

2007 GEORGIA AIRPORT PAVEMENT MANAGEMENT REPORT



Preserving Georgia's Critical Airport Pavement Infrastructure

Acknowledgement

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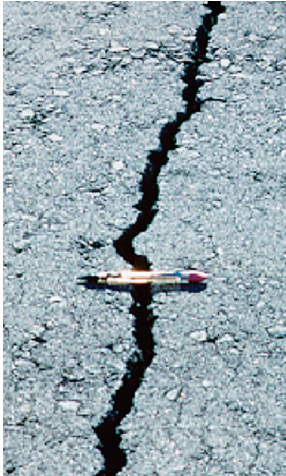


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» BACKGROUND



Airport pavement condition is a critical measure of airport performance, and is important both from a cost effectiveness and safety standpoint. Pavements represent one of the largest capital investments in Georgia's aviation system. Timely airport pavement maintenance and rehabilitation (M&R) is crucial because repairs are much more costly once the condition deteriorates below a certain level. Additionally, airport pavement weaknesses, such as cracks and loose debris, pose a significant safety risk to aircraft.



Recognizing a need to protect this critical investment, the Georgia Department of Transportation – Aviation Programs and the Federal Aviation Administration (FAA), established a statewide airport pavement management system (APMS) in 1998. The ultimate goal of the APMS is to provide the airports, Aviation Programs, and the FAA with pavement condition information and analytical tools to monitor pavement performance, identify system needs, make programming decisions for funding, and provide information for congressional and legislative decision makers.

Applied Pavement Technology, Inc. (APTech), with assistance from Wilbur Smith Associates (WSA) and AVCON, conducted an update to the APMS in 2007. During this project, the pavement conditions at 103 Georgia airports were assessed, and the pavement condition data incorporated into the APMS database. The collected information was used to develop cost-effective strategies for the maintenance and rehabilitation of the pavement infrastructure. This report describes the findings and recommendations of the APMS update.

» BENEFITS OF THE AIRPORT PAVEMENT MANAGEMENT SYSTEM

Georgia's APMS yields many benefits. It provides Aviation Programs, the individual airports, and the FAA with the information needed to monitor the condition of the pavements to ensure they are able to safely accommodate aircraft operations. Used appropriately, Georgia's APMS provides the information necessary to make cost-effective decisions about the maintenance and rehabilitation of the pavement infrastructure while understanding the long-term impacts of the decisions being made.

Georgia's APMS also identifies when different pavement strategies, i.e. maintenance, rehabilitation, and reconstruction, would be most appropriate. The timing of projects is important because preventive maintenance actions, such as crack sealing and surface treatments, can extend the life of a pavement in a very cost-effective manner. Once preventive maintenance is no longer the appropriate repair, it is critical to step in with major rehabilitation, such as an overlay, as soon as possible. At some point, the pavement structure will become so degraded the only viable alternative is very costly reconstruction. The financial impact of delaying repairs beyond this point can be severe – reconstruction can cost four to six times the cost of an overlay. In addition, there is a point where the pavement becomes unsafe for aircraft operations.

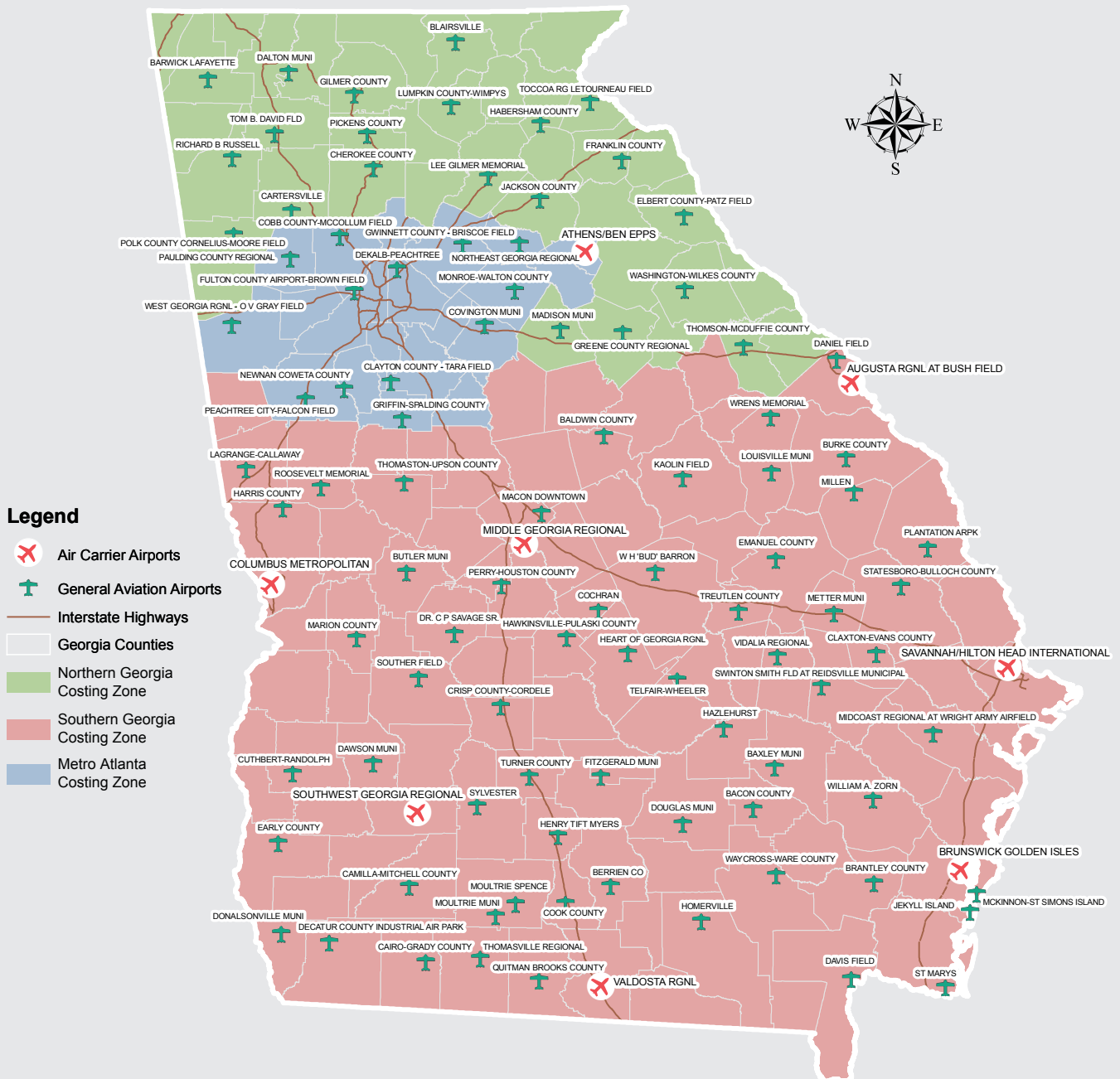
» SUCCESS OF THE AIRPORT PAVEMENT MANAGEMENT SYSTEM

The highly successful Georgia APMS provides Aviation Programs with a tool to leverage every dollar expended on pavement M&R, producing a significant return on investment. Due to Aviation Programs' proactive approach to pavement management and its encouragement and funding of preventive maintenance, the overall condition of the pavement infrastructure increased from 71 to 79 (on a scale of 0 to 100) from 1998 to 2007. During that time, almost \$58 million was expended on pavement M&R at the airports, with Aviation Programs providing more than \$15 million of those funds.

Project Airports

When the APMS was established in 1998, 94 general aviation airports were evaluated. During the 2001 update, the APMS database was expanded to include eight air carrier airports. In 2007, one airport previously included in the APMS database (Hinesville Airport) was eliminated from the system, and two airports were added (Midcoast Regional Airport at Wright Army Airfield and Paulding County Regional Airport), bringing the total to 103 airports. Atlanta's Hartsfield-Jackson International Airport was not included in this study.



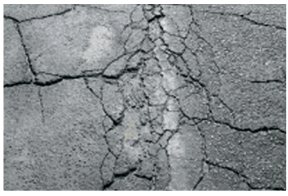
These airports represent 139.4 million square feet of pavement—the equivalent of a two-lane highway stretching from Atlanta to Denver. This can be further broken down into 68.1 million square feet of runway pavement, 36.6 million square feet of taxiway pavement, 34.7 million square feet of apron and helipad pavement. The following figure identifies the airports evaluated in 2007.



Pavement Condition Assessment

The Pavement Condition Index (PCI) procedure, documented in FAA Advisory Circular (AC) 150/5380-6B, Guidelines and Procedures for Maintenance of Airport Pavements, and ASTM Standard D5340, Standard Test Method for Airport Pavement Condition Index Surveys, was used to assess the pavement condition at Georgia airports. The PCI is used to indicate the condition of the operational surface of the pavement and, to some extent, the structural integrity of the pavement. During a PCI survey, distress type, distress severity, and distress quantity are recorded and analyzed. This information is used to calculate the PCI value of the section. The final calculated PCI value is a number from 0 to 100, with 100 representing a pavement in excellent condition, and 0 representing a completely failed pavement.

- A PCI of 40 or less is indicative of a pavement needing complete replacement.
- A PCI in the range of 40 to 70 often can be repaired with major rehabilitation, such as an overlay.
- Preventive maintenance is often a viable alternative for a PCI range above 70.

	PCI	PCI	REPRESENTATIVE PAVEMENT SURFACE	REPAIR ALTERNATIVE
PREVENTIVE MAINTENANCE	86-100	96		Pavements with PCIs above 60 to 70 often benefit from cost-effective preventive maintenance actions, such as crack sealing and surface treatments.
	76-85			
MAJOR REHABILITATION	56-75	60		Pavements with a PCI in the range of 40 to 70 will typically require more expensive rehabilitation, such as an overlay.
	41-55			
	26-40			
RECONSTRUCTION	11-25	5		Pavement allowed to deteriorate below a PCI of 40 could require costly reconstruction to restore it to operational condition.
	0-10			

» TYPICAL DISTRESS TYPES AT GEORGIA AIRPORTS

Following is a description of the most commonly observed pavement distresses at Georgia airports. The discussion is limited to asphalt cement concrete pavements because the majority of the Georgia airport infrastructure consists of this type of pavement.



LONGITUDINAL AND TRANSVERSE CRACKING

The predominant distress type found on the asphalt pavements at Georgia airports is longitudinal and transverse (L&T) cracking. This distress can be caused by any of the following: 1) separation of pavement at paving lane joints, 2) shrinkage of AC pavement due to temperature differentials in older or brittle pavement, or 3) reflection cracking from underlying existing cracking in over-laid pavements.



BLOCK CRACKING

This distress generally appears over relatively large areas as a series of L&T cracks arranged in a pattern of square or rectangular blocks. It is caused by the shrinkage of the asphalt pavement over time and the repeated deformation caused by daily temperature cycles. It is not a load-related distress, and its occurrence usually indicates that the pavement has significantly hardened (oxidized).



WEATHERING AND RAVELING

As asphalt pavement ages and hardens, the asphalt binder and aggregate can begin to wear away. This process is called weathering and raveling. The wearing away of asphalt cement, or binder, is called weathering. Raveling occurs as the aggregate begins to dislodge and produce loose pieces of material.



DEPRESSIONS

Depressions are pavement surface areas having elevations slightly lower than those of the surrounding pavement. Depressions can be caused by settlement of the underlying base layers or soils. Depressions are often found in areas where insufficient drainage capacity exists and soils are weakened due to water penetration or where underlying layers were not compacted enough during construction. Additionally, depressions can be built in during construction.



ALLIGATOR (FATIGUE) CRACKING

Alligator (fatigue) cracking is a load-related distress. Alligator cracking is caused by excessive tensile strains at the bottom of the AC layer or stabilized asphalt base layer from repeated aircraft loadings. Alligator cracking typically shows up on the surface as a series of parallel cracks, which eventually interconnect to form a pattern resembling the skin of an alligator.



RUTTING

Rutting is characterized by surface depressions located in the wheel path. These depressions are typically caused by consolidation or lateral movement of the material in any pavement layer or a combination of pavement layers due to repeated traffic loadings.



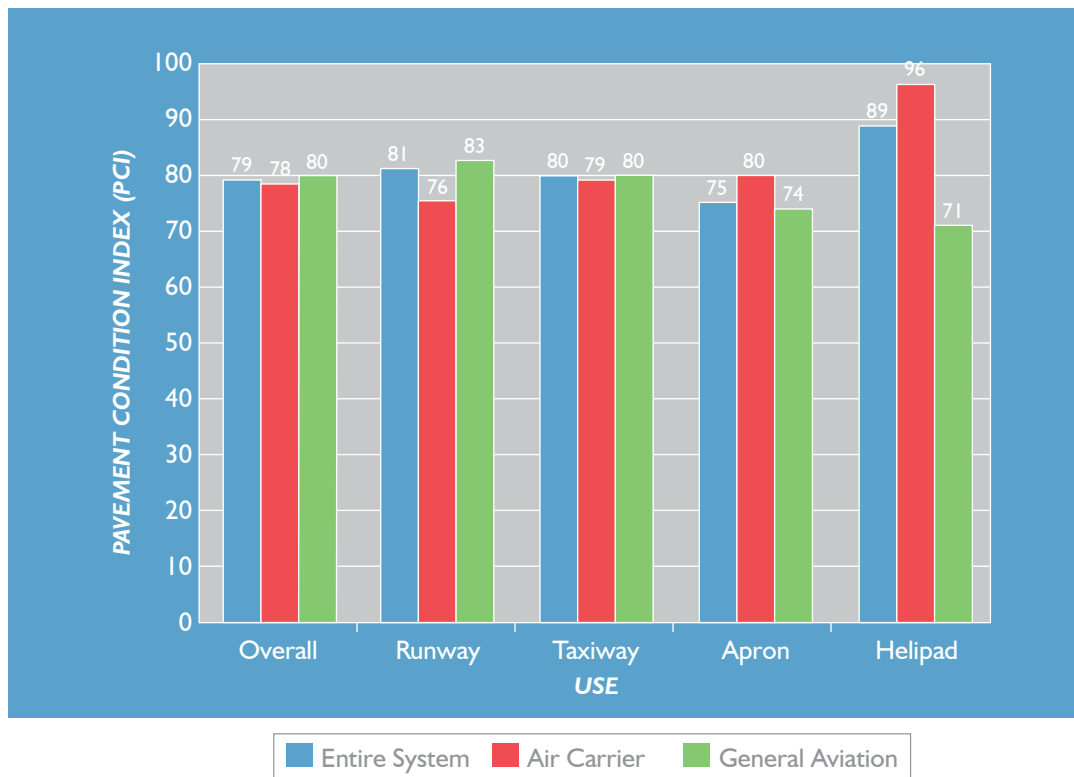
SWELLING

Swelling is characterized by an upward deformation in a pavement's surface. It can be a small area that is swelled dramatically, or it might be a gradual change in elevation over a larger area. Typically, cracking at the crest of a swell is observed. This cracking is recorded as L&T cracking in addition to the swelling distress. The primary causes of swelling are frost heave and expanding soils, such as clay, in the underlying layers of the pavement cross section.

» OVERALL PAVEMENT CONDITION

The overall 2007 area-weighted condition of the 103 airports is a PCI of 79. This can be compared to the 1998 area-weighted PCI of 71 for 94 airports and 78 in 2001 for 102 airports. This significant improvement in pavement condition is testimony to Aviation Programs' careful management of the airfield pavement infrastructure.

PAVEMENT CONDITION BY USE



HISTORIC PAVEMENT CONDITIONS

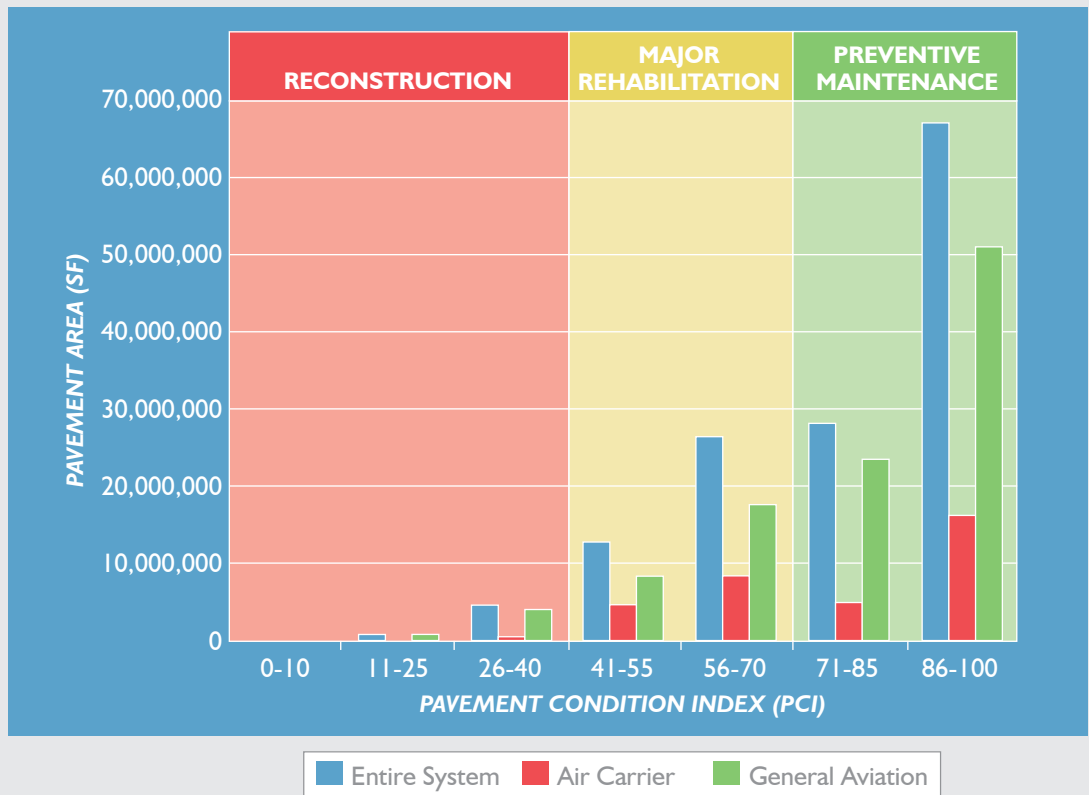
Airports	1998 PCI	2001 PCI	2007 PCI
ENTIRE SYSTEM <i>(94 airports in 1998; 102 airports in 2001; 103 airports in 2007)</i>	71	78	79
8 AIR CARRIER AIRPORTS	N/A	80	78
GENERAL AVIATION AIRPORTS <i>(94 in 1998 and 2001; 95 in 2007)</i>	71	77	80

Pavement Needs Assessment

More than 72 percent of Georgia’s airport pavements are at the condition level where timely improvements need to be performed to prevent the pavements from deteriorating to a point when very costly rehabilitation could be needed to keep them operational and safe. Approximately 4 percent of the pavement infrastructure at the 103 project airports is in need of reconstruction, and approximately 24 percent is in need of rehabilitation. The remainder of the system is at the condition level where preventive maintenance actions—such as crack sealing, joint sealing, and surface treatments—are most cost-effective. However, the pavement system is aging, and many of the pavements that would benefit now from preventive maintenance will soon deteriorate to a point where rehabilitation will be required.

The following figure shows which types of work should be performed on the Georgia airport pavements depending on their condition. Preventive maintenance refers to activities such as crack sealing, joint resealing, and surface treatments. Rehabilitation includes overlays and concrete restoration. Reconstruction involves the replacement of pavement.

PAVEMENT NEEDS BY TYPE OF TREATMENT



Analyzing the Results



An M&R program was developed for the Georgia airports using the Micro PAVER pavement management software. The analysis was run for 2008 through 2012, and an inflation factor of 7 percent was applied.

» PCI VALUES

For each year of the analysis, the future conditions of the pavements were estimated, and a determination was made as to whether preventive maintenance or major rehabilitation/ reconstruction was the appropriate and most cost-effective strategy. If a pavement was projected to be above a critical PCI of 60 for general aviation taxiways and aprons, 65 for air carrier taxiways and aprons, 70 for general aviation runways, and 75 for air carrier runways, the pavement was recommended for preventive maintenance. Below these critical PCI thresholds, major rehabilitation was recommended.

At one extreme end of the scale, if no funding is provided for pavement M&R, Georgia's pavement system will experience a slow but steady decline in condition, with an anticipated PCI of 72 by the end of 2012 for the entire system, a PCI of 73 for air carrier airports, and a PCI of 71 for general aviation airports. This decrease means more major rehabilitation/ reconstruction is needed which in turn increases costs.

» FUNDING LEVELS

On the other hand, if all projects identified were to be funded, an approximate total of \$108.3 million would be needed during the next 5 years—\$28.3 million for air carrier airports and \$80.0 million for general aviation airports. The funding needs through 2012 by airport are summarized in the next table.

Because unlimited funding results in the majority of projects being programmed during the first year of the analysis, additional funding levels were investigated. It was determined that an annual funding level of \$10 million for general aviation airports and \$4 million for air carrier airports would allow the desired pavement condition goals to be maintained through 2012.

» IN SUMMARY

- 95 general aviation Airports and 8 air carrier airports for a total of 103 airports were evaluated.
- Due to on-going efforts, the overall condition of the pavement infrastructure increased from 71 to 79 (on a scale of 0 to 100) from 1998 to 2007.
- Current backlog of work is \$108.3 million – \$80 million for general aviation airports and \$28.3 million for air carrier airports.
- Proposed annual funding level of \$10 million for general aviation airports and \$4 million for air carrier airports would allow the desired pavement condition goals to be maintained through 2012.



5-year Pavement Funding Needs through 2012

Classification	Associated City	Airport Name	Area-Weighted 2007 PCI	5-Year Total Funding Needs
GENERAL AVIATION	Adel	Cook County Airport	91	\$306,776
	Alma	Bacon County Airport	79	\$732,723
	Americus	Souther Field	91	\$316,118
		Turner County Airport	78	\$238,441
	Atlanta	Cobb County-McCollum Field	75	\$2,687,075
	Atlanta	Dekalb-Peachtree Airport	59	\$10,036,948
	Atlanta	Fulton County-Brown Field	65	\$4,148,365
	Atlanta	Newnan-Coweta County Airport	81	\$1,025,385
	Atlanta	Peachtree City - Falcon Field	78	\$792,248
	Augusta	Daniel Field	79	\$796,667
	Bainbridge	Decatur County Industrial Airpark	72	\$1,523,542
	Baxley	Baxley Municipal	86	\$578,216
	Blairsville	Blairsville Airport	96	\$92,852
	Blakely	Early County Airport	98	\$68,814
	Brunswick	McKinnon-St Simons Island Airport	75	\$3,216,166
	Buena Vista	Marion County Airport	66	\$324,365
	Butler	Butler Municipal Airport	92	\$101,140
	Cairo	Cairo-Grady County Airport	97	\$25,840
	Calhoun	Tom B. David Field	87	\$768,307
	Camilla	Camilla-Mitchell County Airport	98	\$16,384
	Canon	Franklin-Hart County Airport	91	\$64,679
	Canton	Cherokee County Airport	67	\$720,890
	Carrollton	West Georgia Regional Airport-O.V. Gray Field	82	\$668,903
	Cartersville	Cartersville Airport	76	\$1,009,340
	Cedartown	Polk County-Cornelius Moore Field	94	\$128,236
	Claxton	Claxton-Evans County Airport	90	\$99,109
	Cochran	Cochran Airport	87	\$174,331
	Cordele	Crisp County-Cordele Airport	95	\$181,658
	Cornelia	Habersham County Airport	92	\$75,028
	Covington	Covington Municipal Airport	71	\$1,117,887
	Cuthbert	Cuthbert-Randolph County Airport	62	\$215,996
	Dahlonega	Lumpkin County-Wimpy's Airport	80	\$139,895
	Dallas	Paulding County Regional Airport	100	\$0
	Dalton	Dalton Municipal Airport	84	\$453,056
	Dawson	Dawson Municipal Airport	86	\$181,504
	Donalsonville	Donalsonville Municipal Airport	95	\$41,588
	Douglas	Douglas Municipal Airport	91	\$217,094
	Dublin	W.H. "Bud" Barron Airport	90	\$359,446
	Eastman	Heart Of Georgia Regional Airport	96	\$195,674
	Elberton	Elbert County-Patz Field	72	\$457,911
Ellijay	Gilmer County Airport	100	\$0	
Fitzgerald	Fitzgerald Municipal Airport	86	\$405,738	
Folkston	Davis Field	43	\$153,526	
Gainesville	Lee Gilmer Memorial Airport	69	\$1,467,068	
Greensboro	Greene County Regional Airport	91	\$121,734	
Griffin	Griffin-Spalding County Airport	79	\$821,666	
Hampton	Clayton County-Tara Field	92	\$146,650	
Hawkinsville	Hawkinsville-Pulaski County Airport	65	\$214,696	
Hazlehurst	Hazlehurst Airport	76	\$536,198	
Hinesville	Midcoast Regional Airport at Wright Army Airfield	70	\$4,256,249	
Homerville	Homerville Airport	69	\$398,146	
Jasper	Pickens County Airport	88	\$186,456	

Classification	Associated City	Airport Name	Area-Weighted 2007 PCI	5-Year Total Funding Needs
GENERAL AVIATION	Jefferson	Jackson County Airport	85	\$277,162
	Jekyll Island	Jekyll Island Airport	85	\$119,362
	Jesup	William A. Zorn Airport	95	\$122,419
	Lafayette	Barwick-Lafayette Airport	96	\$127,317
	Lagrange	Lagrange-Callaway Airport	71	\$2,542,861
	Lawrenceville	Gwinnett County-Briscoe Field	68	\$4,669,947
	Louisville	Louisville Municipal Airport	96	\$145,214
	Macon	Macon Downtown Airport	68	\$1,447,389
	Madison	Madison Municipal Airport	87	\$93,773
	McRae	Telfair-Wheeler Airport	81	\$470,624
	Metter	Metter Municipal Airport	96	\$61,938
	Milledgeville	Baldwin County Airport	83	\$302,032
	Millen	Millen Airport	79	\$335,736
	Monroe	Monroe-Walton County Airport	86	\$446,049
	Montezuma	Dr. C. P. Savage, Sr. Airport	84	\$91,036
	Moultrie	Moultrie Municipal Airport	81	\$772,426
	Moultrie	Spence Field	49	\$5,358,440
	Nahunta	Brantley County Airport	34	\$818,237
	Nashville	Berrien County Airport	82	\$96,092
	Perry	Perry-Houston County Airport	77	\$492,098
	Pine Mountain	Harris County Airport	54	\$987,779
	Quitman	Quitman-Brooks County Airport	90	\$117,605
	Reidsville	Swinton Smith Field At Reidsville Municipal Airport	84	\$488,160
	Rome	Richard B. Russell Regional Airport	81	\$1,480,111
	Sandersville	Kaolin Field	93	\$88,824
	Soperton	Treutlen County Airport	98	\$31,140
	St. Marys	St. Marys Airport	81	\$592,862
	Statesboro	Statesboro-Bulloch County Airport	79	\$898,953
	Swainsboro	Emanuel County Airport	100	\$148,696
	Sylvania	Plantation Airpark	76	\$970,392
	Sylvester	Sylvester Airport	96	\$49,794
	Thomaston	Thomaston-Upson County Airport	84	\$1,041,989
Thomasville	Thomasville Regional Airport	80	\$1,099,178	
Thomson	Thomson-McDuffie Regional Airport	78	\$768,468	
Tifton	Henry Tift Myers Airport	89	\$324,318	
Toccoa	Toccoa-R. G. Letourneau Field	89	\$356,498	
Vidalia	Vidalia Regional Airport	66	\$2,433,413	
Warm Springs	Roosevelt Memorial Airport	81	\$343,740	
Washington	Washington-Wilkes County Airport	67	\$498,358	
Waycross	Waycross-Ware County Airport	87	\$1,283,128	
Waynesboro	Burke County Airport	56	\$418,200	
Winder	Northeast Georgia Regional Airport	67	\$3,723,658	
Wrens	Wrens Memorial Airport	88	\$42,000	
AIR CARRIER	Albany	Southwest Georgia Regional Airport	77	\$3,547,898
	Athens	Athens-Ben Epps Field	64	\$2,522,775
	Augusta	Augusta Regional at Bush Field	75	\$3,815,316
	Brunswick	Brunswick-Golden Isles Airport	84	\$2,539,552
	Columbus	Columbus Metropolitan Airport	75	\$3,558,223
	Macon	Middle Georgia Regional Airport	57	\$5,718,153
	Savannah	Savannah/Hilton Head International Airport	88	\$5,315,681
Valdosta	Valdosta Regional Airport	90	\$1,252,582	



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