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MINIMUM AVIATION SYSTEM PERFORMANCE STANDARDS (MASPS) FOR THE AERONAUTICAL MOBILE-SATELLITE (R) SERVICE (AMS(R)S) AS USED IN AERONAUTICAL DATA LINKS

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FOREWORD

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TABLE OF CONTENTS

1 PURPOSE AND SCOPE 1

1.1 Introduction 1

1.2 System Overview 2
1.2.1 System Architecture 2
1.2.2 ICAO Global CNS/ATM and System Performance Concepts 2
1.2.3 AMS(R)S System Overview 2
1.2.4 End-to-End Communications Environments 3
1.2.4.1 The Aeronautical Telecommunications Network (ATN) 3
1.2.4.2 FANS 1/A Data Link 4
1.2.5 AMS(R)S Service Responsibilities 4

1.3 Operational Applications 5
1.3.1 Air Traffic Services 5
1.3.2 Aeronautical Operational Control 5
1.3.3 Non-Safety Communications Services 5

1.4 Operational Goals 7
1.4.1 Coverage 7
1.4.2 Compatibility and Interoperability 7
1.4.3 Priority of Safety Communications 7
1.4.4 Failure Modes, Warnings, and Flags 7
1.4.5 Human Factors Considerations 7

1.5 Assumptions 8
1.5.1 Assumptions Regarding Required Communications Performance (RCP) 8
1.5.2 Assumptions Regarding the ATN 8

1.6 Verification Procedures 8

1.7 Reference Documents 9

1.8 Definition of Terms 9

2 SUBNETWORK PERFORMANCE REQUIREMENTS 11

2.1 General Requirements 11

2.2 Specific Requirements 11
2.2.1 Standard Operating Conditions 12
2.2.2 Spectrum Requirements 12
2.2.2.1 Emission Designators 12
2.2.2.2 Interference 14
2.2.2.2.1 Emissions 14
2.2.2.2.2 Susceptibility 14
2.2.3 Coverage Volume 14
2.2.4 Priority, Precedence and Preemption 15
2.2.4.1 Priority Levels 15
2.2.4.2 Precedence 15
2.2.4.3 Preemption 15
2.2.5 Subnetwork Installed Communications Performance (ICP) 15
2.2.5.1 Transfer Delay 16
2.2.5.1.1 Traffic Model 16
2.2.5.1.2 Subnetwork Model 17

2.2.5.1.3 Transfer Delay Performance . . . 17
2.2.5.1.3.1 Chapter 4 SARPs-Compliant Systems . . . 17
2.2.5.1.3.2 Next Generation Satellite Systems . . . 17
2.2.5.1.4 Transfer Delay Characterization . . . 18
2.2.5.2 Integrity . . . 18
2.2.5.3 Service Availability Criteria . . . 19
2.2.5.3.1 Service Outages . . . 19
2.2.5.3.2 Availability Ratio . . . 20
2.2.5.3.3 Multi-User Availability . . . 20
2.2.5.3.4 Single-User Availability . . . 20
2.2.5.4 Continuity of Service Criteria . . . 20
2.2.5.4.1 Continuity of Service Event . . . 21
2.2.5.4.2 Continuity of Service . . . 21
2.2.5.4.3 Multi-User Continuity of Service . . . 21
2.2.5.4.4 Single-User Continuity of Service . . . 21
2.2.6 Service Monitoring . . . 21
2.2.7 Subnetwork Interoperability . . . 22
2.2.7.1 Subnetwork Communications Protocols . . . 22
2.2.7.2 Transparency to User Data . . . 22
2.2.7.3 Interactions with External Elements . . . 22
2.2.7.3.1 Connection Establishment Delay . . . 22
2.2.7.3.2 Connectivity Events . . . 23
2.2.7.3.3 System Control Interactions . . . 23

3 SUBSYSTEM REQUIREMENTS . . . 25

3.1 Performance Partitioning Methodologies . . . 26
3.1.1 RF Performance . . . 26
3.1.2 Transfer Delay Partitioning Methodology . . . 27
3.1.2.1 Latency Transfer Delay Component . . . 27
3.1.2.2 Mean Transfer Delay . . . 27
3.1.2.3 95th Percentile Transfer Delay . . . 27
3.1.3 Integrity Methodology . . . 27
3.1.4 Availability Methodology . . . 28
3.1.4.1 Methodology for Computing Multi-User Availability . . . 28
3.1.4.2 Methodology for Computing Single User Availability . . . 28
3.1.5 Continuity Methodology . . . 29
3.1.5.1 Methodology for Computing Multi-User Continuity of Service . . . 29
3.1.5.2 Methodology for Computing Single User Continuity of Service . . . 30

3.2 AES Subsystem Requirements . . . 30

3.3 Satellite Network Infrastructure (SNI) Requirements . . . 31
3.3.1 SNI Performance Requirements . . . 31
3.3.1.1 RF Link Performance Requirements . . . 31
3.3.1.2 Mitigation of Harmful Interference . . . 31
3.3.1.2.1 Intrasystem Interference . . . 31
3.3.1.2.2 Intersystem Interference . . . 31
3.3.1.3 Network Coordination and Control Function . . . 32
3.3.1.3.1 Intrasystem Coordination . . . 32
3.3.1.3.2 Intersystem Coordination: Same Frequency Band, Same Protocols . . . 32
3.3.1.3.3 Intersystem Coordination: Different Frequency Bands . . . 33
3.3.1.3.4 Intersystem Coordination: Same Frequency Band, Different Protocols . . . 33
3.3.2 SNI Functional Requirements . . . 33

4 SUBNETWORK PERFORMANCE VERIFICATION PROCEDURES 35

4.1 Verification Techniques 35

4.2 Verification of Specific Requirements 36
4.2.1 Standard Operating Conditions 36
4.2.2 Spectrum Requirements 36
4.2.2.1 Emissions Designators 36
4.2.2.2 Interference 36
4.2.2.2.1 Emissions 36
4.2.2.2.2 Susceptibility 37
4.2.3 Coverage Volume 38
4.2.4 Priority, Precedence and Preemption 38
4.2.4.1 Priority Levels 39
4.2.4.2 Precedence 40
4.2.4.3 Preemption 40
4.2.5 Subnetwork Installed Communications Performance 40
4.2.5.1 Transfer Delay 40
4.2.5.1.1 Traffic Model 41
4.2.5.1.2 Subnetwork Model 41
4.2.5.1.3 Transfer Delay Performance 41
4.2.5.1.3.1 Chapter 4 SARPs-Compliant Systems 41
4.2.5.1.3.2 Next Generation Satellite Systems 42
4.2.5.1.4 Transfer Delay Characterization 42
4.2.5.2 Integrity 44
4.2.5.3 Service Availability Criteria 44
4.2.5.3.1 Service Outages 44
4.2.5.3.2 Availability Ratio 45
4.2.5.3.3 Multi-User Availability 45
4.2.5.3.4 Single-User Availability 45
4.2.5.4 Continuity of Service Criteria 46
4.2.5.4.1 Continuity of Service Event 46
4.2.5.4.2 Continuity of Service 46
4.2.5.4.3 Multi-User Continuity of Service 47
4.2.5.4.4 Single User Continuity of Service 47
4.2.6 Service Monitoring 48
4.2.7 Subnetwork Interoperability 48
4.2.7.1 Subnetwork Communications Protocols 48
4.2.7.2 Transparency to User Data 49
4.2.7.3 Interactions with External Elements 49
4.2.7.3.1 Connection Establishment Delay 49
4.2.7.3.2 Connectivity Events 50
4.2.7.3.3 System Control Interactions 50

4.3 Verification of Section 3 Requirements 50

MEMBERSHIP 51

APPENDICES

Appendix A—ACRONYMS AND GLOSSARY

A.1 List of Acronyms A-1

A.2 Glossary and Definitions A-4

Appendix B—METHODOLOGY FOR PREPARATION OF LINK BUDGETS FOR SYSTEMS PROVIDING AMS(R)S (NORMATIVE)

B.1 Introduction B-1

B.2 RF Link Analytical Methodology B-1
B.2.1 System-specific Constants B-3
B.2.1.1 RF Link Naming Conventions B-3
B.2.2 RF Link Performance Criteria B-4
B.2.3 Computing the Achieved Carrier-to-Noise Density Ratio. B-5
B.2.3.1 Computing the Nominal Carrier-to-Noise-Density Ratio B-6
B.2.3.2 Accounting for Interference Terms B-6
B.2.3.2.1 Locally Generated Interference B-7
B.2.3.2.2 Remotely Generated Interference B-8
B.2.3.2.3 Allocation for External Interference Effects B-9
B.2.3.3 Accounting for Random Variations in the Received Carrier Level B-9
B.2.3.3.1 Accounting for Polarization Losses B-10
B.2.3.3.2 The Pro-Forma Random Loss Budget for B-12
B.2.4 Propagation Effects B-13
B.2.4.1 Multipath B-13
B.2.4.2 Scintillation. B-15
B.2.5 Computing the Required Carrier-to-Noise Density Ratio B-17
B.2.5.1 Computing the Theoretical Energy-to-Noise Density Ratio B-18
B.2.5.2 Addressing Multipath Effects in the Modem Pro Forma B-19
B.2.5.3 Modem Implementation Losses B-20
B.2.5.4 Completing the Modem Pro Forma B-20

B.3 Example Pro Forma Analysis. B-21
B.3.1 Basic Uplink Computations. B-22
B.3.2 Uplink Interference B-25
B.3.3 Downlink Terms B-26
B.3.4 Total System Terms. B-26
B.3.5 Example Random Loss Budget B-27
B.3.6 Example Modem Budget B-29
B.3.7 Example Computation of "Excess" System Margin B-30

B.4 References for Appendix B B-31

Appendix C—METHODOLOGY FOR COMPUTING AND PARTITIONING AVAILABILITY AND CONTINUITY OF SERVICE (NORMATIVE)

C.1 Introduction C-1

C.2 Key Analysis Equations C-1
C.2.1 Availability Analysis Equations C-2
C.2.1.1 Outage Duration C-2
C.2.1.2 Outage Rate/Mean Time Between Outage C-2
C.2.1.3 Outage Restoration Rate/Mean Restoration Time C-3
C.2.1.4 Availability Ratio C-3
C.2.1.5 Geographically Dependent Availability Ratio C-4
C.2.1.6 Availability Calculation Using Independent Elements C-5
C.2.1.7 Availability Effects of Traffic Loading C-6
C.2.1.8 Effect of Redundancy on Availability Calculations C-8

C.2.1.8.1 K-redundancy with common repair. . . . C-8
C.2.1.8.2 K-redundancy with independent repair C-9
C.2.1.8.3 K-redundancy without repair. . . . C-9
C.2.2 Continuity of Service Analysis Equations C-9
C.2.2.1 Rate of Continuity of Service Events C-11
C.2.2.2 Geographically Dependent Continuity of Service Event Rate C-11
C.2.2.3 Estimating the Rate from the Probability C-11
C.2.2.4 Estimating the Continuity of Service C-12

C.3 AMS(R)S Availability Model C-12
C.3.1 Fault-Free Rare Events C-13
C.3.1.1 RF Link Events. . . . C-14
C.3.1.2 Scintillation Events. . . . C-15
C.3.1.3 Interference Events. . . . C-16
C.3.1.4 Capacity Overload Events C-16
C.3.2 System Component Failure Events C-17
C.3.2.1 GES Failure Events C-18
C.3.2.2 Satellite Failure Events. . . . C-19
C.3.2.3 NCS Failure Events C-20
C.3.2.4 AES Failure Events C-20
C.3.3 Multi-User vs. Single User Availability C-21
C.3.3.1 Multi-User Availability C-21
C.3.3.2 Single-User Availability. . . . C-22

C.4 AMS(R)S Availability Example C-23
C.4.1 Example System Parameters C-23
C.4.2 Fault-Free Rare Events C-24
C.4.2.1 RF Link Events. . . . C-24
C.4.2.2 Scintillation. . . . C-24
C.4.2.3 Interference. . . . C-26
C.4.2.4 Capacity Overload C-26
C.4.2.5 Fault Free Rare Event Summary C-29
C.4.3 System Component Failures C-29
C.4.3.1 GES Failure Events C-29
C.4.3.2 Satellite Failure Events. . . . C-29
C.4.3.3 NCS Failure Events C-31
C.4.3.4 AES. . . . C-31
C.4.3.5 System Element Failures C-31
C.4.4 System Availability Estimate C-31

C.5 AMS(R)S Continuity of Service Model. . . . C-31
C.5.1 Fault-Free Rare Events C-32
C.5.1.1 RF Events C-32
C.5.1.2 Scintillation Events. . . . C-32
C.5.1.3 Interference Events. . . . C-32
C.5.1.4 Capacity Overload Events C-32
C.5.2 System Component Failures C-33
C.5.3 Multi-User vs. Single User Continuity of Service. . . . C-33

C.6 AMS(R)S Continuity of Service Example. . . . C-34
C.6.1 Fault-Free Rare Events C-34
C.6.1.1 RF Link. . . . C-34
C.6.1.2 Scintillation. . . . C-34
C.6.1.2.1 Equatorial Region C-34

C.6.1.2.2 High Latitude Regions. . . . C-35
C.6.1.2.3 Continuity of Service. . . . C-35
C.6.1.3 Interference. . . . C-35
C.6.1.4 Capacity Overload C-36
C.6.1.4.1 Uplink C-36
C.6.1.4.2 Downlink. . . . C-37
C.6.1.4.3 Total COS Effect of Capacity Overload C-38
C.6.1.5 Fault Free Rare Event Summary C-38
C.6.2 System Component Failures C-38
C.6.2.1 GES. . . . C-38
C.6.2.2 Satellites C-39
C.6.2.3 NCS C-40
C.6.2.4 AES. . . . C-40
C.6.2.5 System Element Failures C-40
C.6.3 System Availability Estimate C-40

C.7 References for Appendix C C-40

Appendix D—METHODOLOGY FOR COMPUTING AND PARTITIONING COMMUNICATIONS INTEGRITY (NORMATIVE)

D.1 Introduction D-1

D.2 Integrity Analysis Methodology D-2
D.2.1 Integrity Analysis Terms and Equations D-2
D.2.1.1 Integrity Assumptions and Related Requirements D-2
D.2.1.2 Forward Error Correction D-2
D.2.1.2.1 Acknowledge-Request Protocol D-3
D.2.1.2.2 Union Bound D-3
D.2.1.3 Hamming Weight D-4
D.2.1.4 Weight Enumerating Function D-4
D.2.1.5 Signal-to-Noise Ratio D-4
D.2.1.5.1 Burst Errors D-5

D.3 Integrity Analysis Methodology D-5
D.3.1 Fault Tree. . . . D-5
D.3.2 Parameter Declaration D-6
D.3.3 Data Integrity D-6
D.3.3.1 Word Error Rate D-6
D.3.3.1.1 Frame Check Sequence D-10
D.3.3.1.2 Overall User Data Integrity D-10
D.3.4 Address Integrity D-10
D.3.5 Overall Communications Integrity D-10

D.4 Integrity Analysis Example D-10
D.4.1 System Assumptions D-10
D.4.2 Forward Link D-11
D.4.2.1 Weight Enumerating Function D-11
D.4.2.2 Word Error Rate D-12
D.4.2.2.1 Address Block D-12
D.4.2.2.2 Data Block. . . . D-13
D.4.2.3 Data Integrity D-13
D.4.3 Reverse Link D-13
D.4.3.1 Weight Enumerating Function D-13
D.4.3.2 Word Error Rate D-14

D.4.3.2.1 Address Block D-14
D.4.3.2.2 Data Block D-14
D.4.3.3 Data Integrity D-14

D.5 References for Appendix D D-15

Appendix E—MINIMUM TRAFFIC MODEL (FOR OCEANIC AND REMOTE AREAS) (NORMATIVE)

E.1 Introduction E-1

E.2 Discussion E-1

E.3 Segmentation and Block Overhead Approximations: E-2

Appendix F—METHODS OF COMBINING AND PARTITIONING ICP FACTOR VALUES (INFORMATIVE)

F.1 Introduction F-1

F.2 Combinatorial Methods F-1
F.2.1 Availability and Continuity F-1
F.2.2 Integrity F-1
F.2.3 Transfer Delay F-1
F.2.3.1 Sources and Manipulation of Transfer Delay Data F-1
F.2.3.2 Analysis by Data Probability Distributions F-3
F.2.3.3 An Approximation Technique for Aggregation and Partitioning of Transfer Delay Data F-5

F.3 Illustrations of Transfer Delay Partitioning by Various Methods F-7
F.3.1 Aggregation F-7
F.3.2 Partitioning for Allocation and Allotment F-8
F.3.3 Conclusions F-9

F.4 Reference for Appendix F F-10

Appendix G—A VOLUMETRIC MODEL FOR ASSESSING INTERFERENCE BETWEEN SATCOM-EQUIPPED AIRCRAFT IN THE SAME AIRSPACE (INFORMATIVE)

G.1 Introduction G-1

G.2 Model Development G-1
G.2.1 Estimating the Worst Case Interference G-1
G.2.2 Computing the Interference Volume G-3
G.2.2.1 Stratified Airspace G-3
G.2.2.2 Transmit (Source) Antenna Pattern G-4
G.2.2.3 Receiver (Victim) Antenna Pattern G-5
G.2.2.4 Computing the Total Volume of the Stratified Airspace G-7
G.2.3 Interference Airspace G-7
G.2.4 Computing the Average Load Per Aircraft G-7
G.2.5 Computing the Number of Active Communications Attempts G-8
G.2.6 Computing the Unavailability Ratio G-8
G.2.7 Multi-User Unavailability G-9

G.3 Example Volumetric Interference Computation G-10
G.3.1 System Assumptions G-10
G.3.2 Estimating the Worst-Case Interference G-11
G.3.3 Computing the Interference Volume G-11

G.3.3.1 Transmit (Source) Antenna Pattern G-11
G.3.3.2 Receiver (Victim) Antenna Pattern. G-11
G.3.3.3 Computing the Total Volume of Stratified Airspace G-12
G.3.3.4 Interference Airspace G-13
G.3.3.5 Average Load Per Aircraft G-13
G.3.3.6 Number of Active Communications Attempts G-13
G.3.3.7 Compute the Single User Unavailability G-14
G.3.3.8 Compute Multi-User Unavailability G-14

G.4 Detailed Derivations Supporting the Volumetric Model G-15
G.4.1 Determination of the Interference Volume G-15
G.4.2 Determination of Interference Limits in the Radial Direction. G-19

G.5 References for Appendix G G-19

Appendix H—OVERVIEW OF AMS(R)S SYSTEMS AND THEIR ENVIRONMENTS

H.1 AMSS and AMS(R)S Systems in the Spectrum Regulatory Environment H-1

H.2 AMSS/AMS(R)S System Architectures H-2
H.2.1 System Elements and Their Functions H-2
H.2.1.1 Satellite and RF Path H-2
H.2.1.2 Ground Earth Station (GES). H-2
H.2.1.3 Aircraft Earth Station (AES) H-2
H.2.1.4 Network Control and Coordination Functions H-2
H.2.2 Satellite System Architectures. H-3
H.2.2.1 Coverage. H-3
H.2.2.1.1 Geostationary Orbit Constellations H-3
H.2.2.1.2 Low Earth Orbit (LEO) and Medium Earth Orbit (MEO) Constellations H-3
H.2.2.2 Feeder Links H-4
H.2.2.3 AMS(R)S Operational Service Levels H-4

H.3 End-to-End Communications Environments H-4
H.3.1 End-to-End Data Link H-4
H.3.1.1 The Aeronautical Telecommunications Network (ATN). H-5
H.3.1.2 FANS 1/A Data Link H-5
H.3.1.3 Transceiver Avionics Interface Modes. H-6
H.3.1.3.1 Data-2 Interface. H-6
H.3.1.3.2 Data-3 Interface. H-6

H.4 Data and Voice Communication H-6

H.5 AMS(R)S Service Responsibilities H-7

H.6 AMS(R)S Performance as a Component of Global CNS/ATM H-7
H.6.1 Assumptions Regarding the Required Communications Performance (RCP) Concept . . . H-8
H.6.1.1 Required Communications Technical Performance (RCTP) H-8
H.6.1.2 Installed Communications Performance (ICP). H-8
H.6.1.3 Actual Communications Performance (ACP) H-9
H.6.2 Installed Communications Performance (ICP) Parameters. H-9
H.6.2.1 Transfer Delay H-9
H.6.2.2 Integrity H-10
H.6.2.3 Availability and Continuity H-10

H.7 Throughput and Capacity. H-10

TABLE OF FIGURES

Figure 1-1 Aeronautical Mobile Satellite System (AMSS) End-to-End Model 4
Figure 1-2 End-to-End Packet-Mode Services System Structure 6
Figure 2-1 AMS(R)S Subnetwork and Performance Reference Points (ISO 8208 protocol is representative only) 12
Figure 3-1 Partitioning Air-to-Ground Subnetwork into AES and SNI 25
Figure 4-1 Harmonic Bandwidths for Interference Analysis 37
Figure 4-2 Example of To-Aircraft-Direction Transfer Delay Measurement System 43
Figure B-1 RF Link Naming Conventions B-4
Figure B-2 Example CDFs for Polarization Loss B-11
Figure B-3 Global Pattern of Ionospheric Scintillation B-16
Figure C-1 Timing of Outage Duration Events C-2
Figure C-2 Example of Non-Delivery that Does Not Result in Outage C-2
Figure C-3 “Availability Tree” Methodology C-13
Figure C-4 Examples of Fading Rate Effects on Signal Interruptions C-15
Figure C-5 Examples of External and Internal Networking Between GES Sites C-19
Figure C-6 Example Probability of Outage Given a Known Satellite Failure C-30
Figure D-1 Sample Fault Trees for Integrity Analysis D-8
Figure F-1 Representative Histogram of Transfer Delay Data F-2
Figure F-2 Comparison of Normalized Histogram Data and Fitted Distribution; (a) PDF and (b) CDF F-4
Figure G-1 "Stratified Airspace" as a Basis for Interference Analysis G-5
Figure G-2 Example Idealized Receive Antenna Pattern G-6
Figure G-3 Effective Range Computed Using Normalized, Idealized Antenna Pattern (Example Only, Not for General Use) G-13
Figure G-4 Multi-User Unavailability Due to Interference at LE=0.05 Erlang G-14
Figure G-5 Definition of Interference Volume Vk in y-z Plane G-16
Figure G-6 Definition of Interference Volume, Vk, in x-y Plane G-18

TABLE OF TABLES

Table 2-1 Pro Forma for System Characteristic Declaration 13
Table 2-2 Pro-forma Table for Transfer Delay Characteristics 18
Table B-1 Pro-Forma RF Link Analysis Budget for AMSS/AMS(R)S Systems B-2
Table B-2 Example Pro-Forma Random Loss Budget B-13
Table B-3 Pro Forma Modem Budget for Computation of Required C/No B-18
Table B-4 Theoretical BER Equations for Common Modulations B-19
Table B-5 System-specific Parameters for Example Pro Forma Analysis B-22
Table B-6 Sample Pro-Forma Link Budget Suitable for Inclusion in MASPS Appendix B-23
Table B-7 Example Random Loss Budget, Return Link B-27
Table B-8 Example Modem Budget B-29
Table C-1 Declared and Derived Parameters for Traffic Load Analysis. C-7
Table C-2 Parameters for Example Computation of Traffic Overload Effect. C-28
Table D-1 Simple Code Example D-4
Table D-2 Declared Parameters for Integrity Analysis D-9
Table D-3 Declared Parameters for Example Integrity Analysis. D-12
Table E-1 Minimum Uplink Data Traffic Model (To-Aircraft) E-3
Table E-2 Minimum Downlink Data Traffic Model (From-Aircraft). E-4
Table E-3 Assumed Data Block Characteristics Corresponding to Traffic Types E-5
Table F-1 Comparison of Raw Data and Fitted Curve Parameters. F-4
Table F-2 Comparison of Combining Algorithm with True Convolved Values F-6
Table G-1 Baseline assumptions for Interference Analysis. G-1
Table G-2 Pro Forma Baseline Budget for Determination of G-3
Table G-3 Baseline assumptionsfor Example Interference Analysis. G-11
Table G-4 Pro Forma Baseline Budget for Determination of G-12
Table G-5 Determination of Integration Limits for Volumetric Model. G-17

1 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum aviation system performance standards for communications utilizing aeronautical mobile satellite systems for the air-ground communications subnetwork in an Aeronautical Telecommunications Network (ATN) environment. The FANS 1/A data link environment is also addressed. These standards specify characteristics that should be useful to designers, installers, manufacturers, service providers and users of systems intended for operational use within the United States National Airspace System (NAS). Where systems are global in nature, the system may have international applications that are taken into consideration.

Compliance with these standards is recommended as one means of assuring that the system and each subsystem will perform its intended function(s) satisfactorily under conditions normally encountered in routine aeronautical operations for the environments intended. The MASPS may be implemented by one or more regulatory documents and/or advisory documents (e.g., certification, authorization, approval, commissioning, advisory circular, notice, etc.) and may be implemented in part or in total. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Communications supporting the Air Traffic Service (ATS) and Aeronautical Operational Control (AOC) may be provided by one or more satellite systems, each of which has particular operating characteristics. The technical details of each individual system will be in system-specific attachments prepared in accordance with this document. The system-specific performance will become the minimum performance requirements for that system. This document anticipates that the system-specific attachment(s) will provide one means of assessing whether a particular AMS(R)S system is appropriate for a specific operational environment. The requirements for operational environments will be developed in accordance with DO-264. A system-specific attachment will not require RTCA approval or publication.

Section 1 of this document describes a generalized Aeronautical Mobile Satellite Service (AMSS) System, the particular characteristics of its AMS(R)S component, and the data link environment in which it is used. Section 1 also provides information needed to understand the rationale for system characteristics and requirements that are stated within this document. This section contains typical applications and envisioned operational goals and assumptions necessary to establish a basis for the subsequent sections.

Section 2 defines the general requirements of an AMS(R)S subnetwork, specific requirements for its interfaces, and specific minimum Installed Communications Performance (ICP) requirements when viewed as an air/ground subnetwork of an end-to-end data network. The ICP requirements include delay, integrity, availability and continuity of service parameters.

Section 3 establishes requirements for specific information that must be provided in the system-specific attachments and establishes pro-forma tables and methodology by which that information is to be provided. The purpose of this disclosure is to provide confidence that the subnetwork design will achieve the "Point B-to-Point C" performance specified in Section 2, prior to the approval of that system for AMS(R)S. The ultimate proof of performance at the subnetwork level is the verification procedures of Section 4.

Section 4 describes procedures recommended for verifying compliance of the subnetwork with the minimum performance requirements in Section 2.

Appendices of this document are structured to contain either normative or informative material, and are so identified in each case. Normative appendices contain material, such

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as descriptions of acceptable analytic methodologies, where the inclusion of such material in the main body of the document would be cumbersome. The main body references appendix material wherever appropriate.

The word "subnetwork" as used in this document is intended to include all components that make up a major independent and necessary functional part of the air-ground communications subsystem so that the system can properly perform its intended functions. If any element of the subnetwork includes computer software, then the guidelines contained in RTCA/DO-178B should be considered for ground-based, as well as airborne, applications.

Users of this document are urged to become familiar with the tutorial material on aeronautical satellite communications and the various aeronautical communications networks contained in Appendix H.

1.2 System Overview

1.2.1 System Architecture

This MASPS is intended to be independent of the wide variety of system architectures that may be capable of providing AMS(R)S, and has been written under the assumption that a system can be characterized as either conforming to the ICAO "Chapter 4 SARPs" or as a Next Generation Satellite System (NGSS). For the purposes of this document, an NGSS is defined as any system that provides AMS(R)S in a manner that does not comply with the Chapter 4 SARPs and DO-210D, but does meet the NGSS requirements of this MASPS. In those instances where a distinction of requirements is necessary, each requirement is identified as related to either a "Chapter 4 SARPs" or "Next Generation Satellite System".

1.2.2 ICAO Global CNS/ATM and System Performance Concepts

The goal of the International Civil Aviation Organization (ICAO) Global Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) concept is to implement a global system with cost-effective communications, navigation, and surveillance systems, and to integrate these with appropriate automation and procedural solutions leading to major enhancements in air traffic management (ATM). A primary emphasis is also placed on digital communications, supporting information transfer via both data link and voice. The current concepts for navigation and communications solutions emphasize satellite systems (GNSS and AMSS) for global coverage, and line-of-sight systems for high-traffic volume communications in the terminal area. However, alternative means of communications, such as HF Data Link, are also considered to be candidates for the CNS system of the future.

Required Communications Performance (RCP) is a statement of the end-through-end communications performance necessary for flight within a defined airspace, or to perform a discretely defined operation or procedure. An RCP is determined by cognizant authorities in consideration of air traffic operations and flight standards, target levels of safety, separation assurance, and functional hazard analysis associated with the airspace, operation or procedure. Thus, RCP is independent of the technology, or combination of technologies, that may be utilized for communications. An assumed concept of RCP and its relationships with the performance requirements of this document are contained in Section 1.5.1.

1.2.3 AMS(R)S System Overview

The Aeronautical Mobile-Satellite (R) Service, abbreviated as AMS(R)S, is the designation by the ICAO and ITU for two-way communications via satellite(s) pertaining to aeronautical safety and regularity of flight national or international civil air routes. The designator (R) in AMS(R)S indicates that the allocation is intended for aeronautical com-

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