

TABLE OF CONTENTS

Executive Summary	I
I. Study Overview	I
II. Inventory	I
III. Forecast	III
IV. Facility Needs.....	VI
V. Alternatives/System Performance.....	VII
VI. Costs	VIII
VII. Sensitivity Analysis.....	VIII
VIII. Recommended System.....	XV
1. Inventory And Data Collection	1
1.1 Inventory Overview	1
1.2 Surveys of System Airports.....	3
1.3 Existing System.....	3
1.4 Summary of Key Information	3
1.5 Summary of Inventory Effort	19
2. Aviation Activity Forecasts	20
2.1 Forecast Overview	20
2.2 General Aviation Activity	20
2.2.1 Based General Aviation Aircraft Forecast	21
2.2.2 Fleet Mix Forecast for Based General Aviation Aircraft.....	30
2.2.3 General Aviation Operations.....	40
2.3 Commercial Airline Activity	58
2.3.1 Historical Enplaned Passengers.....	58
2.3.2 Forecast of Commercial Passenger Enplanements	61
2.3.3 Enplanement Forecasts for Ronald Reagan Washington National and Washington Dulles International	77
2.3.4 Forecast of Commercial Aircraft Operations.....	80
2.3.5 Commercial Aircraft Operations Forecast for Ronald Reagan Washington National and Washington Dulles International Airports.....	87
2.4 Summary	90
3. Facilities Objectives Analysis	93
3.1 Chapter Overview	93
3.2 VATSP Airport Classification System and Airport Roles	94
3.2.1 Past Roles for Airports in Virginia	94
3.2.2 Current Roles for Airports in Virginia	95
3.2.3 Comparison of VATSP Roles to NPIAS and FAA Asset Roles.....	98
3.3 The Ability of Virginia Airports to Meet Licensing Standards.....	105
3.4 The Ability of Virginia Airports to Meet the Virginia Airport Board's Basic Airport Unit Criteria	110

3.5	Facility, Service, and Equipment (FS&E) Objectives.....	113
3.6	Facility, Service, and Equipment (FS&E) Objectives Analysis.....	118
3.6.1	Airside Facility Objectives.....	118
3.6.2	Airport Reference Code (ARC).....	118
3.6.3	Airfield Capacity.....	120
3.6.4	Primary Runway Length and Width.....	121
3.6.5	Runway Strength.....	123
3.6.6	Taxiway Type.....	125
3.6.7	Approach Type.....	126
3.6.8	Airport Runway Instrumentation.....	128
3.6.9	Weather.....	130
3.6.10	Air Traffic Control Communications.....	131
3.6.11	Additional Visual Aids.....	133
3.6.12	Landside Facilities.....	134
3.6.13	Aircraft Hangar Storage.....	134
3.6.14	Apron Area.....	138
3.6.15	Terminal Building.....	140
3.6.16	Auto Parking Space.....	142
3.6.17	Services.....	144
3.6.18	Fixed Base Operators (FBO).....	144
3.6.19	Fuel.....	146
3.6.20	Aircraft Maintenance.....	147
3.6.21	Aircraft Rental & Charter Service.....	148
3.6.22	Pilot Training.....	150
3.6.23	Terminal/Pilot Services.....	150
3.6.24	Ground Transportation Services.....	152
3.6.25	Utilities.....	153
3.6.26	Equipment Objectives.....	153
3.6.27	Maintenance Objectives.....	154
3.7	Safety/Compliance Objectives.....	159
3.7.1	Runway Safety Area (RSA).....	161
3.7.2	Runway Protection Zone (RPZ) Protection.....	161
3.7.3	Approach Surfaces.....	163
3.7.4	Runway Object Free Area (ROFA).....	164
3.7.5	Displaced Threshold.....	165
3.7.6	Future Development.....	165
3.8	Airport Planning Objective.....	166
3.9	Summary.....	167
4.	Alternatives Analysis.....	253
4.1	Chapter Overview.....	253
4.1.1	Factors Used to Review System Performance.....	253
4.1.2	Current System Performance.....	255
4.1.3	Access to Any System Airport.....	255

4.1.4	Access to Airports with Commercial Air Service.....	257
4.1.5	Access to Airports with a Runway Length of 5,500 Feet or Greater	260
4.1.6	Access to Airports with a Precision Instrument Approach.....	262
4.1.7	Access to Airports with On-Site Weather Reporting Equipment	264
4.1.8	Access to Business Class Airports	266
4.2	Results of Current System Performance Review	268
4.3	Alternatives Identification and Review	270
4.3.1	Access to Any System Airport.....	270
4.3.2	Access to Airports with Commercial Airline Service	273
4.3.3	Access to Airports with a Runway Length of 5,500 feet or Greater	273
4.3.4	Access to Airports with a Precision Instrument Approach.....	277
4.3.5	Access to Airports with On-Site Weather Reporting Equipment	278
4.3.6	Access to Airports that Serve Business Aircraft Needs.....	282
4.4	Alternatives Analysis Conclusions	284
4.4.1	Access to Any System Airports.....	284
4.4.2	Access to Airports with Commercial Airline Service	285
4.4.3	Access to Airports with a Runway Length of 5,500 feet or Greater	285
4.4.4	Access to Airports with a Precision Instrument Approach.....	286
4.4.5	Access to Airports with an On-Site Weather Reporting System.....	287
4.4.6	Access to Airports that Serve Business Aircraft Needs.....	287
4.5	Recommended Changes to Existing Airport Roles	290
5.	Development Costs	292
5.1	Chapter Overview	292
5.2	Cost Development.....	292
5.3	Funding Sources	294
5.4	Project Classification and Funding Distribution	295
5.5	Summary of Costs.....	296
6.	Sensitivity Analysis	301
6.1	Chapter Overview	301
6.2	Sensitivity to Accessibility and Costs for Airports with Business Class Characteristics	301
6.2.1	Business Class Airport Accessibility Created by Development on Existing Airports and Associated Costs.....	302
6.2.2	Business Class Airport Accessibility Provided by New and Replacement Airports and Associated Costs.....	304
6.2.3	Accessibility to a Business Class Airport	306
6.2.4	Summary of Business Class Airport Accessibility	307
6.3	Accessibility Provided by Out-of-State, Privately-Owned, Non-NPIAS Publicly-Owned, and Commercial Service Airports	307
6.3.1	Accessibility Provided by Nearby Out-of-State Airports to Any Airport	309
6.3.2	Accessibility Provided by Nearby Out-of-State Business Airports	309
6.3.3	Accessibility Provided by Nearby Out-of-State Commercial Service Airports	311
6.3.4	Summary of Accessibility Provided by Out-of-State Airports	311

6.3.5	Accessibility Provided by Privately-Owned Airports	312
6.3.6	Summary of Accessibility Provided by Privately-Owned Airports	315
6.3.7	Accessibility Provided by Publicly-Owned, Public Use Non-NPIAS Airports	317
6.3.8	Summary of Accessibility Provided by Publicly-Owned Public Use Non-NPIAS Airports	319
6.3.9	Accessibility to Commercial Service Airports.....	319
6.3.10	Summary of Accessibility to Commercial Service Airports	322
6.4	Sensitivity to Costs	322
6.4.1	Sensitivity to Deviations in Aviation Demand Forecasts.....	322
6.4.2	Sensitivity to FAA Funding Levels	324
6.4.3	Summary of Cost Sensitivity.....	326
6.5	DOAV Turf Runway Initiative.....	327
6.6	Summary	328
7.	Plan Summary And Recommendations.....	331
7.1	Chapter Overview	331
7.2	Airport Demand Objectives	331
7.2.1	Aviation Demand Response	334
7.3	Airport Facility Objectives	334
7.3.1	Costs to Implement FS&E Objectives.....	334
7.3.2	Runway Extensions Recommended in FS&E Objectives	335
7.3.3	Costs to Implement Master Plan and Airport Capital Improvement Plan (ACIP) Improvements	337
7.3.4	Runway Extensions Identified in Master Plans and Airport-Specific ACIPs.....	338
7.3.5	Actions to Meet Virginia Licensing Standards	339
7.3.6	Actions to Meet Criteria for Virginia’s Basic Airport Unit.....	340
7.3.7	Airport Facility Recommendations	342
7.4	Airport Accessibility Objectives	343
7.4.1	Accessibility to Commercial Service Airports.....	343
7.4.2	Ground Accessibility to Any Airport.....	346
7.4.3	Air Accessibility to Any Airport	346
7.4.4	Accessibility Provided by Privately-Owned Airports	348
7.4.5	Accessibility Provided by Publicly-Owned, Non-NPIAS General Aviation Airports.....	351
7.4.6	Accessibility to Business Class Airports	353
7.5	Airport Role Objectives	357
7.5.1	Recommended Airport Role Changes	357
7.5.2	Recommended Roles for Replacement and New System Airports.....	357
7.5.3	Airport Role Recommendations	358
7.6	System Development Cost Objectives	359
7.7	State Funding.....	361
7.7.1	Commonwealth Airport Fund	361
7.7.2	Aviation Special Funds.....	362
7.7.3	State Funding and the Recommended Plan.....	363
7.8	Funding Level Gap Analysis	364
7.9	Recommended System	366

Appendices

- Appendix A: Sponsor Survey Form Sample
- Appendix B: Population Analysis Methodology
- Appendix C: Individual Airport Project Lists
- Appendix D: Proposed Airport Project Lists

List of Tables

Table I:	Average Annual Growth Rates for Based General Aviation Aircraft	IV
Table II:	Actual and Forecast Commercial Aircraft Operations at Ronald Reagan Washington National and Washington Dulles International Airports	V
Table III:	Accessibility to Virginia System	VII
Table IV:	Unconstrained Development Cost Summary Table	VIII
Table V:	Business Class Airports Serving Virginia	XI
Table VI:	Project Costs for the 0-5 Year Planning Period.....	XV
Table VII:	Project Costs for the 5-10 Year Planning Period.....	XVI
Table VIII:	Project Costs for the 10+ Year Planning Period.....	XVI
Table IX:	Total Project Costs across the Planning Period	XVII
Table 1 - 1:	Aircraft Approach Category (AAC).....	4
Table 1 - 2:	Airplane Design Group (ADG)	4
Table 1 - 3:	Primary Runway Lengths.....	7
Table 1 - 4:	Instrument Approach Capability & Minima	11
Table 1 - 5:	NAVAIDS and Lighting.....	15
Table 2 - 1:	Historic Average Annual Growth Rates for.....	22
Table 2 - 2:	Comparison of Forecast Growth for Based Aircraft in Virginia and the U.S.	26
Table 2 - 3:	Preferred Based Aircraft Forecasts by Airport.....	27
Table 2 - 4:	Growth Rate Assumptions for Virginia's General Aviation Fleet by Aircraft Category	34
Table 2 - 5:	Comparison of U.S. and Virginia General Aviation Fleet Growth by Aircraft Category ...	35
Table 2 - 6:	Actual and Forecast General Aviation Fleet Mix for Study Airports	37
Table 2 - 7:	Actual Operations per Based Aircraft at Virginia Airports.....	44
Table 2 - 8:	Actual and Assumed Future Year Operations per Based Aircraft Assumptions for Virginia Airports.....	45
Table 2 - 9:	Actual and Forecast General Aviation Operations for Virginia Airports	48
Table 2 - 10:	Comparison of Based General Aviation Aircraft at NPIAS Airports in Virginia and Neighboring States.....	51
Table 2 - 11:	Comparison of Operations per Based Aircraft (OBPA) at all NPIAS Airports.....	52
Table 2 - 12:	Unweighted Statewide 5-Year (2008-2012) Average OPBA for all NPIAS Airports (Virginia and Neighboring States).....	53
Table 2 - 13:	Towered Airports in Virginia and Neighboring States.....	54
Table 2 - 14:	Towered Airport Operations per Based Aircraft in Virginia and Neighboring States	55
Table 2 - 15:	Historical Enplanement Growth for Virginia Airports and the U.S.	59
Table 2 - 16:	Historical and Forecast Virginia Real Personal Income	63



Table of Contents

Table 2 - 17: Actual and Forecast Airport Shares of Total Virginia Enplanements 65

Table 2 - 18: Actual and Forecast Real Personal Income for Virginia Commercial Service
Airport Market Areas 66

Table 2 - 19: Actual and Forecast Passenger Enplanements at Virginia Commercial Service
Airports 75

Table 2 - 20: Actual and Forecast Passenger Enplanements at Ronald Reagan Washington National
and Washington Dulles International Airports 79

Table 2 - 21: Current Average Passenger Load Factors at 81

Table 2 - 22: Average Aircraft Size and Load Factor Assumptions for Virginia Commercial Service
Airports 82

Table 2 - 23: Actual and Forecast Commercial Passenger Aircraft Operations at Virginia Airports 83

Table 2 - 24: Actual and Forecast Commercial Aircraft Operations at Ronald Reagan Washington
National and Washington Dulles International Airports 89

Table 2 - 25: Summary of Aviation Demand Projections 92

Table 3 - 1: Comparison of Past and Current VATSP Roles for Virginia Airports 96

Table 3 - 2: FAA NPIAS Airport Roles - Virginia Airport Roles 98

Table 3 - 3: FAA GA Categories and Criteria 101

Table 3 - 4: FAA General Aviation Asset and VATSP Service Roles 103

Table 3 - 5: Virginia Airports Not Meeting Licensing Standards 108

Table 3 - 6: Virginia Airports Not Meeting Basic Airport Unit Criteria 110

Table 3 - 7: Virginia Airports Not Meeting Basic Airport Unit Criteria for a Terminal 112

Table 3 - 8: Aircraft Storage Distribution 135

Table 3 - 9: Maintenance Equipment Minimum Objectives 154

Table 3 - 10: Existing and Recommended Airport Reference Codes (ARCs) 169

Table 3 - 11: Existing and Recommended Airfield Capacity 172

Table 3 - 12: Existing and Recommended Primary Runway Lengths and Widths 175

Table 3 - 13: Existing and Recommended Primary Runway Strength 178

Table 3 - 14: Existing and Recommended Taxiways 181

Table 3 - 15: Existing and Recommended Approaches 184

Table 3 - 16: Existing and Recommended Airport Runway Instrumentation 187

Table 3 - 17: Existing and Recommended On-Site Weather Reporting 191

Table 3 - 18: Existing and Recommended Communications 194

Table 3 - 19: Existing and Recommended Visual Aids 197

Table 3 - 20: Existing and Recommended T-Hangars 200

Table 3 - 21: Existing and Recommended Conventional Hangars 203

Table 3 - 22: Existing and Recommended Apron Area 206

Table 3 - 23: Existing and Recommended Terminal Buildings 209

Table 3 - 24: Existing and Recommended Auto Parking 212

Table 3 - 25: Existing and Recommended FBO 215

Table 3 - 26: Existing and Recommended Fuel 218

Table 3 - 27: Existing and Recommended Aircraft Maintenance 221

Table 3 - 28: Existing and Recommended Aircraft Rental and Charter Service 224

Table 3 - 29: Existing and Recommended Pilot Training 227



Table of Contents

Table 3 - 30:	Existing and Recommended Terminal/Pilot Services.....	230
Table 3 - 31:	Existing and Recommended Ground Transportation	233
Table 3 - 32:	Existing and Recommended Utilities	236
Table 3 - 33:	Existing and Recommended Pavement Maintenance.....	239
Table 3 - 34:	Existing RSA and RPZ Objectives.....	242
Table 3 - 35:	Existing Approach Surface, ROFA, and Displaced Threshold Objectives	246
Table 3 - 36:	Existing and Recommended Planning Documents	250
Table 4 - 1:	Existing and Future Population Coverage for 45 and 30 Minutes System Drive Times	257
Table 4 - 2:	Access to Airports with a Runway Length of 5,500 Feet or Greater	260
Table 4 - 3:	Airports with Current Precision Approach/Vertical Guidance.....	264
Table 4 - 4:	Airports with Current On-Site Weather Reporting Equipment.....	266
Table 4 - 5:	Current Business Class Airports.....	268
Table 4 - 6:	Results of Current System Performance Review	268
Table 4 - 7:	Airports Recommended for a 5,500-foot Runway Length	286
Table 4 - 8:	Virginia Counties above the State Average Population Growth Rate	289
Table 4 - 9:	Virginia Business Class Airports - Existing & Recommended.....	291
Table 5 - 1:	Virginia AIP Funding 2003-2013.....	294
Table 5 - 2:	Virginia Airport Capital Plan Funding.....	296
Table 5 - 3:	Development Cost Summary Tables	298
Table 5 - 4:	Development Cost Summary Tables by Airport	299
Table 6 - 1:	Runway Extensions Summary.....	303
Table 6 - 2:	Costs of Runway Extensions at Existing Airports to a 5,500-foot Runway Length.....	304
Table 6 - 3:	Proposed and Replacement Airport Summary	305
Table 6 - 4:	Privately-Owned, Public Use Airports – NPIAS Airports Only.....	312
Table 6 - 5:	Privately-Owned, Public Use Airport Development Costs.....	317
Table 6 - 6:	Publicly-Owned, Public Use Non-NPIAS Airports	318
Table 6 - 7:	Publicly-Owned, Non-NPIAS Airport Development Costs.....	319
Table 6 - 8:	Commercial Service Airport Accessibility by Drive Times	322
Table 6 - 9:	Forecast Demand Ranges	323
Table 6 - 10:	Forecast Demand Deviation Effect on Project Costs	323
Table 6 - 11:	Forecast Demand Deviation Effect on Project Costs	325
Table 6 - 12:	Impact of FAA Funding Scenarios on State Funding Levels.....	326
Table 7 - 1:	Costs to Meet FS&E Objectives	335
Table 7 - 2:	Runway Extensions to Meet VATSP FS&E Objectives.....	336
Table 7 - 3:	Costs for ACIP and Master Plan Projects.....	338
Table 7 - 4:	ACIP/ALP/MPU Runway Extensions	338
Table 7 - 5:	Projects and Costs to Resolve Licensing Standards Deficiencies.....	339
Table 7 - 6:	Projects and Costs to Resolve Basic Airport Unit Deficiencies.....	341
Table 7 - 7:	System Development Cost Summary.....	343
Table 7 - 8:	Recommended Changes to State Airport Roles.....	357

Table 7 - 9:	Costs for Replacement and Proposed New Regional Airports	358
Table 7 - 10:	Development Costs for All Virginia Airports.....	359
Table 7 - 11:	Development Costs for All Virginia Airports by Funding Source	360
Table 7 - 12:	Average Annual Funding Needs vs. Historic Average Annual Funds.....	361
Table 7 - 13:	Capital Airport Funds, Funding History.....	362
Table 7 - 14:	State Funding Needs over the Plan Period	364
Table 7 - 15:	Recommended Airport System.....	366

List of Figures

Figure I:	Current Virginia Air Transportation System	II
Figure II:	Actual and Forecast Passenger Aircraft Operations at Virginia Commercial Service Airports	IV
Figure III:	Forecast of Based Aircraft at Virginia Commercial Service and	V
Figure IV:	Forecast of Statewide General Aviation Operations	VI
Figure V:	Future System Accessibility	X
Figure VI:	Commercial Service Airport Accessibility	XII
Figure VII:	Recommended Business Class Airport Accessibility	XIV
Figure VIII:	Funding Level Gap Analysis	XVIII
Figure IX:	Recommended System.....	XIX

Figure 1 - 1:	Current Virginia Air Transportation System	2
Figure 2 - 1:	Historic Based Aircraft at Virginia Commercial Service and General Aviation Airports ...	21
Figure 2 - 2:	Comparison of Results for Based Aircraft Forecast Methodologies.....	24
Figure 2 - 3:	Comparison of Forecast Average Annual Growth for Based Aircraft.....	24
Figure 2 - 4:	Forecast of Based Aircraft at Virginia Commercial Service and General Aviation Airports	26
Figure 2 - 5:	Historical Virginia and Comparative U.S. General Aviation Fleet Mix.....	30
Figure 2 - 6:	Change in General Aviation Fleet by Aircraft Category for Virginia and the U.S. 2000 to 2012	31
Figure 2 - 7:	Change in General Aviation Fleet by Aircraft Category for Virginia and the U.S. 2007 to 2012	32
Figure 2 - 8:	Forecast Growth Rates for the U.S. and	33
Figure 2 - 9:	Forecast Based General Aviation Aircraft Fleet Mix at Virginia Airports.....	34
Figure 2 - 10:	Actual and Forecast Based General Aviation Aircraft Fleet Mix at Virginia Airports.....	36
Figure 2 - 11:	Actual 2000 and 2012 Statewide General Aviation Operations	41
Figure 2 - 12:	Forecast of Statewide General Aviation Operations	57
Figure 2 - 13:	Virginia Historical Passenger Enplanements.....	58
Figure 2 - 14:	Historical Passenger Enplanements at Virginia Airports.....	60
Figure 2 - 15:	Econometric Forecast Model for Virginia Commercial Service Airport Enplanements	62
Figure 2 - 16:	Forecast of Passenger Enplanements at Virginia Commercial Service Airports	64
Figure 2 - 17:	Actual and Forecast of Passenger Enplanements at Richmond Int. Airport.....	67
Figure 2 - 18:	Actual and Forecast of Passenger Enplanements at Norfolk International Airport.....	68

Figure 2 - 19: Actual and Forecast of Passenger Enplanements at Newport News-Williamsburg International Airport.....	69
Figure 2 - 20: Actual and Forecast of Passenger Enplanements at Roanoke-Blacksburg Regional Airport.....	70
Figure 2 - 21: Actual and Forecast of Passenger Enplanements at Charlottesville-Albemarle Airport..	71
Figure 2 - 22: Actual and Forecast of Passenger Enplanements at Lynchburg Regional Airport.....	72
Figure 2 - 23: Actual and Forecast of Passenger Enplanements at Shenandoah Valley Regional Airport.....	73
Figure 2 - 24: Actual and Forecast Average Annual Enplanement Growth for Virginia Commercial Service Airports.....	74
Figure 2 - 25: Actual and Forecast of Passenger Enplanements at Ronald Reagan Washington National Airport	77
Figure 2 - 26: Actual and Forecast Passenger Enplanements at Washington Dulles International Airport.....	78
Figure 2 - 27: Actual and Forecast Passenger Enplanements at All Virginia Commercial Service Airports	80
Figure 2 - 28: Actual and Forecast Passenger Aircraft Operations at All Virginia Commercial Service Airports.....	86
Figure 2 - 29: Actual and Forecast Commercial Airline Operations at Ronald Reagan Washington National Airport	87
Figure 2 - 30: Actual and Forecast Commercial Airline Operations at Washington Dulles International Airport.....	88
Figure 2 - 31: Actual and Forecast Commercial Airline Operations.....	90
Figure 3 - 1: FAA Asset Study - GA Airport Categories	101
Figure 3 - 2: Facility, Service, and Equipment Minimum Objectives Chart.....	114
Figure 3 - 3: Percent of Airports by Role that Meet ARC Objective	119
Figure 3 - 4: Percent of Airports by Role that Meet Airfield Capacity Objectives	121
Figure 3 - 5: Percent of Airports by Role that Meet Runway Length Objectives	122
Figure 3 - 6: Percent of Airports by Role that Meet Runway Width Objectives	123
Figure 3 - 7: Percent of Airports by Role that Meet Runway Strength Objectives.....	124
Figure 3 - 8: Percent of Airports by Role that Meet Taxiway Objectives	125
Figure 3 - 9: Percent of Airports by Role that Meet Approach Objectives	127
Figure 3 - 10: Percent of Airports by Role that Meet Airport Runway Instrumentation Objectives.....	129
Figure 3 - 11: Percent of Airports by Role that Meet Weather Objectives.....	131
Figure 3 - 12: Percent of Airports by Role that Meet Air Traffic Control Communications Objectives .	132
Figure 3 - 13: Percent of Airports by Role that Meet Visual Aids Objectives.....	133
Figure 3 - 14: Percent of Airports by Role that Meet T-Hangar Space Objectives	136
Figure 3 - 15: Percent of Airports by Role that Meet Conventional Hangar Space Objectives	137
Figure 3 - 16: Percent of Airports by Role that Meet Apron Space Objectives.....	139
Figure 3 - 17: Percent of Airports by Role that Meet Terminal Building Space Objective	141
Figure 3 - 18: Percent of Airports by Role that Meet Auto Parking Objectives.....	143
Figure 3 - 19: Percent of Airports by Role that Meet FBO Objectives	145
Figure 3 - 20: Percent of Airports by Role that Meet Fuel Objectives.....	146

Figure 3 - 21: Percent of Airports by Role that Meet Maintenance Objectives	148
Figure 3 - 22: Percent of Airports by Role with Availability to Aircraft Rental	149
Figure 3 - 23: Percent of Airports by Role with Availability to Aircraft Charter Service	149
Figure 3 - 24: Percent of Airports by Role that Meet Pilot Training Objectives	150
Figure 3 - 25: Percent of Airports by Role that Meet Terminal/Pilot Services Objectives	151
Figure 3 - 26: Percent of Airports by Role that Meet Ground Transportation Objectives	152
Figure 3 - 27: Percent of Airports by Role that Meet Utilities Objectives	153
Figure 3 - 28: Percent of Airports by Role that Meet Pavement Maintenance Objectives	156
Figure 3 - 29: Percent of Airports by Role that Meet Safety/Compliance Objectives	160
Figure 3 - 30: Percent of Airports by Role that Meet Planning Document Objectives	167
Figure 4 - 1: Current Access to Any Airport	256
Figure 4 - 2: Current Access to Commercial Service Airports within a 45 Minute Drive Time	259
Figure 4 - 3: Current Access to Airports with a 5,500-foot Runway or Greater	261
Figure 4 - 4: Current Access to Airports with Precision Approach and LPV Guidance	263
Figure 4 - 5: Current Access to Airports with On-Site Weather Reporting Systems.....	265
Figure 4 - 6: Current Access to Business Class Airports	267
Figure 4 - 7: Future Access to Existing and Recommended Airport System.....	271
Figure 4 - 8: Future Access to Commercial Service Airports	274
Figure 4 - 9: Future Access to Airports with a Runway Length of 5,500 feet or Greater.....	276
Figure 4 - 10: Future Access to Airports with a Precision Approach	279
Figure 4 - 11: Future Access to Airports with On-Site Weather Reporting System	281
Figure 4 - 12: Future Access to Business Class Airports.....	283
Figure 6 - 1: Business Class Airports, Runway Extension Constraints	308
Figure 6 - 2: Accessibility Provided by Out-of-State Airports	310
Figure 6 - 3: Accessibility Provided by Privately-Owned and Non-NPIAS Airports	316
Figure 6 - 4: Commercial Service Airport Population Coverage	321
Figure 7 - 1: Existing and Projected Statewide Demand for Key Activities	332
Figure 7 - 2: Commercial Service Airports Serving Virginia Demand within a 45-minute Drive Time	345
Figure 7 - 3: Existing and Recommended Airports Providing Approaches with Vertical Guidance ...	347
Figure 7 - 4: Privately-Owned, Public Use System Airports.....	350
Figure 7 - 5: Publicly-Owned, Non-NPIAS Airports.....	352
Figure 7 - 6: Existing and Recommended Business Class Airports	355
Figure 7 - 7: Funding Level Gap Analysis	366
Figure 7 - 8: Recommended Virginia Aviation System	369

Acronyms and Abbreviations

The following is a list of acronyms and abbreviations found throughout the 2013 Virginia Air Transportation System Plan Update:

AAC	AIRCRAFT APPROACH CATEGORY
AAG	AVERAGE ANNUAL GROWTH (SEE FORECAST - PACKAGE 2)
AAGR/AARG	AVERAGE ANNUAL GROWTH RATE/AVERAGE ANNUAL RATE OF GROWTH
AC 150/5060-5	FAA AIRPORT CAPACITY AND DELAY ADVISORY CIRCULAR
ADG	AIRPLANE DESIGN GROUP
ADS-B	AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST
ALP	AIRPORT LAYOUT PLAN
ALSF 2	HIGH INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHING LIGHTS
AMP	AIRPORT MASTER PLAN
APAP	ABBREVIATED PRECISION APPROACH PATH
ARFF	AIRCRAFT RESCUE AND FIRE FIGHTING
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
ASSET STUDY	FAA AIRPORTS STRATEGIC SYSTEMS EVALUATION TASK STUDY
ASV	ANNUAL SERVICE VOLUME
ATCT	AIRPORT TRAFFIC CONTROL TOWER
AWOS	AUTOMATED WEATHER OBSERVING SYSTEM
CAGR	COMPOUND AVERAGE GROWTH RATE
CAT-EX	CATEGORICAL EXCLUSION
CM	COMMERCIAL
CS	COMMERCIAL SERVICE
DME	DISTANCE MEASURING EQUIPMENT
DOAV	VIRGINIA DEPARTMENT OF AVIATION
DTW	DUAL TANDEM WHEEL
DW	DUAL WHEEL
EA	ENVIRONMENTAL ASSESSMENT
EIS	ENVIRONMENTAL IMPACT STATEMENT
EX	EXAMPLE
FAA	FEDERAL AVIATION ADMINISTRATION
FAA-TAF	FEDERAL AVIATION ADMINISTRATION-TERMINAL AREA FORECAST
FAR	FEDERAL AVIATION REGULATIONS
GA	GENERAL AVIATION
GC	GENERAL AVIATION COMMUNITY
GCO	GROUND COMMUNICATION OUTLET
GPS	GLOBAL POSITIONING SYSTEM
GR	GENERAL AVIATION REGIONAL
HELO	HELICOPTER
HIRL	HIGH INTENSITY RUNWAY LIGHTING
I.E.	FOR EXAMPLE/IN OTHER WORDS
LIRL	LOW INTENSITY RUNWAY LIGHTING

LO	LOCAL SERVICE
MALS	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS
ME	MULTI-ENGINE PISTON
MIRL	MEDIUM INTENSITY RUNWAY LIGHTING
NAVAIDS	NAVIGATIONAL AIDS
NDB	NON-DIRECTIONAL BEACON
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NPIAS	NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS
ODALS	OMNI-DIRECTIONAL APPROACH LIGHTING SYSTEM
OPS	OPERATIONS
OPS/ASV	ANNUAL OPERATIONS DIVIDED BY ANNUAL SERVICE VOLUME
PAPI	PRECISION APPROACH PATH INDICATOR
PCI	PAVEMENT CONDITION INDEX
PVASI	PULSATING VISUAL APPROACH SLOPE INDICATOR
RCO	REMOTE COMMUNICATION OUTLET
REILS	RUNWAY END IDENTIFIER LIGHTS
RL	RELIEVER
ROFA	RUNWAY OBJECT FREE AREA
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
RTR	REMOTE TRANSMITTER/RECEIVER
SPCC	SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN
SE	SINGLE-ENGINE PISTON
SF	SQUARE FEET
SW	SINGLE WHEEL
SWPPP	STORMWATER POLLUTION PREVENITION PLAN
SY	SQUARE YARD
TAF	TERMINAL AREA FORECAST
TJ	TURBOJET
TP	TURBOPROP
TRIL	TRI-COLOR VISUAL APPROACH SLOPE INDICATOR
VASI	VISUAL APPROACH SLOPE INDICATOR
VATSP	VIRGINIA AIR TRANSPORTATION SYSTEM PLAN
VGVA	VERTICAL GUIDANCE VISUAL AIDS
VOR	VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE
VORTAC	VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE TACTICAL AIR NAVIGATIONAL AID
YRS	YEARS