2.2.7.1	En Route Mode Switching Requirements	101
2.2.2.7.1.1	Entry Criteria	101
2.2.2.7.1.2	Exit Criteria	102
2.2.2.7.1.3	Display Transition Requirements	102
2.2.2.7.2	Terminal Mode Switching Requirements	102
2.2.2.7.2.1	Entry Criteria	102
2.2.2.7.2.2	Exit Criteria	102
2.2.2.7.2.3	Display Transition Requirements	102
2.2.3	Class Gamma Requirements for LNAV Approach Operation	102
2.2.3.1	General Human Factors Requirements	102
2.2.3.2	Path Selection	102
2.2.3.2.1	Approach Selection	103
2.2.3.2.2	Missed Approach Sequencing	103
2.2.3.3	Path Definition	103
2.2.3.3.1	Approach Path Definition	103
2.2.3.3.2	Missed Approach Path Definition	105
2.2.3.3.3	Departure Path Definition	106
2.2.3.3.4	Vertical Path for LNAV Procedures	106
2.2.3.4	Navigation Displays	107

2.2.3.4.1	Primary Navigation Displays	107
2.2.3.4.2	Non-Numeric Cross-Track Deviation	107
2.2.3.4.3	Numeric Cross-Track Deviation	107
2.2.3.4.4	Missed Approach Waypoint Distance Display	108
2.2.3.4.5	Missed Approach Waypoint Bearing Display	108
2.2.3.4.6	Displayed Data Update Rate	108
2.2.3.4.7	Display Update Latency	108
2.2.3.5	Database Requirements	108
2.2.3.6	Alerts	109
2.2.3.6.1	Alert Limits	109
2.2.3.6.2	Caution Associated with Loss of Integrity Monitoring	109
2.2.3.6.3	Caution Associated with Loss of Navigation	109
2.2.3.7	Mode Switching Requirements	110
2.2.3.7.1	LNAV Approach Mode Switching Requirements	110
2.2.3.7.1.1	Entry Criteria	110
2.2.3.7.1.2	Exit Criteria	110
2.2.3.7.1.3	Display Transition Requirements	110
2.2.3.7.2	Departure Requirements	111
2.2.3.7.2.1	Entry Criteria	111
2.2.3.7.2.2	Exit Criteria	111
2.2.3.7.2.3	Display Transition Requirements	111
2.2.4	Class Gamma Requirements for LNAV/VNAV Operations	111
2.2.4.1	General Human Factors Requirements	111
2.2.4.2	Path Selection	111
2.2.4.2.1	5-Digit Channel Selection	111
2.2.4.2.2	Approach Selection	112
2.2.4.2.3	Missed Approach Sequencing	112
2.2.4.2.4	Deselection of Vertical Guidance	112
2.2.4.3	Path Definition	112
2.2.4.3.1	Approach Path Definition	112
2.2.4.3.2	Missed Approach Path Definition	113
2.2.4.3.3	Navigation Center Offset	113
2.2.4.4	Navigation Displays	113
2.2.4.4.1	Primary Navigation Displays	113
2.2.4.4.2	Non-Numeric Lateral Cross-Track Deviation	114
2.2.4.4.2.1	Definition of Final Approach Segment Lateral deviations	114
2.2.4.4.2.2	Non-VTF Deviation with FAS Data Block	114
2.2.4.4.2.3	VTF Deviation with FAS Data Block	115
2.2.4.4.2.4	Deviation without FAS Data Block	115
2.2.4.4.2.5	Missed Approach Deviation	115
2.2.4.4.3	Numeric Lateral Cross-Track Deviation	116
2.2.4.4.4	Non-Numeric Vertical Deviation	116
2.2.4.4.5	Missed Approach Waypoint/LTP/FTP Distance Display	118
2.2.4.4.6	Missed Approach Waypoint/LTP/FTP Bearing Display	118
2.2.4.4.7	Displayed Data Update Rate	118
2.2.4.4.8	Display Update Latency	119
2.2.4.4.9	Display of Vertical Accuracy	119
2.2.4.5	Database Requirements	119
2.2.4.5.1	Content	119
2.2.4.5.2	Data Integrity	120
2.2.4.6	Alerts	120
2.2.4.6.1	Alert Limits	120
2.2.4.6.2	Caution Associated with Loss of Integrity Monitoring	120
2.2.4.6.3	Caution Associated with Loss of Navigation	121
2.2.4.6.4	Low Altitude Alert	122
2.2.4.6.5	Alerting Scheme	122

2.2.4.7	LNAV/VNAV Approach Mode Switching Requirements	122
2.2.4.7.1	Entry Criteria	122
2.2.4.7.2	Exit Criteria	123
2.2.4.7.3	Display Transition.....	123
2.2.4.7.4	Advisory of LNAV/VNAV Availability	123
2.2.5	Class Gamma Requirements for LP and LPV Approach Operations	123
2.2.5.1	General Human Factors Requirements	123
2.2.5.2	Path Selection.....	124
2.2.5.2.1	5-Digit Channel Selection	124
2.2.5.2.2	Approach Name Selection	124
2.2.5.2.3	Missed Approach Sequencing.....	124
2.2.5.2.4	Selection of the Approach Type.....	124
2.2.5.3	Path Definition	125
2.2.5.3.1	Approach Path Definition	125
2.2.5.3.2	Missed Approach Path Definition.....	125
2.2.5.3.3	Navigation Center Offset	125
2.2.5.4	Navigation Displays	125
2.2.5.4.1	Primary Navigation Displays	125
2.2.5.4.2	Non-Numeric Lateral Cross-Track Deviation.....	125
2.2.5.4.2.1	Definition of Final Approach Segment Lateral Deviations.....	125
2.2.5.4.2.2	Non-VTF Deviation.....	125
2.2.5.4.2.3	VTF Deviation.....	125
2.2.5.4.2.4	Missed Approach Deviation	125
2.2.5.4.3	Numeric Lateral Cross-Track Deviation	125
2.2.5.4.4	Non-Numeric Vertical Deviation	125
2.2.5.4.5	Missed Approach Waypoint/LTP/FTP Distance Display	125
2.2.5.4.6	Missed Approach Waypoint/LTP/FTP Bearing Display.....	125
2.2.5.4.7	Displayed Data Update Rate	126
2.2.5.4.8	Display Update Latency.....	126
2.2.5.4.9	Display of Vertical Accuracy.....	126
2.2.5.5	Database Requirements	126
2.2.5.5.1	Content.....	126
2.2.5.5.2	Data Integrity	127
2.2.5.6	Alerts.....	127
2.2.5.6.1	Alert Limits.....	127
2.2.5.6.2	Caution Associated with Loss of Integrity Monitoring	127
2.2.5.6.3	Caution Associated with Loss of Navigation	127
2.2.5.6.4	Low Altitude Alert.....	129
2.2.5.6.5	Alerting Scheme.....	129
2.2.5.7	LP/LPV Approach Mode Switching Requirements.....	129
2.2.5.7.1	Entry Criteria	129
2.2.5.7.2	Exit Criteria	129
2.2.5.7.3	Display Transition.....	129
2.2.5.7.4	Advisory of LPV, LP Availability	130
2.3	Class Delta-4 Requirements for Approach Operations	130
2.3.1	General Human Factors Requirements.....	130
2.3.2	Approach Selection.....	130
2.3.2.1	Confirmation of Selected Approach.....	131
2.3.3	Path Definition	131
2.3.3.1	Navigation Center Offset.....	131
2.3.4	Navigation Displays.....	131
2.3.4.1	Non-Numeric Lateral Cross-Track Deviation	131
2.3.4.2	Non-Numeric Vertical Deviation	131
2.3.4.3	Landing Threshold Point/Fictitious Threshold Point Distance Display	132
2.3.4.4	Data Update Rate	132
2.3.4.5	Data Update Latency.....	132

2.3.5	Database Requirements.....	132
2.3.5.1	Content.....	132
2.3.5.2	Access.....	132
2.3.6	Alerts.....	133
2.3.6.1	Alert Limits.....	133
2.3.6.2	Caution Associated with Loss of Navigation.....	133
2.4	Airborne Equipment Performance - Environmental Conditions	134
2.4.1	Environmental Tests.....	135
2.4.1.1	Required Performance.....	135
2.4.1.1.1	Accuracy.....	135
2.4.1.1.2	Loss of Navigation Indication.....	136
2.4.1.1.3	Loss of Integrity Indication.....	136
2.4.1.1.4	Initial Acquisition Test.....	136
2.4.1.1.5	Sensitivity and Dynamic Range.....	136
2.4.1.1.6	Navigation Display.....	136
2.4.1.1.7	Database.....	136
2.4.1.1.8	Mode Annunciation.....	136
2.4.1.1.9	TO-TO and TO-FROM Capability.....	136
2.4.1.1.10	System Operating.....	136
2.4.1.2	Clarification of Environmental Tests.....	136
2.4.1.2.1	Power Input Tests.....	137
2.4.1.2.2	Icing Tests.....	137
2.4.1.2.3	RF and Induced Signal Susceptibility Tests.....	137
2.4.1.2.4	Lightning Induced Transient Susceptibility Tests.....	137
2.4.1.2.5	Lightning Direct Effects Tests.....	138
2.4.1.2.6	Crash Safety Shock.....	138
2.5	Test Methods and Procedures	147
2.5.1	Test Cross Reference Matrix.....	149
2.5.2	SBAS Message Loss Rate Test.....	227
2.5.2.1	Evaluation of Message Loss Rate During the Measurement Accuracy Test.....	227
2.5.2.2	Test Procedure.....	227
2.5.2.3	Pass/Fail Determination.....	227
2.5.2.4	Evaluation of Message Loss Rate During the 24-Hour System Accuracy Test.....	227
2.5.2.4.1	Test Procedure.....	227
2.5.2.4.2	Pass/Fail Criteria.....	227
2.5.3	Step Detector Test.....	227
2.5.3.1	Verification of Step Detector Operation Without Exclusion Capability.....	228
2.5.3.2	Verification of No Interference with Fault Detection Algorithm.....	228
2.5.3.3	Verification of Step Detector Operation with Exclusion Capability.....	228
2.5.3.4	Verification of No Interference with Exclusion of the FDE Algorithm.....	229
2.5.4	Initial Acquisition Test Procedures.....	229
2.5.4.1	Simulator and Interference Conditions.....	229
2.5.4.2	Test Procedures (Initial Acquisition).....	230
2.5.4.3	Pass/Fail Determination.....	230
2.5.4.4	Test Procedures (Initial Acquisition After Abnormal Interference).....	231
2.5.5	Reserved.....	232
2.5.6	Satellite Reacquisition Time Test.....	232
2.5.6.1	Simulator and Interference Conditions.....	232
2.5.6.2	Test Procedures.....	233
2.5.6.3	Pass/Fail Determination.....	234
2.5.7	Interference Rejection Test.....	234
2.5.7.1	Simulator and Interference Conditions.....	234
2.5.7.2	Test Procedures.....	234
2.5.7.3	Pass/Fail Determination.....	235
2.5.8	Accuracy Tests.....	235

2.5.8.1	Measurement Accuracy Test.....	235
2.5.8.2	Simulator and Interference Conditions.....	236
2.5.8.2.1	Test Procedures.....	237
2.5.8.3	24-Hour Actual Satellite Accuracy Test.....	240
2.5.8.3.1	Test Procedure.....	240
2.5.8.3.2	Pass/Fail Criteria.....	240
2.5.8.4	SBAS Tracking Bias.....	240
2.5.9	Integrity Monitoring Test Procedures.....	241
2.5.9.1	General Test Conditions.....	241
2.5.9.1.1	Test Philosophy.....	241
2.5.9.1.2	GPS Constellation.....	241
2.5.9.1.3	Applicability of RTCA/DO-178B.....	241
2.5.9.1.4	Test Repetition.....	241
2.5.9.1.5	Protection Level/Alert Limit.....	242
2.5.9.1.6	Time-to-Alert.....	242
2.5.9.2	Availability Tests.....	242
2.5.9.3	Off-Line FDE Tests.....	245
2.5.9.3.1	Off-Line Test Setup.....	245
2.5.9.3.2	Selection of Geometries.....	245
2.5.9.3.3	Test Procedure.....	246
2.5.9.3.3.1	Class Gamma Equipment.....	246
2.5.9.3.3.2	Class Beta Equipment.....	247
2.5.9.3.4	Pass/Fail Criteria.....	247
2.5.9.4	False Alert Rate Test.....	248
2.5.9.4.1	False Alert Rate Simulations for Snapshot Algorithms.....	248
2.5.9.4.2	False Alert Rate Simulations for Non-Snapshot Algorithms.....	249
2.5.9.5	On-Line Verification Test.....	249
2.5.9.5.1	On-Target Computational Test.....	249
2.5.9.5.2	On-Line Behavioral Test.....	250
2.5.10	LNAV/VNAV, LP, LPV Approach Fault Detection.....	250
2.5.10.1	General Test Conditions.....	250
2.5.10.1.1	Test Philosophy.....	250
2.5.10.1.2	GPS Constellation.....	250
2.5.10.1.3	Applicability of RTCA/DO-178B.....	251
2.5.10.1.4	Test Repetition.....	251
2.5.10.1.5	Protection Level/Alert Limit.....	251
2.5.10.1.6	Time-to-Alert.....	251
2.5.10.2	Availability Tests.....	251
2.5.10.3	Off-Line Missed Alert Tests.....	251
2.5.10.3.1	Off-Line Test Setup.....	251
2.5.10.3.2	Selection of Geometries.....	253
2.5.10.3.3	Test Procedures and Pass/Fail Criteria.....	253
2.5.10.4	False Alert Rate Test.....	254
2.5.10.5	On-Line Verification Test.....	254
2.5.10.5.1	On-Target Computational Test.....	254
2.5.10.5.2	On-Line Behavioral Test.....	255
2.5.11	Test Procedures for Class Gamma Equipment.....	255
2.5.11.1	General Gamma Bench Test Procedures.....	255
2.5.11.1.1	Simulated Flight Bench Test Procedures.....	256
2.5.11.1.1.1	Simulated Flight Plan Test 1.....	256
2.5.11.1.1.2	Simulated Flight Plan Test 2.....	257
2.5.11.1.2	Waypoint Distance Display.....	271
2.5.11.1.3	Equipment Response Time Test.....	272
2.5.11.1.4	Loss of Power and Navigation Cautions and Annunciations.....	273
2.5.11.1.5	Cross-Track Deviation Display Bench Test for En Route and Terminal.....	273
2.5.11.1.6	Cross-Track Deviation Display Test for LNAV Approaches.....	277

FAWP	279
FAWP	281
2.5.11.2 Reserved.....	282
2.5.11.3 Human Factors Bench Tests.....	282
2.5.11.3.1 Equipment Usability	282
2.5.11.3.2 Display Brightness and Readability Test	282
2.5.11.3.3 Audible Alerts Test.....	285
2.5.11.3.4 Equipment Controls Test	286
3.0 INSTALLED EQUIPMENT PERFORMANCE	289
4.0 OPERATIONAL CHARACTERISTICS.....	291
5.0 MEMBERSHIP	293

APPENDIX A : SPACE-BASED AUGMENTATION SYSTEM SIGNAL SPECIFICATION..... A-1

A.1 Introduction.....	A-1
A.2 Signal Characteristics.....	A-1
A.2.1 Carrier Frequency	A-1
A.2.2 Spurious Transmissions.....	A-1
A.2.3 Modulation	A-1
A.2.4 Carrier Phase Noise	A-1
A.2.5 Signal Spectrum.....	A-1
A.2.6 Signal Characteristics Modified Relative To GPS.....	A-2
A.2.6.1 Doppler Shift.....	A-2
A.2.6.2 Carrier Frequency Stability	A-2
A.2.6.3 Polarization	A-2
A.2.6.4 Code/Carrier Frequency Coherence	A-2
A.2.6.5 User Received Signal Levels.....	A-2
A.2.6.6 Correlation Loss	A-2
A.2.6.7 Maximum Code Phase Deviation.....	A-3
A.3 SBAS C/A Codes	A-3
A.3.1 Requirements	A-3
A.3.2 Identification of SBAS Codes	A-3
A.3.3 SBAS Codes	A-3
A.3.4 Recommended SBAS/GPS Coder Implementation	A-4
A.4 SBAS Signal Data Contents and Formats	A-5
A.4.1 Introduction	A-5
A.4.2 Principles and Assumptions.....	A-6
A.4.2.1 Data Rate.....	A-6
A.4.2.2 Timing.....	A-6
A.4.2.3 Error Corrections	A-7
A.4.2.4 Tropospheric Model.....	A-7
A.4.2.5 Residual Tropospheric Error.....	A-9
A.4.2.6 PRN Masks	A-9
A.4.2.7 Number of Satellites.....	A-9
A.4.2.8 Issue of Data.....	A-9
A.4.2.9 Acquisition Information	A-10
A.4.3 Format Summary	A-10

A.4.3.1	Block Format.....	A-10
A.4.3.2	Block Length and Content.....	A-10
A.4.3.3	Parity.....	A-10
A.4.3.4	Preamble	A-12
A.4.4	Messages and Relationships Between Message Types	A-12
A.4.4.1	Do Not Use for Safety Applications Message Type 0.....	A-14
A.4.4.2	PRN Mask Assignments Message Type 1	A-14
A.4.4.2.1	PRN Mask Transition.....	A-15
A.4.4.3	Fast Corrections Message Types 2 - 5.....	A-15
A.4.4.4	Integrity Information Message Type 6	A-17
A.4.4.5	Fast Correction Degradation Factor Message Type 7	A-18
A.4.4.6	Degradation Factors Message Type 10	A-20
A.4.4.7	Long Term Satellite Error Corrections Message Type 25.....	A-20
A.4.4.8	Mixed Fast Corrections/Long Term Satellite Error Corrections Messages Type 24.....	A-24
A.4.4.9	Ionospheric Grid Point Masks Message Type 18.....	A-25
A.4.4.10	Ionospheric Delay Corrections Messages Type 26	A-31
A.4.4.10.1	Pierce Point Location Determination	A-33
A.4.4.10.2	Selection of Ionospheric Grid Points	A-34
A.4.4.10.3	Ionospheric Pierce Point Vertical Delay and Model Variance Interpolation	A-36
A.4.4.10.4	Computing Slant Ionospheric Delay and Ionospheric Model Variance	A-39
A.4.4.11	GEO Navigation Message Type 9	A-40
A.4.4.12	GEO Almanacs Message Type 17	A-41
A.4.4.13	SBAS Service Message Type 27	A-43
A.4.4.13.1	Definition of Regions	A-43
A.4.4.14	Null Message Type 63 and Internal Test Message 62	A-46
A.4.4.15	SBAS Network Time/UTC/GLONASS Time Offset Parameters Message Type 12	A-46
A.4.4.16	Clock-Ephemeris Covariance Matrix Message Type 28.....	A-47
A.4.5	Modeling the Degradation of Data	A-50
A.4.5.1	Fast and Long-Term Correction Degradation	A-51
A.4.5.1.1	Fast Correction Degradation	A-51
A.4.5.1.2	Range-Rate Correction Degradation	A-52
A.4.5.1.2.1	Range-Rate Correction Degradation - IODF \neq 3	A-52
A.4.5.1.2.2	Range-Rate Correction Degradation - Either IODF = 3	A-52
A.4.5.1.3	Long Term Correction Degradation.....	A-53
A.4.5.1.3.1	Long Term Correction Degradation - Velocity Code =1	A-53
A.4.5.1.3.2	Long Term Correction Degradation - Velocity Code = 0	A-54
A.4.5.1.3.3	GEO Navigation Message Degradation.....	A-54
A.4.5.1.4	Degradation for En Route Through LNAV.....	A-54
A.4.5.2	Degradation of Ionospheric Corrections	A-55
A.4.6	Principles and Rules for the Generation and Use of Data.....	A-56
A.4.7	Timing	A-56
A.5	References:	A-57

APPENDIX B : STANDARD GPS/WAAS ASSUMPTIONS B-1

B.1	GPS Constellation.....	B-1
B.2	WAAS Constellation.....	B-1
B.3	Selective Availability	B-2
B.4	GPS Satellite Failure	B-2
B.5	GPS Constellation for Availability Analysis	B-2
B.6	Signal Quality Monitoring	B-3
B.6.1	Dead Zones	B-3

B.6.2	False Peaks.....	B-3
B.6.3	Distortions.....	B-4
B.6.4	Threat Models.....	B-4
B.6.4.1	Threat Model A.....	B-4
B.6.4.2	Threat Model B.....	B-4
B.6.4.3	Threat Model C.....	B-4

APPENDIX C : STANDARD RECEIVED SIGNAL AND INTERFERENCE ENVIRONMENT..... C-1

C.1	Introduction.....	C-1
C.2	Operating Interference Environment.....	C-1
C.2.1	Out-of-Band Interference.....	C-1
C.2.1.1	Out-of-Band Pulse Interference.....	C-2
C.2.2	In-Band and Near-Band Interference.....	C-2
C.2.2.1	In-Band and Near-Band Pulsed Interference.....	C-3
C.2.3	GNSS Noise.....	C-4
C.3	Minimum Standard Antenna Frequency Selectivity.....	C-4

APPENDIX D : DATA FORMAT FOR HIGH INTEGRITY INFORMATION TO SUPPORT STRAIGHT AND ADVANCED LANDING APPROACH OPERATIONS ... D-1

D.1	Introduction.....	D-1
D.2	Format.....	D-1
D.2.1	Overall Structure	D-1
D.2.2	Data Block Description	D-1
D.2.3	Data Block Structure	D-2
D.3	Final Approach Segment Data Block.....	D-2
D.3.1	Final Approach Segment Parameter Definition	D-3
D.3.2	Final Approach Segment Data Table.....	D-5
D.4	Advanced Procedures Data Blocks	D-6
D.5	CRC Definition.....	D-6
D.6	Informative Section	D-7
D.6.1	Integrity Protection of Data Blocks	D-7
D.6.2	Approach Path Selection	D-7
D.6.3	Data Block Generation	D-7
D.6.4	Database Formatting and Distribution.....	D-8
D.6.5	CRC Generation and decoding	D-8
D.6.6	CRC selection.....	D-9
D.6.7	Reference Coordinate System.....	D-10
D.7	References:	D-10

APPENDIX E : BASELINE WEIGHTED NAVIGATION SOLUTION AND NAVIGATION SYSTEM ERROR ALGORITHMS FOR SBAS VERTICALLY GUIDED APPROACHES E-1

E.1	Introduction.....	E-1
E.2	Baseline Navigation Solution	E-1
E.3	References.....	E-2

APPENDIX F : VELOCITY DATA IN SUPPORT OF ADS-B.....	F-1
F.1 Introduction.....	F-1
F.2 Velocity Solution with Figure of Merit.....	F-1
F.3 References.....	F-4
APPENDIX G : REQUIREMENTS FOR BAROMETREIC ALTIMETER AIDING	G-1
G.1 General.....	G-1
G.2 Altimeter Aiding with GNSS Calibration.....	G-1
G.2.1 Requirements for Calibration	G-1
G.2.2 Calculation of σ_{baro}	G-2
G.2.3 Actual Use of the Altitude Measurement to Augment GNSS	G-3
G.3 Barometric Altimeter Aiding Using Baro-corrected Pressure Altitude.....	G-4
G.3.1 Requirements for calibration	G-4
G.3.2 Calculation of σ_{baro}	G-4
G.3.3 Actual Use of the Barometric Altitude Measurement to Augment GNSS	G-5
G.3.4 Requirements for Pilot Interaction.....	G-5
G.4 Test Procedures.....	G-5
G.5 References.....	G-6
APPENDIX H : STANDARD OUTPUT FORMAT	H-1
H.1 Introduction.....	H-1
H.2 GPS Minimum Output and Output Timing.....	H-1
H.2.1 Minimum GPS/SBAS Output	H-1
H.2.2 Timing	H-3
H.3 Other Desirable GPS Outputs	H-5
H.4 Summary.....	H-5
H.5 References:	H-5
APPENDIX I : MODE SWITCHING FLOWCHART FOR GAMMA EQUIPMENT.....	I-1
I.1 Introduction.....	I-1
APPENDIX J : SBAS-BASED PROTECTION LEVELS FOR EN ROUTE THROUGH LPV APPROACH.....	J-1
J.1 SBAS Protection Level Equations - General Least Squares Solutions.....	J-1
J.2 HPL_{SBAS} Parameters	J-2
J.2.1 K	J-2
J.2.2 Variance of Fast and Long Term Correction Residuals	J-3
J.2.3 Variance of Ionospheric Delay	J-3
J.2.4 Variance of Airborne Receiver Errors	J-4
J.2.5 Variance of Tropospheric Errors	J-5
J.3 Rationale for HPL and VPL Parameters	J-5
J.3.1 Selection of K Values	J-5

J.3.2	Rationale for Fast and Long-Term Residuals.....	J-5
J.3.3	Rationale for Ionospheric Delay Residuals	J-6
J.3.4	Rationale for Receiver Residuals	J-6
J.3.5	Rationale for Tropospheric Residuals.....	J-6

APPENDIX K : FAULT DETECTION AND EXCLUSION REFERENCES..... K-1

APPENDIX L : THE DIRECT AND INDIRECT GEODETIC PROBLEMS FOR GREAT CIRCLE..... L-1

L.1	General.....	L-1
L.2	Definitions of Terms	L-2
L.3	Nomenclature	L-2
L.4	WGS-84 Parameters (from [5])	L-3
L.5	The Indirect Problem	L-3
L.6	The Direct Problem	L-5
L.7	Validation	L-7
L.8	References.....	L-9

APPENDIX M : TEST CONSIDERATIONS M-1

M.1	Introduction.....	M-1
M.2	(Initial) Acquisition and Reacquisition Testing Statistical Justification	M-1
M.3	Accuracy Statistical Justification	M-3
M.4	General Simulator Scenario Conditions.....	M-4
M.5	Example Test Set-up and Compensation of Signals, Noise and Interference	M-5
M.5.1	Description of the Test Set-up	M-5
M.5.2	Use of the Test Set-up for the Accuracy Test (See 2.5.8).....	M-6

APPENDIX N : REFERENCE MATERIAL FOR DETERMINING THE MEAN SEA LEVEL HEIGHT FROM WGS-84 COORDINATES..... N-1

N.1	Introduction.....	N-1
N.1.1	General Altimetry	N-1
N.1.2	Mean Sea Level (MSL) Altitude	N-2
N.1.3	Barometric Altitude	N-2
N.1.4	Radar Altitude	N-2
N.1.5	GPS Altitude.....	N-2
N.1.6	SBAS-Derived Altitude	N-2

APPENDIX O : GLOSSARY AND ACRONYMS O-1

APPENDIX P : IONOSPHERIC GRID POINT (IGP) SELECTION FLOWCHARTS....P-1

P.1	Introduction.....	P-1
------------	--------------------------	------------

APPENDIX Q : SBAS CONSIDERATIONS FOR HELICOPTERS.....	Q-1
Q.1 General.....	Q-1
Q.1.1 Helicopter/Heliport Deceleration	Q-1
Q.1.2 PinS Description.....	Q-1
Q.2 PinS Approach Operations	Q-1
Q.2.1 Fictitious Helipoint Equivalence to Fictitious Threshold Point.....	Q-1
Q.2.2 FAS Data Block Application to PinS Procedures.....	Q-1
Q.2.3 PinS Lateral Display Scaling.....	Q-3
Q.2.4 Vertical Display Scaling.....	Q-3
Q.3 Deceleration Point Annunciation	Q-3
Q.4 Selective CDI and HAL Values to Support Tighter Route Area Semi-widths	Q-4
Q.5 Autopilot Considerations	Q-4
Q.6 Heliport Approach Database Considerations	Q-4

APPENDIX R : REQUIREMENTS AND TEST PROCEDURES FOR TIGHTLY INTEGRATED GPS/INERTIAL SYSTEMS	R-1
R.1 Introduction.....	R-1
R.2 Requirements	R-1
R.2.1 General FDE Requirements	R-1
R.2.1.1 Fault Free Performance	R-2
R.2.2 Unique Additional Requirements.....	R-3
R.2.2.1 Assumed Failure Mechanisms.....	R-3
R.2.2.2 Detection limit.....	R-4
R.2.2.3 SatZap	R-5
R.2.2.4 Receiver Clock Aiding.....	R-5
R.2.2.5 Altitude Aiding.....	R-5
R.2.2.6 Discriminator Averaging.....	R-6
R.2.2.7 Inertial Coasting Performance Evaluation.....	R-6
R.2.2.7.1 Accuracy Coasting	R-6
R.2.2.7.2 Integrity Coasting.....	R-7
R.2.2.8 Gravity Compensation.....	R-8
R.3 Tightly Integrated GPS/Inertial Design Concepts.....	R-9
R.3.1 Integration Methods.....	R-9
R.3.1.1 Pre-residual (Innovation) Screening.....	R-10
R.3.1.2 Post-Residual Monitoring	R-10
R.3.1.3 Additional Measurement Bias States.....	R-10
R.3.1.4 Multiple Kalman Filters	R-10
R.3.1.5 Extrapolation Method	R-10
R.3.1.6 Solution Separation Method.....	R-11
R.3.2 Detection and Exclusion Mechanisms	R-11
R.3.2.1 Transient Detection/Exclusion for 2 nmi/hour Grade Systems	R-11
R.3.2.2 Satellite Redundancy.....	R-11
R.3.2.3 Integrity Coasting.....	R-11
R.3.2.4 Gravity/Schuler Coupling.....	R-11
R.3.2.5 Other Schuler Coupling Related Effects	R-12
R.4 Assumptions	R-12
R.4.1 Signal Error Model	R-12
R.4.2 Satellite Clock Drift Characteristics.....	R-13

R.5	Validation	R-13
R.5.1	Categorization of Detection and Exclusion Mechanisms	R-13
R.5.1.1	Examples	R-14
R.5.2	Covariance Simulation	R-14
R.5.2.1	Covariance Simulation Methods for Availability Evaluation	R-14
R.5.3	False Alert Probability	R-15
R.5.4	Fault Free Accuracy Performance	R-16
R.5.5	Off-Line Rare Normal Verification	R-16
R.5.6	Off-Line Detection/Exclusion Verification	R-16
R.5.6.1	Detection and Exclusion Mechanism Equivalent to RAIM	R-17
R.5.6.2	Claimed Additional Detection and Exclusion Mechanisms	R-17
R.5.6.2.1	Examples	R-17
R.5.6.2.1.1	RAIM with Transient Detection/Exclusion	R-17
R.5.6.2.1.2	Solution Separation Detection and Exclusion	R-18
R.5.6.2.2	Reference RAIM Models	R-18
R.5.6.3	Integrity Coasting	R-19
R.5.7	On-Line Validation	R-19
R.5.8	Gravity Compensation Validation	R-19
R.5.9	Ionospheric Error Models	R-21
R.5.9.1	Ionospheric Daily Variation	R-21
R.5.9.2	Ionospheric Storms	R-21
R.6	References	R-21
APPENDIX S	: PROCESSING FLOW DIAGRAMS	S-1
S.1	Introduction	S-1
APPENDIX T	: GEO BIAS ANALYSIS TOOL	T-1
T.1	GEO Bias Algorithm Rationale	T-1
T.2	GEO Bias Algorithm Procedure (Overview)	T-1
T.3	Analysis	T-2
T.3.1	GEO Filter Models	T-3
T.3.1.1	Future GEOs	T-5
T.3.2	Range Normalization	T-5
T.4	Bias Model Tool: Instructions and examples	T-6
APPENDIX U	: GUIDANCE MATERIAL FOR INTERFACING WITH ADS-B	U-1
U.1	Purpose and Scope	U-1
U.2	Position Output and Validity	U-1
U.3	Horizontal Figure of Merit (HFOM)	U-1
U.4	Horizontal Protection Limit (HPL)	U-1
U.5	Velocity	U-2
U.6	Vertical Figure of Merit and Vertical Protection Limit (VPL)	U-2
APPENDIX V	: CHANGE 1 FOR DO-229D	V-1

TABLE OF FIGURES

FIGURE 1-1 WAAS ARCHITECTURE.....	5
FIGURE 1-2 FUNCTIONAL CLASSES	10
FIGURE 1-3 DIAGRAM OF FDE CONDITIONS	16
FIGURE 1-4 MARKOV CHAIN FOR FDE	17
FIGURE 1-5 EXAMPLE FDE EVENTS	18
FIGURE 2-1 SENSITIVITY AND DYNAMIC RANGE CONFIGURATION.....	40
FIGURE 2-2A RECEIVER BANDWIDTH AND AVERAGE CORRELATOR SPACING FOR E-L DISCRIMINATOR TRACKING OF GPS SATELLITES.....	57
FIGURE 2-2B RECEIVER BANDWIDTH AND AVERAGE CORRELATOR SPACING FOR DD DISCRIMINATOR TRACKING OF GPS SATELLITES.....	57
FIGURE 2-3 TF LEG	81
FIGURE 2-4 RF LEG	82
FIGURE 2-5 DIRECT-TO PATH DEFINITION	83
FIGURE 2-6 CF LEG	83
FIGURE 2-7 FLY-BY THEORETICAL TRANSITION AREA	85
FIGURE 2-8 FLY-OVER THEORETICAL TRANSITION AREA	86
FIGURE 2-9 WAYPOINT SEQUENCING	87
FIGURE 2-10 DEFAULT NAVIGATION MODES.....	97
FIGURE 2-11 FULL-SCALE DEFLECTION AND DEFINED PATH FOR NORMAL LNAV APPROACH (not VTF approach).....	104
FIGURE 2-12 FULL SCALE DEFLECTION AND DEFINED PATH FOR LNAV VTF APPROACH	105
FIGURE 2-13 MISSED APPROACH SCENARIOS	106
FIGURE 2-14 FINAL APPROACH SEGMENT DEFINITION.....	113
FIGURE 2-15 VTF FINAL APPROACH SEGMENT LATERAL DEVIATIONS WITH FAS DATA BLOCK.....	115
FIGURE 2-16 FINAL APPROACH SEGMENT VERTICAL DEVIATIONS	118
FIGURE 2-17 FLIGHT PROFILE FOR FLIGHT PLAN 1	270
FIGURE 2-18 FLIGHT PROFILE FOR FLIGHT PLAN 2	271
FIGURE 2-19 CROSS-TRACK DEVIATION FOR EN ROUTE AND TERMINAL	275
FIGURE 2-20 CROSS TRACK DEVIATION FOR VTF LNAV APPROACH	279
FIGURE 2-21 CROSS-TRACK DEVIATION FOR LNAV APPROACH.....	281
FIGURE A-1 SBAS/GPS CODER IMPLEMENTED WITH SINGLE G2 OUTPUT PLUS PROGRAMMABLE G2 DELAY	A-5
FIGURE A-2 SBAS/GPS CODER IMPLEMENTED WITH A PROGRAMMABLE INITIAL G2 STATE.....	A-5
FIGURE A-3 CONVOLUTIONAL ENCODING	A-7
FIGURE A-4 DATA BLOCK FORMAT.....	A-10
FIGURE A-5 INTERRELATIONSHIPS OF MESSAGES	A-13
FIGURE A-6 EXAMPLE PRN MASK.....	A-15
FIGURE A-7 TYPES 2 - 5 FAST CORRECTIONS MESSAGES FORMAT.....	A-16
FIGURE A-8 TYPE 6 INTEGRITY MESSAGE FORMAT.....	A-18
FIGURE A-9 TYPE 7 FAST CORRECTION DEGRADATION FACTOR MESSAGE FORMAT ...	A-19
FIGURE A-10 TYPE 25 LONG TERM SATELLITE ERROR CORRECTIONS Velocity Code = 0	A-21
FIGURE A-11 TYPE 25 LONG TERM SATELLITE ERROR CORRECTIONS Velocity Code = 1	A-23
FIGURE A-12 TYPE 24 MIXED FAST CORRECTION/LONG TERM SATELLITE ERROR CORRECTIONS MESSAGE FORMAT.....	A-25
FIGURE A-13 EXAMPLE OF AN IONOSPHERIC GRID MASK.....	A-27
FIGURE A-14 PREDEFINED GLOBAL IGP GRID (BANDS 9 AND 10 ARE NOT SHOWN)	A-30
FIGURE A-15 TYPE 18 IGP MASK MESSAGE FORMAT.....	A-31

FIGURE A-16	TYPE 26 IONOSPHERIC DELAY CORRECTIONS MESSAGE FORMAT	A-32
FIGURE A-17	IONOSPHERIC PIERCE POINT GEOMETRY	A-34
FIGURE A-18	IONOSPHERIC GRID POINT INTERPOLATION	A-36
FIGURE A-19	FOUR-POINT INTERPOLATION ALGORITHM DEFINITIONS	A-38
FIGURE A-20	THREE-POINT INTERPOLATION ALGORITHM DEFINITIONS	A-39
FIGURE A-21	TYPE 9 GEO NAVIGATION MESSAGE FORMAT	A-40
FIGURE A-22	TYPE 17 GEO ALMANACS MESSAGE FORMAT	A-42
FIGURE A-23	SERVICE MESSAGE TYPE 27	A-44
FIGURE A-24	TYPE 28 CLOCK-EPHEMERIS COVARIANCE MATRIX MESSAGE FORMAT	A-49
FIGURE C-1	INTERFERENCE LEVELS AT THE ANTENNA PORT	C-1
FIGURE C-2	IN-BAND AND NEAR-BAND INTERFERENCE ENVIRONMENTS	C-2
FIGURE C-3	FREQUENCY SELECTIVITY	C-5
FIGURE D-1	FINAL APPROACH SEGMENT DIAGRAM	D-2
FIGURE D-2	PROBABILITY OF UNDETECTED ERROR	D-9
FIGURE D-3	PROBABILITIES OF CORRECT DECODING AND DETECTED ERRORS	D-10
FIGURE H-1	GPS TIMING RELATIONSHIPS	H-4
FIGURE M-1	(RE)ACQUISITION TEST PROBABILITY STATISTICS	M-2
FIGURE M-2	PSEUDORANGE ACCURACY TEST PASS CRITERIA	M-3
FIGURE M-3	PSEUDORANGE ACCURACY TEST PASS PROBABILITY	M-4
FIGURE P-1	GRID POINT SELECTION CRITERIA	P-2
FIGURE P-2	ABS IPP LATTITUDE BELOW 60 DEG (5X5)	P-3
FIGURE P-3	ABS IPP LATITUDE BELOW 85 DEG	P-4
FIGURE P-4	ABS IPPLATITUDE BETWEEN 60 & 75 DEG BANDS 9-10	P-5
FIGURE P-6	ABS IPP LATITUDE ABOVE 85 DEG	P-6
FIGURE P-7	ABS IPP LATITUDE BELOW 60 DEG (10X10 SQUARES)	P-7
FIGURE P-8	ABS IPP LATITUDE BELOW 60 DEG (10X10 TRIANGLES)	P-8
FIGURE P-9	ABS IPP LATITUDE BETWEEN 60 & 75 DEG BANDS 9-10	P-9
FIGURE Q-1	LATERAL DISPLAY SCALING FOR PinS APPROACH OPERATIONS	Q-3
FIGURE R-1	FLIGHT PROFILE ASSUMED FOR THE COASTING TIMES	R-8
FIGURE S-1	APPLICATION OF SBAS CORRECTION PARAMETERS	S-2
FIGURE S-2	SATELLITE CORRECTIONS (WHEN SBAS-BASED SIGMA VALUES ARE APPLIED)	S-3
FIGURE S-3	IONOSPHERIC CORRECTIONS	S-4
FIGURE S-4	GEOMETRIC RANGE (WHEN SBAS-BASED SIGMA VALUES ARE APPLIED)	S-5
FIGURE S-5	POSITION SOLUTION (WHEN SBAS-BASED SIGMA VALUES ARE APPLIED)	S-6
FIGURE S-6	CLOCK/EPHEMERIS CONTRIBUTION TO WEIGHT USED FOR HPLFD FOR EN ROUTE THROUGH APPROACH (LNAV)	S-7
FIGURE T-1	COMPARISON OF CORRELATION PEAKS FOR A NARROWBAND GEO AND A GPS CORRELATION PEAK	T-1
FIGURE T-2	OVERVIEW OF GEO BIAS CALCULATION ALGORITHM FOR A SINGLE RECEIVER	T-2
FIGURES T-3 AND T-4	MAGNITUDE AND GROUP DELAY RESPONSES OF THE WAAS GEO SIGNAL GENERATOR IN COMBINATION WITH THE NARROWBAND GEO (AOR-W)	T-4
FIGURES T-5 AND T-6	MAGNITUDE AND GROUP DELAY RESPONSES OF THE GCCS GEO SIGNAL GENERATOR IN COMBINATION WITH THE WIDEBAND (PANAMSAT/ORBITAL) GEO	T-4
FIGURES T-7 AND T-8	MAGNITUDE AND PHASE RESPONSES OF A SAMPLE RECEIVER (FINAL IF, PRECORRELATION) FILTER	T-4
FIGURES T-9 AND T-10	ALL EARLY-MINUS-LATE AND DOUBLE-DELTA TRACKING ERRORS OF GPS AND INMARSAT NARROWBAND GEO SIGNALS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 1)	T-8

FIGURES T-11 AND T-12 ALL EARLY-MINUS-LATE AND DOUBLE-DELTA TRACKING ERRORS OF GPS AND MTSAT NARROWBAND GEO SIGNALS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 1)	T-8
FIGURES T-13 AND T-14 ALL EARLY-MINUS-LATE AND DOUBLE-DELTA TRACKING ERRORS OF GPS AND WIDEBAND GEO SIGNALS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 1)	T-9
FIGURES T-15 AND T-16 SUMMARY OF GEO BIAS ERRORS FOR ALL (32+19) GPS AND SBAS PRNS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 1). RECEIVER DESIGN PASSES IF ALL BIASES ARE BELOW LIMTS INDICATED ON PLOTS	T-9
FIGURES T-17 AND T-18 ALL EARLY-MINUS-LATE AND DOUBLE-DELTA TRACKING ERRORS OF GPS AND INMARSAT NARROWBAND GEO SIGNALS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 2)	T-11
FIGURES T-19 AND T-20 ALL EARLY-MINUS-LATE AND DOUBLE-DELTA TRACKING ERRORS OF GPS AND MTSAT NARROWBAND GEO SIGNALS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 2)	T-11
FIGURES T-21 AND T-22 ALL EARLY-MINUS-LATE AND DOUBLE-DELTA TRACKING ERRORS OF GPS AND WIDEBAND GEO SIGNALS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 2)	T-12
FIGURES T-23 AND T-24 SUMMARY OF GEO BIAS ERRORS FOR ALL (32+19) GPS AND SBAS PRNS AS OUTPUT BY TOOL GIVEN THE SAMPLE INPUT PARAMETERS ABOVE (EXAMPLE 2). RECEIVER DESIGN PASSES IF ALL BIASES ARE BELOW LIMTS INDICATED ON PLOTS	T-12

TABLE OF TABLES

TABLE 1-1 EQUIPMENT CLASSES AND REQUIREMENTS ORGANIZATION.....	11
TABLE 2-1 TIMEOUT INTERVALS	31
TABLE 2-2 FAST CORRECTION USER TIME-OUT INTERVAL EVALUATION	32
TABLE 2-3 URA VALUES	44
TABLE 2-4A GPS TRACKING CONSTRAINTS FOR E-L DLL DISCRIMINATORS	55
TABLE 2-4B GPS TRACKING CONSTRAINTS FOR DD DLL DISCRIMINATORS	56
TABLE 2-4C SBAS RANGING FUNCTION TRACKING CONSTRAINTS	58
TABLE 2-5 SAFETY-CRITICAL FUNCTIONS	69
TABLE 2-6 LABELS AND MESSAGES	75
TABLE 2-7 FLY-BY THEORETICAL TRANSITION AREA ‘R’ AND Y VALUES	84
TABLE 2-8 NON-NUMERIC ELECTRICAL OUTPUT REQUIREMENTS	91
TABLE 2-9 NON-NUMERIC DISPLAY REQUIREMENTS.....	91
TABLE 2-10 NON-NUMERIC DISPLAY REQUIREMENTS.....	96
TABLE 2-11 DEFINITION OF DEFAULT NAVIGATION MODES.....	98
TABLE 2-12 SUMMARY OF TYPICAL MODE SWITCHING TRANSITIONS.....	98
TABLE 2-13 SUMMARY OF CHANGES IN CROSS-TRACK FULL SCALE DEFLECTION FOR MODE SWITCHING	99
TABLE 2-14 CLASS BETA-1 ENVIRONMENTAL TEST REQUIREMENTS	139
TABLE 2-15 CLASS GAMMA-1 ENVIRONMENTAL TEST REQUIREMENTS	140
TABLE 2-16 CLASS BETA-2 ENVIRONMENTAL TEST REQUIREMENTS	141
TABLE 2-17 CLASS GAMMA-2 ENVIRONMENTAL TEST REQUIREMENTS	142
TABLE 2-18 CLASS BETA-3 ENVIRONMENTAL TEST REQUIREMENTS	143
TABLE 2-19 CLASS GAMMA-3 ENVIRONMENTAL TEST REQUIREMENTS	144
TABLE 2-20 CLASS DELTA-4 ENVIRONMENTAL TEST REQUIREMENTS.....	145
TABLE 2-21 TEST CROSS REFERENCE MATRIX.....	151

TABLE 2-22 GRADUATED SAMPLING PASS/FAIL CRITERIA.....	231
TABLE 2-23 STEADY STATE ACCURACY TEST CWI VALUES*	237
TABLE 2-24 SATELLITE EQUIVALENT POWER SPECTRAL DENSITY	237
TABLE 2-25 PASS THRESHOLD TABLE	239
TABLE 2-26 MAXIMUM NUMBER OF OUTCOMES TO OFF-LINE FDE TEST.....	248
TABLE 2-27 WAYPOINT INFORMATION FOR FIRST FLIGHT PLAN FOR SIMULATED FLIGHT PLAN TEST 1	256
TABLE 2-28 WAYPOINT INFORMATION FOR SIMULATED FLIGHT PLAN TEST 2	258
TABLE 2-29 SIMULATED FLIGHT PLAN TEST NUMBER 1	259
TABLE 2-30 SIMULATED FLIGHT PLAN TEST NUMBER 2	265
TABLE 2-31 WAYPOINTS FOR CROSS TRACK DEVIATION BENCH TEST FOR EN ROUTE AND TERMINAL	276
TABLE 2-32 TEST SEQUENCE FOR EN ROUTE AND TERMINAL CROSS-TRACK DEVIATION	277
TABLE 2-33 TEST SEQUENCE FOR VTF LNAV APPROACH CROSS TRACK DEVIATION	278
TABLE 2-34 TEST SEQUENCE FOR LNAV APPROACH CROSS-TRACK DEVIATION.....	280
TABLE 2-35 HUMAN FACTORS TEST: CHECKLIST 1. EQUIPMENT USABILITY	283
TABLE 2-36 HUMAN FACTORS TEST: CHECKLIST 2. DISPLAY BRIGHTNESS	284
TABLE 2-37 HUMAN FACTORS TEST: CHECKLIST 3. AUDIBLE ALERTS	286
TABLE 2-38 HUMAN FACTORS TEST: CHECKLIST 4. EQUIPMENT CONTROLS.....	287
TABLE A-1 SBAS RANGING C/A CODES.....	A-4
TABLE A-2 METEOROLOGICAL PARAMETERS FOR TROPOSPHERIC DELAY	A-8
TABLE A-3 MESSAGE TYPES.....	A-13
TABLE A-4 PRN MASK ASSIGNMENTS	A-14
TABLE A-5 TYPE 6 INTEGRITY MESSAGE CONTENT	A-18
TABLE A-6 EVALUATION OF UDRE _i	A-18
TABLE A-7 TYPE 7 FAST CORRECTION DEGRADATION FACTOR MESSAGE CONTENTS	A-19
TABLE A-8 FAST CORRECTIONS DEGRADATION FACTOR AND USER TIME-OUT INTERVAL EVALUATION.....	A-19
TABLE A-9 TYPE 10 DEGRADATION factors.....	A-20
TABLE A-10 TYPE 25 LONG TERM SATELLITE ERROR CORRECTIONS HALF MESSAGE PARAMETERS WITH VELOCITY CODE OF 0.....	A-22
TABLE A-11 TYPE 25 LONG TERM SATELLITE ERROR CORRECTIONS HALF MESSAGE PARAMETERS WITH VELOCITY CODE OF 1	A-23
TABLE A-12 PREDEFINED WORLD-WIDE IGP SPACING – Bands 0 - 8	A-25
TABLE A-13 PREDEFINED WORLD-WIDE IGP SPACING - BANDS 9 - 10.....	A-25
TABLE A-14 IONOSPHERIC MASK BANDS	A-28
TABLE A-14 IONOSPHERIC MASK BANDS (CONTINUED)	A-29
TABLE A-15 TYPE 18 IGP MASK MESSAGE CONTENTS	A-31
TABLE A-16 IONOSPHERIC DELAY MODEL PARAMETERS FOR MESSAGE TYPE 26.....	A-32
TABLE A-17 EVALUATION OF GIVE _i	A-33
TABLE A-18 TYPE 9 GEO NAVIGATION MESSAGE PARAMETERS	A-41
TABLE A-19 TYPE 17 GEO ALMANACS MESSAGE PARAMETERS	A-42
TABLE A-20 TYPE 27 SERVICE MESSAGE PARAMETERS	A-45
TABLE A-21 δ UDRE INDICATOR EVALUATION	A-46
TABLE A-22 SBAS NETWORK TIME/UTC PARAMETERS	A-47
TABLE A-23 UTC STANDARD IDENTIFIER	A-47
TABLE A-24 TYPE 28 CLOCK-EPHEMERIS COVARIANCE MATRIX MESSAGE PARAMETERS	A-50
TABLE A-25 MESSAGE CONTENT BROADCAST INTERVALS	A-57
TABLE B-1 OPTIMIZED 24 GPS CONSTELLATION	B-1

TABLE B-2	GPS CONSTELLATION ON DECEMBER 1, 1995 AT 00:00 UTC.....	B-3
TABLE C-1	OUT-OF-BAND PULSE INTERFERENCE	C-2
TABLE C-2	IN-BAND AND NEAR-BAND INTERFERENCE BANDWIDTH DEFINITIONS.....	C-3
TABLE C-3	IN-BAND AND NEAR-BAND PULSE INTERFERENCE	C-4
TABLE C-4	EFFECTIVE NOISE DENSITY FOR ALL GNSS SOURCES	C-4
TABLE C-5	FREQUENCY SELECTIVITY	C-5
TABLE D-1	FINAL APPROACH SEGMENT (FAS).....	D-5
TABLE G-1	PRESSURE GRADIENT ERRORS (KNOWN GL).....	G-3
TABLE G-2	PRESSURE GRADIENT ERRORS (UNKNOWN GL).....	G-3
TABLE H-1	MINIMUM GPS OUTPUT	H-2
TABLE L-1	TEST CASE INPUT	L-7
TABLE L-2	TEST CASE OUTPUT	L-8
TABLE L-3	NUMBER OF ITERATIONS	L-8
TABLE M-1	GRADUATED SAMPLING PASS/FAIL CRITERIA.....	M-2
TABLE R-1	SUMMARY OF FDE REQUIREMENTS.....	R-1
TABLE R-2	SUMMARY OF FAILURE TYPE PROBABILITIES	R-4
TABLE R-3	ACCURACY COASTING PERFORMANCE EXAMPLE	R-7
TABLE R-4	INTEGRITY COASTING PERFORMANCE EXAMPLE	R-8
TABLE R-5	EQUIVALENT ALTITUDE ACCURACY	R-12
TABLE R-6	REQUIRED NUMBER OF TRIALS FOR EACH FAILURE MODE.....	R-17

1.0 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum operational performance standards (MOPS) for airborne navigation equipment (2D and 3D) using the Global Positioning System (GPS) augmented by Satellite-Based Augmentation Systems (SBAS); which, in the U.S. is the Wide Area Augmentation System (WAAS). DO-229 only provides standards for single frequency airborne navigation equipment. A separate document will be created in the future to address standards for dual frequency equipment. These standards are intended to be applicable to other SBAS providers, such as European Geostationary Navigation Overlay Service (EGNOS) and Japan's Multi-functional Transport Satellite (MTSAT) Satellite-based Augmentation System (MSAS).

In this document, the term “shall” is used to indicate requirements. An approved design should comply with every requirement, which can be assured by inspection, test, analysis, or demonstration. The term “must” is used to identify items that are important but are either duplicated somewhere else in the document as a “shall”, or are considered to be outside the scope of this document. The term “should” is used to denote a recommendation that would improve the SBAS equipment, but does not constitute a requirement.

The standards define minimum performance, functions and features for SBAS-based sensors that provide position information to a multi-sensor system or separate navigation system. They also address SBAS-based Area Navigation (RNAV) equipment to be used for the en route, terminal, and Lateral Navigation (LNAV) phases of flight. These standards are based upon a nominal allocation of the aircraft-level requirements in RTCA/DO-236B, *Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation*, accounting for the unique issues associated with SBAS and GNSS navigation service and minimizing the need for pilot training. These standards also define performance, functions and features for equipment that satisfies the requirements for Lateral Navigation/Vertical Navigation (LNAV/VNAV), Localizer Performance without vertical guidance (LP), and Localizer Performance with Vertical guidance (LPV) instrument procedures. The standards cover SBAS-based equipment that is designed to serve combinations of the above phases of flight.

Compliance with these standards by manufacturers, installers and users is recommended as one means of assuring that the equipment will satisfactorily perform its intended functions under conditions encountered in routine aeronautical operations, and will ensure a basic compatibility with the requirements defined in RTCA/DO-236B. Manufacturers and operators who elect to comply directly with the requirements of RTCA/DO-236B as part of an aircraft certification (type certificate or supplemental type certificate) may bypass these RNAV standards, but are not expected to be eligible for a Class Gamma TSO authorization.

The regulatory application of these standards is the responsibility of appropriate government agencies. In the United States, the Federal Aviation Administration (FAA) has published a Technical Standard Order (TSO) for GPS/WAAS equipment to reference the requirements and bench test procedures in Section 2.

The word “equipment”, as used in this document, includes all components or units necessary (as determined by the equipment manufacturer or installer) to properly perform its intended function. For example, the airborne “equipment” may include: sensor(s), a computer unit, an input-output unit that interfaces with existing aircraft