

PennDOT

Multi-Modal Planning & Implementation Services

State Aviation System Plan Update



Commonwealth of Pennsylvania Department of Transportation Bureau of Aviation

Overview

The 2007 State Aviation System Plan (SASP) Update addressed four key elements of the previous (2002) SASP report:

- Airport classifications and the state of the system
- Pennsylvania's airports in the National Plan of Integrated Airport Systems (NPIAS)
- Project benefits and system contribution analyses
- Ideal funding level

What is New and Why

Updated Classification Criteria and Reclassified Airports

In the 2002 SASP, the "advanced" classification included too broad a range of airports, from York to Philadelphia International. Classifications were based on subjective weightings applied to specific facility amenities and services "performance" criteria. The 2007 SASP Update defined airport classifications based solely on the objective facility amenities and services for each airport type. All "advanced" and several "intermediate" airports were reviewed and reclassified as "commercial service" (15), "advanced" (15), and "intermediate" (21).

State of the System

SASP airports' adherence to the performance criteria for the "commercial service," "advanced," and "intermediate" classifications was reviewed. This review compared the data pertaining to these performance criteria contained in the 1999 and 2005 SASP airport inventory tables. The percent of airports that achieved these performance criteria was determined. The vast majority of Pennsylvania's airports meet the key performance criteria for runways and taxiways.

Pennsylvania's NPIAS Airports

The FAA entry requirements for NPIAS airports were studied as were the 64 AIP eligible NPIAS airports in Pennsylvania. Eight case-study airports were examined and recommendations made regarding their NPIAS status. This process was documented for future use by PennDOT. A GIS map was developed to illustrate the coverage of NPIAS airports throughout the state, based on 30-minute drive times.

Project Benefits and System Contribution Analyses

In order to analyze and prioritize projects, a process was developed to determine which projects provide the greatest benefit to the system based on the operational contribution to the system and on project cost. The process calculates the operational contribution to the system from runway, taxiway, and apron projects. The process assigns a higher weight to projects at busier airports and identifies the level of sponsor and project readiness.

Definition of an Ideal Four-Year Funding Level

A tool was developed to estimate ideal or realistic funding levels tied to typical project implementation timelines and statewide funding demand for any four-year period. This tool provides an estimate of ideal funding levels that are supportable and realistic.



Element 1—Significant Changes

Objectives

- Refine the airport classification system
- Assess the “State of the System” in terms of facility amenities and services performance criteria

Classifications—Amenities and Services Criteria

The key amenities and services criteria for the “advanced” and “intermediate” airports from the 2002 SASP are listed in the table below. There was no “commercial service” classification in the 2002 SASP.

Commercial Service	Advanced	Intermediate
N/A	5,000-foot main runway	4,000-foot main runway
	Visibility Minimums: 200 ft and ½ mile	Visibility Minimums: 400 ft and 1 mile
	HIRLs	MIRLs

The amenities and services criteria used to evaluate airports for reclassification into the new “commercial service” and revised “advanced” classes in the 2007 SASP were as follows. Revised criteria from the 2002 SASP are shown in red.

2007 SASP Update Classification Criteria

Commercial Service	Advanced	Intermediate
CFR Part 139 Certification— Class I, II & III	4,500-foot main runway	3,800-foot main runway
	Visibility Minimums: 400 feet and ¾ mile	Visibility Minimums: 600 feet and 1 mile
	MIRLs or HIRLs	MIRLs

“Advanced” and “Intermediate” airports had to meet at least two of these criteria.

Unless they were reclassified to or from “advanced,” airports classified as “intermediate” in the 2002 SASP remained in that classification in the 2007 SASP.

An additional “sensitivity” test was used in the classification review, which consisted of confirming the items listed in the table below. This test was to identify which airports, if any, experienced notable decreases in either operations or based aircraft, and indicates the extent to which the airport is performing its role in the state system.

Sensitivity Tests
NPIAS Designation
Steady or increased aviation activity from 1999 to 2005
Steady or increased based aircraft from 1999 to 2005

Airports which met the revised advanced criteria, but did not pass the sensitivity test were not reclassified.



Airport Reclassifications

Underlined airports were reclassified using the 2007 criteria listed above except for those in the “commercial service” classification, which were all reclassified. Those in the “advanced” classification were reclassified from “intermediate,” and those in the “intermediate” classification were reclassified from “advanced.”

Commercial Service (15)

Altoona-Blair County	ADO	Lancaster	LNS
Arnold Palmer Regional	LBE	Lehigh Valley International	ABE
Bradford Regional	BFD	Philadelphia International	PHL
DuBois-Jefferson County	DUJ	Pittsburgh International	PIT
Erie International	ERI	University Park	UNV
Harrisburg International	MDT	Venango Regional	FKL
Johnstown-Cambria County	JST	Wilkes-Barre/Scranton Int'l	AVP
Williamsport Regional	IPT		

Advanced (15)

Allegheny County	AGC	Northeast Philadelphia	PNE
Beaver County	BVI	Penn Valley, Selinsgrove	SEG
<u>Bedford County</u>	HMZ	Port Meadville	GKJ
Butler County	BTP	Reading Regional	RDG
Chester County	MQS	Schuylkill Co – Joe Zerbey	ZER
Capital City	CXY	<u>Washington County</u>	AFJ
Hazleton Municipal	HZL	York	THV
<u>Mifflin County</u>	RVL		

Intermediate (21)

Bradford County	N27	Perkiomen Valley	N10
Brandywine, West Chester	OQN	<u>Pocono Mountains Municipal</u>	MPO
Carlisle	N94	Pottstown Municipal	N47
Clearfield-Lawrence	FIG	<u>Pottstown Limerick</u>	PTW
Connellsville	VVS	Quakertown	UKT
Donegal Springs Airpark	N71	Queen City, Allentown	1N9
<u>Doylestown</u>	DYL	Rock, Pittsburgh	9G1
Indiana County	IDI	Rostraver, Monongahela	FWQ
New Castle Municipal	UCP	<u>Wings Field, Philadelphia</u>	LOM
New Garden Flying Field	N57	Zelienople Municipal	PJC
Northumberland County	N79		

Notes:

Airports meeting the 2007 criteria but not the sensitivity test were not reclassified.

Airports in the Basic, Limited, or Special Use classifications in the 2002 SASP were not evaluated for reclassification in this study.



State of the System

The amenities and services performance criteria listed below were used to evaluate and report on the state of the system. Criteria in red are different from the 2002 SASP.

Amenity/Service	Commercial Service	Advanced ¹	Intermediate ²
Runway Length	5,000 feet	4,500 feet	3,800 feet
Runway Width	ARC C-II	ARC B-II	ARC B-II
Runway Strength	60,000 pounds SW	30,000 pounds SW	12,500 pounds SW
Taxiway	Full parallel	Full parallel	Full parallel
NAVAIDS ³	200 feet and ½ mile	400 feet and ¾ mile	600 feet and 1 mile
Approach Aids	Beacon, wind cone, REILS, PAPIs, MALSR	Beacon, wind cone, REILS, PAPIs, ALS	Beacon, wind cone, REILS, VGSIs
Runway Edge Lights	HIRLs	MIRLs or HIRLs	MIRLs
Weather	ASOS/AWOS	ASOS/AWOS	ASOS/AWOS
Facilities	FBO, phone, bathroom, jet fuel, repairs, ground transportation	FBO, phone, bathroom, jet fuel, repairs, ground transportation	FBO, phone, bathroom, jet fuel, repairs, ground transportation
Services	Aircraft and auto parking, storage, terminal	Aircraft and auto parking, storage, terminal	Aircraft and auto parking, storage, terminal

¹ “Advanced” runway length criterion was based on Figure 3-1 in FAA AC 150/5325-4B, “Runway Length Requirements for Airport Design,” page 12, for 75% of the fleet at 60% useful load at 75°F, sea level, and dry runway.

² “Intermediate” runway length and strength criteria were based on Figure 2-1 from AC 150/5325-4B, page 7, for aircraft 12,500 pounds or less and runway lengths 3,800 feet or greater.

³ The resultant approach minimums from ground and/or satellite based air navigation aids.

The amenities and services performance criteria for “basic”, “limited” and “special use” airports shown below remain unchanged from the 2002 SASP.

Amenity/Service	Basic	Limited	Special Use
Runway Length	3,000 feet	2,200 feet	No amenities and services objectives established
Runway Width	ARC B-I	ARC A-I	
Runway Strength	12,500 lbs SW	12,500 lbs SW	
Taxiway	partial parallel, connectors or turn arounds	None	
NAVAIDS	1,000 feet & 3 miles	None	
Approach Aids	Beacon, wind cone, VGSIs	wind cone	
Runway Edge Lights	MIRLs	None	
Weather	None	None	
Facilities	Phone, bathroom, fuel	Phone, bathroom	
Services	Aircraft & auto parking and storage	Aircraft & auto parking	

The percent of airports within the top three classifications that meet the performance criteria is shown below:

Amenity/Service	Commercial Service	Advanced	Intermediate
Runway Length	100%	100%	43%
Runway Width	100%	100%	62%
Runway Strength	73%	73%	71%*
Parallel Taxiway	73%	80%	43%
NAVAIDS	73%	40%	62%
Approach Aids	67%	33%	52%
Runway Edge Lights	100%	100%	71%
Weather	100%	100%	52%
Facilities	100%	100%	76%
Services	100%	100%	57%

* Runway Strength for Carlisle taken from Airnav.com.

Element 2—National Plan of Integrated Airport Systems (NPIAS) Coverage

Objectives

- Review NPIAS entry requirements and guiding principles to determine whether the Commonwealth has proper coverage from airports of national significance.
- Perform case studies on SASP airports to determine which airports should or should not be in the NPIAS.
- Assess how well the NPIAS airports in the Commonwealth meet the threshold criteria and guiding principles and the extent to which BOA funding supports this.

Pennsylvania’s AIP Eligible NPIAS Airports

The Chart below and map on pages 6 and 7 depict the distribution of Pennsylvania’s NPIAS Airports. These 64 NPIAS Airports meet the entry criteria for location, activity, and based aircraft as well as the guiding principles defined by the FAA.



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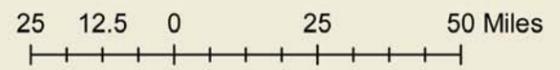
NPIAS Airport Coverage

30 Minute Drive Time Coverage



Legend

- + Tier 1 Airport
- + Tier 2 Airport
- + Other
- Economic Centers
- Major Population Areas (40,000+ Population)
- 30 Minute Area Coverage



NPIAS Case Study Recommendations



Case Study Decision Tree



Note: Airports that are AIP grant obligated can be NPIAS eligible

The case-study airports marginally met some of the criteria and guiding principles and required further evaluation to determine their eligibility for the NPIAS. Recommendations are based on existing conditions and may be reconsidered if local changes justify such actions. Only publicly-owned or reliever airports are eligible for inclusion in the NPIAS and to receive federal airport improvement funding. Therefore, the “yes” recommendations in the table below are only valid upon public ownership of the airport.

Airport	Owner-ship	Based Aircraft	Nearest NPIAS Airport (min)	Meets Primary Criteria	Meets Guiding Principals	Grant Obligated	Now In NPIAS	Recommended for NPIAS
Carlisle-N94	Private	58	25-30	Yes	Yes	No	No	Yes
Cherry Ridge-N30	Private	41	30	Yes	Yes	No	Yes	Yes ⁴
Sky Haven-76N	Private	29	30-35	Yes	No	No	No	No
Mid-State-PSB	Public	8	30-35	No	No	Yes	Yes	No ⁵
Ebensburg-9G8	Public	5	25	No	No	Yes	Yes	No ⁵
Deck-9D4	Private	37	30-35	Yes	Yes	No	No	Yes
Pennridge-N70	Private	50	15-20	No	Yes	No	No	No
Penn's Landing Heliport-P72	Private	4	30	No	Yes	No	No	Yes

⁴Cherry Ridge should remain as a NPIAS airport only until a suitable replacement airport is available

⁵These airports are presently in the NPIAS because of grant obligations

Element 3—System Capacity Needs and Prioritization

Objectives

- Define performance criteria that enable the BOA to analyze and prioritize projects and determine which provide the greatest benefit to the system based on the operational contribution and project cost.
- Define demand versus capacity at the Commonwealth’s key airports.
- Develop an analytical tool to assess proposed projects in terms of their operational contribution to the system.

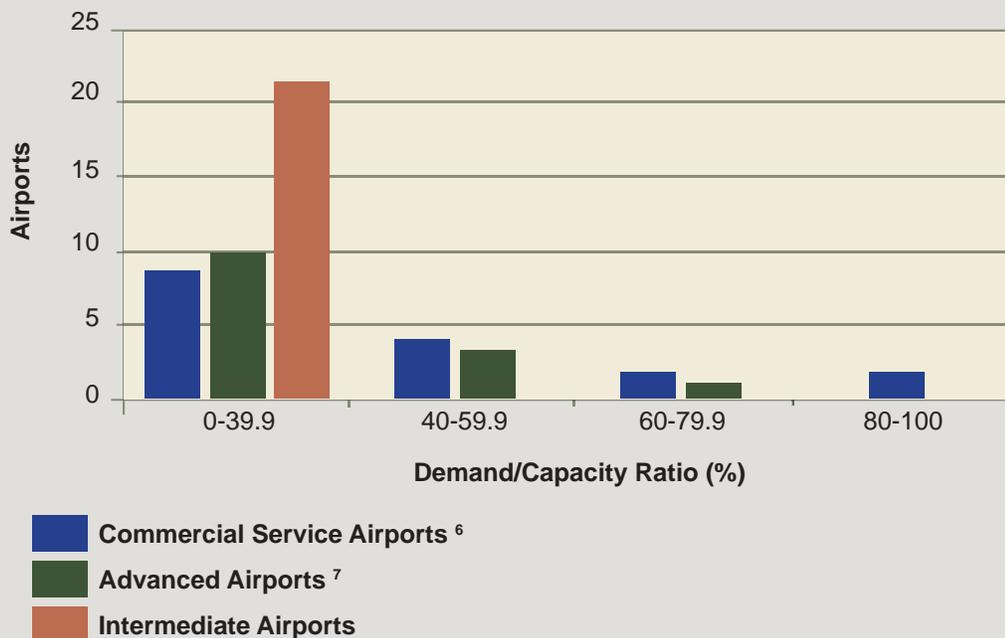
Performance Criteria

The key amenities for enhancing an airport’s operational contribution include

- Primary runway length
- Availability of parallel taxiway for the primary runway
- Based and transient aircraft parking apron

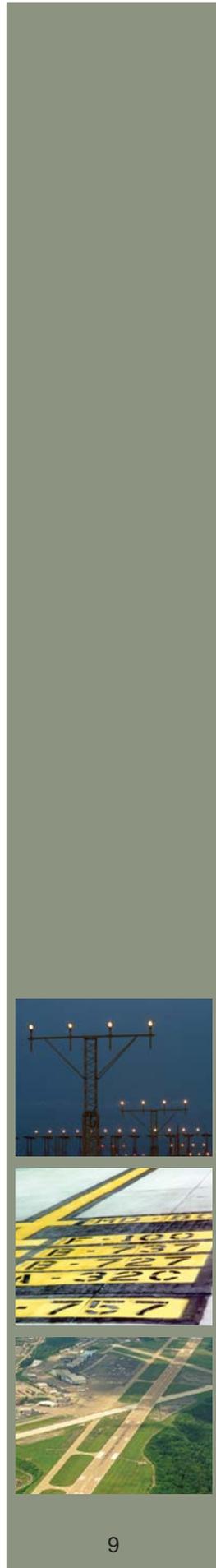
Demand Versus Capacity

The operational contribution of projects was determined based on a ratio of demand versus capacity. Demand was in the form of annual operations and capacity and was determined using the FAA Advisory Circular “Airport Capacity and Delay” for annual service volume (ASV). This analysis illustrated that aside from Philadelphia International, there is no capacity shortfall in the Commonwealth. It also served as the basis for evaluating and prioritizing system needs to avoid capacity shortfalls in the future.



⁶ The Commercial Service Airport at 60-79.9% D/C is Lehigh Valley International, and at 80-100% is Philadelphia International.

⁷ The Advanced airport at 60-79.9% D/C is Beaver County.





State System Benefits

The benefits analysis and project ranking process incorporates four basic steps:

1. Define the annual service volume (ASV) of individual system airports by classification and of the system as a whole.
2. Determine the operational contribution derived from these projects in terms of increases in ASV.
3. Weight projects at airports with higher demand levels more heavily than at airports with lower demand levels.
4. Rank projects at airports based on the level of readiness the sponsor can demonstrate.

These components were then assembled into an operational contribution ranking process. This process ranks projects using an Excel spreadsheet called the “Project Contribution Calculator.” The spreadsheet computes these project contribution metrics:

- **Operational Contribution Increase**—a measure of the operational contribution for each proposed project to the airport and the system
- **Demand-Capacity (D/C) Weighting Factor**—a factor derived from the demand/capacity ratio for each airport that gives heavier weighting to projects at busier airports
- **Weighted Contribution Increase**—multiplies the operational contribution increase by the D/C Weighting Factor
- **Weighted Airport Contribution**—divides the weighted contribution increase by airport ASV resulting in a percent increase in ASV
- **Weighted System Contribution**—divides the weighted contribution increase by state airport system ASV resulting in a percent increase in system capacity
- **Cost per Increased (and Weighted Increased) Annual Operation**—computes the dollars to be spent per increased operational contribution by dividing the project cost by the appropriate contribution increase

The contribution calculator includes five ranking scales:

1. Cost per increased annual operation—for both demand and capacity
2. Cost per weighted increased annual operation
3. Weighted system capacity contribution
4. Project readiness ranking
5. Economic impact

Element 4—Ideal Funding Levels

Objectives

- Identify the components of the project readiness continuum and describe their integral parts.
- Develop project implementation timelines that include major milestones for various project types and the typical durations between milestones.
- Estimate ideal or realistic funding levels based on the implementation timelines and four-year funding demand.

Project Implementation Milestones

The major components of project readiness were identified in terms of key project milestones for each project type and by project purpose. Specific milestones used include the following:

- Planning studies and approvals
- Design
- Permitting
- Bidding and bid results
- Ability to provide local match
- Community buy-in
- Construction

The project purpose categories are listed below:

- Capacity
- Environmental
- Planning
- Reconstruction
- Safety and security
- Standards
- Other

Project Implementation Timelines

The project timelines factor in various levels of complexity for each project type to determine the range of years for implementation.

Project Purpose	Implementation Range	Average
Capacity	4.5 – 13.5 years	9 years
Environmental	2 – 6 years	4 years
Planning	2 – 5 years	3.5 years
Reconstruction	5.5 – 11.5 years	8.5 years
Safety and Security	4.5 – 9.5 years	7 years
Standards	5.5 – 11.5 years	8.5 years
Other	N/A	7.5 years ⁷

⁷The typical project duration for “other” projects was assumed to be the average of all the average durations, or 7.5 years.

Ideal Funding Levels

The total sum (federal, state, and local) of the projects in the PennDOT 12-year plan for the four years covering SFY 2007/08 through 2010/11 is \$249.3 million. This was considered to be the unconstrained statewide “demand” for capital improvements and consists of the funding levels shown below:

AIP ⁹		State ADP ¹⁰	
Approved	Unapproved	Approved	Unapproved
\$76.4 million	\$120.1 million	\$19.1 million	\$33.7 million
\$196.5 million		\$52.8 million	
\$249.3 million			

⁹ Only includes Airport Improvement Program (AIP) projects for airports in the State Block Grant Program.

¹⁰ Includes Aviation Development Program (ADP) projects only; TAP/Capital Budget projects not included.





The total four-year funding demand was further evaluated by project purpose:

Project Purpose	Funding	Percent
Safety, Security and Standards	\$139.3 million	56%
Capacity	\$42.5 million	17%
Reconstruction	\$43.3 million	17%
Planning and Environmental	\$15.2 million	6%
Other	\$9.0 million	4%
Total	\$249.3 million	100%

The average project timeline by project purpose was divided by four to determine the number of four-year funding cycles required to meet the demand. The demand was then divided by the number of four-year cycles to determine how much could be spent in any one four-year cycle. The results are shown below:

Purpose	Four-year demand (\$ million)	Average duration (years) ¹¹	Duration divided by four (years)	Four-year demand divided by duration/4 (\$ million)	Percent
Capacity	\$42.5	9.0	2.25	\$18.9	
Safety, Security and Standards	\$139.3	8.4	2.10	\$66.2	
Reconstruction	\$43.3	8.5	2.13	\$20.4	
Planning and Environmental	\$15.2	4.0	1.00	\$15.2	
Other	\$9.0	7.5	1.88	\$4.8	
Total	\$249.3			\$125.5	50.3%

¹¹ The average duration for "safety, security and standards" and for "planning and environmental" projects is a weighted average of the timelines for the individual project purpose categories.

By applying this approach, the recommended four-year funding level of \$125.5 million for the study period covering SFY2007/08 through 2010/11 is consistent with the actual four-year funding level in the approved 2007 FYP, or \$95.5 million. Actual funding is 76% of the estimate of realistic funding.

It is recommended that the BOA strive to achieve between 80-90% of the realistic funding levels in each approved FYP, which equates to 50% of the funding demand. Based on the current 12-year plan, this equals between \$100 to \$113 million for every four-year cycle, or from \$1.2 to \$4.4 million more each year than is programmed in the current FYP.

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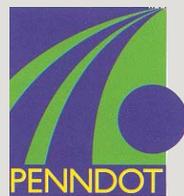


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The Pennsylvania Department of Transportation's Bureau of Aviation would like to sincerely thank the members of the Project Oversight Committee for their assistance in completing this update to the System Plan.



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