System Goals and Objectives

Ohio has a proud aviation history that can be traced from the early days of flight to mankind’s most impressive aeronautical achievement. Huffman Prairie in Dayton, Ohio, served as a landing field for many of the Wright Brothers’ earliest aircraft flights. Neil Armstrong, commander of the Apollo 11 moon mission, was born, and learned to fly, in Wapakoneta, Ohio. From the origins of flight to the moon landing, aviation has played a key part in Ohio’s history.

Ohio’s airport system has grown to include an airport in nearly every county in the state, and consists of seven commercial service and 97 public-use, general aviation airports. This system provides transportation links that enable people and goods to move within the state, across the U.S., and around the world, making Ohio competitive in the world marketplace and enhancing the lives of the state’s inhabitants.

The Ohio Department of Transportation (ODOT) has long recognized the importance of planning in ensuring that aviation fulfills its role in the statewide transportation system. As such, ODOT Office of Aviation has undertaken this statewide airport system plan to analyze the state’s airport system, assess the system’s condition, and develop a plan for meeting the system’s current and future needs.

This study began with the establishment of several high-level goals. These are:

- Optimize investment in Ohio’s airport system with an eye toward safety, efficiency, and economic growth.
- Identify needed system improvements, their associated costs, and provide information to decision makers to assist in prioritizing projects.
- Assist ODOT Office of Aviation and the Federal Aviation Administration (FAA) in making decisions on proposed airport development plans in a period of limited funding.

To ensure proper review and vetting of the study process, findings, and recommendations, ODOT Office of Aviation formed a Project Advisory Committee (PAC), a panel of expert stakeholders that represented the interests of Ohio’s airports, airport sponsors, pilots, aircraft owners, economic development officials, and users of the aviation system. Numerous meetings and conference calls were held with the PAC during the study to obtain their input and comments, which helped guide the study process.

To achieve the goals listed above, the study established performance measures that would be used to evaluate each airport’s performance in the system, and determine an initial set of system improvements. This was accomplished by establishing benchmarks for each performance measure that were a function of how airports were classified in the system. The airport performance measures, benchmarks, and classification methodology were discussed and approved by the PAC.

Capital improvement strategies were developed for each airport and the system as a whole based on a variety of factors, including, but not limited to: development cost, economic impact, geographic coverage, and compliance with FAA design standards.

The ODOT Office of Aviation wanted this study to have a substantial public outreach component. The PAC was heavily involved in the development of communication efforts with the public. Three rounds of public presentations were given at seven locations around the state to keep the public informed.
informed, to answer their questions, and obtain their comments on the study. The first round of meetings was held at the start of the study, the second midway through the study, and the third, to report the draft findings, conclusions, and recommendations of the study. The project website also permitted continuous public comment on the study.

More details on System Goals and Objectives are available in Chapter 1 of this report.

**Ohio Airport System Inventory**

An airport system plan is built upon the data available for each individual airport in the system. The Ohio Airports Focus Study undertook an extensive effort to collect data from all system airports and their respective communities. A 15-page inventory form was created that gathered information on airport facilities, services, plans, operations, and interactions with the local community. An additional 2-page survey collected economic impact data. These surveys were pre-populated with known data that the consultant team was able to gather from sources such as airport layout plans, FAA Form 5010, instrument approach plates, and other FAA and state databases. These surveys were sent to their respective airports and the consultant team followed up with on-site visits to all 104 airports, with the intent of filling in any missing data and getting clarification on items that needed it.

The consultant team spent considerable time reviewing the data it received, identifying inconsistencies, correcting errors, and verifying the data quality. It should be noted that over the course of the study, conditions at airports changed, and the consultant team strove to include the most accurate information available, using 2012 as the base year for data to ensure consistency across the system.

More details on the Ohio Airport System Inventory are available in Chapter 2 of this report.

**Aviation Trends and Issues**

When compiling an aviation system plan, consideration must be given to the trends and issues that influence the supply and demand for aviation goods and services. Many factors can have an impact on aviation and this study examined both national and statewide issues relevant to aviation. At the national level, fluctuating trends regarding aviation usage and economic swings resulting from the nation’s business cycle and previous periods of record high oil prices have all impacted aviation demand. Many of these national trends are reflected within Ohio, along with aviation developments that are unique to the state.

On a more localized level, demographic trends were examined to the extent that patterns of aviation usage often follow shifts in demographics. General aviation indicators (such as aircraft shipments, pilot population, hours flown, and aerial agriculture activity) are typically subject to economic cycles, and as a result, greatly suffered during the recent economic downturn that began in late 2008. Many of these general aviation indicators have yet to fully recover to pre-recession levels.

The global air cargo industry has matured since its rapid expansion in the 1980s and 1990s and, as a result of periods of record high oil prices, now faces stiff competition from alternative modes of transportation. Ohio has experienced this first hand with the loss of three major air cargo hubs\(^1\) over the last decade. Air cargo tonnages in Ohio are now primarily driven through integrated express carriers and passenger aircraft belly cargo at the major commercial service airports.

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\(^1\) UPS shut down the former Emery Worldwide hub at Dayton International in 2006, DHL closed its Wilmington hub in 2009, and BAX Global ceased hub operations at Toledo in 2011.
General aviation airports do accommodate air cargo operations; however, these primarily take place on an unscheduled basis.

Technology’s impact on aviation cannot be overlooked. This study delved into a number of technologies that are likely to have an impact on the way aviation functions in Ohio. Chief among these are the development of NextGen navigation and communication technologies, the expanded use of unmanned aerial vehicles (popularly called drones), and alternative fuel research.

Finally, an area of significant growth, both nationally and locally in Ohio, has been the shale oil and gas industry. Advancements in extraction technologies, along with the current market conditions for oil and gas, have made extraction economically viable in eastern Ohio, leading to a boom in oil drilling and exploration activity. This activity has already begun to positively impact demand for commercial service and general aviation airports in the state.

More details on Aviation Trends and Issues are available in Chapter 3 of this report.

Forecast of Aviation Demand
The Ohio Airports Focus Study analyzed the aviation activity at each of the 104 system airports and developed a forecast for the system out to 2032. Numerous methods of forecasting were compared and examined, and a preferred forecast was selected for each of the topics analyzed. These various methodologies considered national and state aviation trends, as well as demographic changes expected to occur in Ohio over the next 20 years. As shown in Table 1, forecasts were developed for commercial airline enplanements, commercial airline operations, air cargo shipments, based aircraft and general aviation operations.

<table>
<thead>
<tr>
<th>Projection Type</th>
<th>2012</th>
<th>2017</th>
<th>2022</th>
<th>2032</th>
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</thead>
<tbody>
<tr>
<td>Commercial Airline Enplanements</td>
<td>9,744,937</td>
<td>10,916,310</td>
<td>12,076,740</td>
<td>14,831,030</td>
</tr>
<tr>
<td>Commercial Airline Operations</td>
<td>376,257</td>
<td>390,417</td>
<td>418,182</td>
<td>482,291</td>
</tr>
<tr>
<td>Statewide Total Air Cargo Tons</td>
<td>188,097</td>
<td>194,772</td>
<td>201,686</td>
<td>216,257</td>
</tr>
<tr>
<td>Based Aircraft</td>
<td>4,687</td>
<td>4,803</td>
<td>4,925</td>
<td>5,182</td>
</tr>
<tr>
<td>General Aviation Operations</td>
<td>2,723,518</td>
<td>2,786,900</td>
<td>2,853,100</td>
<td>2,993,000</td>
</tr>
</tbody>
</table>

The data in Table 1 shows that aviation activity at Ohio’s system airports is projected to grow at a steady but modest pace.

More details on Forecasts of Aviation Demand are available in Chapter 4 of this report.

Airport Classifications and Facility and Service Objectives
A key component of the Ohio Airports Focus Study was determining what role each airport played in the system. Classification of each airport into distinctive roles allowed the study team to evaluate how well the system was performing based upon each level of airport classification, and it permitted the study team to assess how well each airport was performing in its assigned classification. This was accomplished by assigning facility and service objectives to each airport classification, which allowed the study team to identify facilities and services that were lacking at specific airports.

The Ohio Airports Focus Study established five classifications for airports. One classification was for the commercial service airports in Ohio. The other four classifications were for general aviation
airports, which were established by first splitting general aviation airports into two broad categories – those that serve the demands of turbine aircraft and those that primarily serve the demands of piston aircraft. These two broad groups are further refined by dividing each in two to yield a total of four levels of general aviation airports. The definitions for the five airport classifications used in this state aviation system plan are:

- **Air Carrier Airports** – Air Carrier Airports are intended to support commercial airline activities. Where capacity constraints do not impose limits, this airport classification can also support all types of general aviation activities.

- **Level 1 Airports** – These airports are intended to meet nearly all of the needs of general aviation turbine powered aircraft and their users. These airports should be able to provide nearly all of the services necessary to support corporate jet aircraft. This facility classification can also support recreational general aviation activities and flight training.

- **Level 2 Airports** – These airports are intended to support smaller corporate aircraft, such as small jets and turboprop aircraft, and meet many, but not necessarily all, of their needs. This airport classification is intended to support a variety of uses (business, pleasure, and training).

- **Level 3 Airports** – This classification of airports serves light, twin-engine and single-engine aircraft flying for business, pleasure, and training. Its purpose is to fulfill nearly all of the needs of piston-powered aircraft. Turbine-powered aircraft may use these airports, but the primary focus is on meeting the facilities and services that support piston-powered aircraft.

- **Level 4 Airports** – These airports include facilities that are needed for the flight operations of small general aviation aircraft but do not necessarily provide all of the support services, such as maintenance. Single-engine aircraft represent the primary aircraft type; however, many light twin-engine aircraft may also be accommodated. This airport classification supports private pilots that may be flying for business or pleasure and require minimal support facilities and services.

Ohio’s system airports were assigned to one of these five classifications through an analysis that looked at runway length, aviation fuel sold at the airport, the type of aircraft maintenance available, and instrument approach procedures. Exhibit 1 below shows the classification of each airport in the Ohio aviation system.
Each airport in the Ohio airport system was evaluated based upon a set of performance benchmarks that were determined for each airport classification. These benchmarks are facilities or services that were identified as advantageous (but not required) for airports serving in that particular role. For example, it was recommended that all Level 2 airports have a full parallel taxiway. Exhibit 2 below shows the percentage of airports meeting their respective benchmarks in the Ohio airport system.
Overall, there was a high degree of Ohio system airports meeting their recommended performance benchmarks, demonstrating that the Ohio airport system is a mature system that operates very effectively.

Any performance benchmarks not met by an airport were identified as potential improvements that could help the system operate even more effectively.

More details on Airport Classifications and Facility and Service Objectives are available in Chapter 5 of this report.

**Airport Compliance Evaluation**

With more than $5 billion invested in infrastructure at Ohio’s general aviation airports, it is obvious that such a valuable asset should be preserved and properly maintained. However, some airport sponsors are better stewards than others and both the FAA and ODOT Aviation have an interest in putting future investment dollars into infrastructure projects that will be well cared for by the airport sponsor.

The Ohio Airports Focus Study evaluated this stewardship aspect by examining how well each airport complied with FAA regulations and state and federal grant assurances. The compliance areas examined were:
• **Runway Safety Areas (RSA)** – RSAs are designated areas around a runway intended to minimize damage to aircraft that undershoot, overrun, or unexpectedly exit the runway. This is accomplished by the airport sponsor owning the RSA and ensuring that the area is properly graded and has no objects that would be a collision hazard to aircraft.

• **Runway Protection Zones (RPZ)** – RPZs are areas beyond each runway end intended to protect people and property around the airport. RPZs are most useful when the airport sponsor controls them, either through outright ownership or through easements with property owners that give the airport sponsor the right to maintain and keep the zone clear of incompatible activities and objects.

• **Land Use Compatibility** – In order to ensure that airport development is consistent with community planning, adequate land use controls that prevent incompatible land uses near the airport are recommended. These include appropriate zoning around the airport that restricts land use and structure height, and the use of noise abatement procedures on the airport if needed.

• **Pavement Condition Index (PCI)** – PCI is a numerical measurement of the overall state of an airport’s pavement. Maintaining pavement in adequate condition, which is the responsibility of the airport sponsor, can save money by avoiding the high costs of major pavement rehabilitation projects, or, even costlier, pavement reconstruction.

• **Leases** – Grant assurances require airport sponsors to meet a number of obligations when granting operating rights on the airport. Among these are non-exclusive aeronautical rights, and economic non-discrimination. Using standardized leases that are periodically updated helps to meet this obligation, as well as establishing rules and regulations that ensure a safe airport environment.

• **Through the Fence** – Airport sponsors exercise authority over their airport through the implementation of rules and regulations that tenants on the airport are obligated to follow through lease agreements. However, at some airports, airfield access is available to businesses or individuals that are not on airport-owned land. Airports have little control over these “through the fence” operations unless they have a written agreement with them. Tracking which airports have through the fence operations with agreements, or are working toward agreements, is a good indication of positive stewardship.

The study team evaluated each general aviation airport in the above categories. For certain categories, estimates were made of the costs to comply with standards that were not being met. The cost to bring each airport’s RSA into compliance (including necessary land purchases where applicable), the cost of acquiring RPZ land not currently under control, and the cost of maintaining each airport’s existing pavement over the next 20 years were all factored into the cost of system compliance.

These estimates were tabulated for each airport as part of their individual recommendations.

More details on Airport Compliance Evaluation are available in Chapter 6 of this report.

**Regional Need and Capacity Analysis**

To assess the degree of coverage that the Ohio airport system provides, the study examined how much market area the system of airports covered in terms of both Ohio population and geographic area using 30-minute drive times around each airport. The overall system and each airport classification level were assessed. Additionally, various facilities and services were evaluated for their coverage, including the coverage provided by 5,000-foot runways, airports with weather reporting, and the availability of flight training services.
The overall system was shown to provide coverage for 98 percent of Ohio’s population, along with 92 percent of the land area, demonstrating how robust the Ohio airport system is. Exhibit 3 illustrates the extent of coverage provided by the Ohio airport system.

**Exhibit 3**
Coverage by All System Airports

These drive time market areas were also used to identify gaps and overlaps existing in the system. The existence of these gaps and overlaps did not imply that corrective action was required, or even recommended. Rather, the information was provided to supplement any data that FAA or ODOT Aviation already collected in the process of evaluating grant requests.

Gaps in coverage were assessed for Level 1 and 2 Airports, airports with 5,000-foot or longer runways, airports with instrument approaches that provided vertical guidance, and airports with weather reporting capabilities. Areas lacking coverage with airports that could add to the coverage if upgraded to provide the service or capability in question, had each airport identified along with how much additional coverage that airport could provide.

An example of the gaps in coverage by airports with 5,000-foot long runways is shown in Exhibit 4 below. As can be seen, numerous gaps in coverage exist. As a result of this geographic analysis, 18 geographic areas were identified as lacking coverage and more than 50 airports were identified as having the ability to enhance coverage should their runway be extended to 5,000 feet.

Tables listing each airport with the potential to provide coverage in these gaps were provided, along with data showing how much additional population and geographic coverage these airports could provide should any of these airports have their runway extended to 5,000 feet or beyond.

Airport overlaps were defined as intersecting market areas of two airports, with certain conditions screened out of consideration (e.g., Air Carrier Airports were not considered in the overlap analysis). For each pair of overlapping airports, additional information was developed for each airport that could be used by the FAA and ODOT Aviation in evaluating future capital projects at the airports.

More details are on Regional Capacity Analysis are available in Chapter 7 of this report.
System Recommendations
The Ohio Airports Focus Study analyzed the state’s airports in a variety of different ways and developed a list of improvements intended to help the system operate more effectively. These improvements were broadly based on two concepts. The first is that airports should strive to meet compliance factors. The second is that airports should strive to meet recommended facility and service performance benchmarks that are based upon airport classification.

Cost estimates were developed for each set of recommendations. Recommendations related to compliance factors focused on issues related to FAA grant assurances that are typically eligible for FAA funding assistance. These included RSA impacts and obtaining fee simple RPZ control for system airports primary runways. In addition, the necessary upkeep and continued maintenance of Ohio’s airport pavement was assessed for the next 20 years. Together, these improvements were estimated at more than $500 million.

Recommendations tied to each airport’s system classification and respective performance benchmarks ranged from minimum recommended runway lengths to support facilities such as navaids, weather reporting, and fencing. It should be noted that system plan recommendations do not supersede recommendations from individual airport master plans or make a project eligible for FAA or ODOT funding. These system enhancement recommendations were estimated to cost nearly $345 million.

Funding sources for these improvements include the federal government (primarily the FAA), ODOT Office of Aviation (although ODOT funding is extremely limited), and local government, including revenue produced by the airport itself.

More details on System Recommendations are available in Chapter 8 of this report.