KDOT Airport Facilities Inventory and Needs Assessment

Executive Summary Report

PREPARED FOR

KDOT Division of Aviation

September 2023

Kansas Department of Transportation
Division of Aviation

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Prepared for:

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1.0 Background

For more than a century, the State of Kansas has served as an aviation hub and center of aircraft manufacturing within the United States and across the globe, including:

- Home to two of the premier general aviation aircraft manufacturers (Bombardier Learjet and Textron Aviation's Beechcraft and Cessna) as well as Spirit AeroSystems, the world's largest tier-one aerostructures manufacturer.
- Home to more than 450 aviation supply chain companies.
- Aviation accounts for more than $7B of KS Gross Domestic Product. That's 4%, easily exceeding the national average of 0.7%.
- $2.25B in annual aerospace exports.
- #3 largest concentration of aviation workers in the United States.
- Throughout the history of Kansas aerospace manufacturing, mor than 70% of the world's current general aviation fleet was produced in Kansas and more than 250,000 airplanes have been built in the state.

*Source. Kansas Department of Commerce - https://www.kansascommerce.gov/industry/aerospace/.

This commitment to aircraft manufacturing and aviation training is not possible without a robust airport system. The Kansas airport system provides over $9 Billion in economic output and contains 80 airports classified in the FAA's National Plan of Integrated Airport Systems (NPIAS) as well as 29 non-NPIAS public-use airports with paved runways. These airports serve as the backbone of the aviation transportation system in the state. In order to meet the needs of Kansas residents, businesses, educational institutions, emergency management, and the traveling public, the following studies have previously been completed by the Kansas Department of Transportation, Division of Aviation (KDOT Aviation).

- The Kansas Airport System Plan (KASP) was updated in 2016 to assess the needs of the state's airports, determine the extent to which the airport system fulfills the needs of the state, help justify funding for future airport improvements, and provide information for governmental and other entities concerning the value, use, and needs of the state's public use airports.

- The Kansas Aviation Economic Impact Study was completed in 2016 to highlight the significant economic contributions from aviation on the state's economy. This study quantified the economic impacts from all aspects of aviation including airports, airport-related businesses, and aerospace manufacturing throughout the state.

- The KDOT Aviation Airport Pavement Management Plan (PMP) was updated in 2022 to evaluate airport pavements statewide, identify system deficiencies, provide project recommendations and priorities for various funding scenarios, and provide general costs for planning purposes.

2.0 Purpose & Goals

The Kansas Airport Improvement Program (KAIP) is a funding program administered through KDOT Aviation that is designed to assist airport sponsors in improving and maintaining the State's system of public-use airports. The primary strategy of the KAIP program is to preserve and enhance (modernize) the Kanas airport system through four objectives:

- Maintaining the system's runway condition rating of "very good."
- Minimizing surface travel time to air ambulance pick-up locations.
- Improve safety.
- Enhance airport and community economic development appeal.

In June 2023, to supplement the recently completed PMP report, KDOT Aviation initiated a statewide Airport Facilities Inventory and Needs Assessment to determine airport infrastructure needs in the state and the funding levels necessary to achieve the KAIP Program objectives. All 109 public-use airports (except for ICT Wichita Dwight D. Eisenhower National Airport) have been included in this evaluation.

A Joint Task Force (JTF) of airport managers, airport planning/engineering consultants, construction professionals, economic development partnerships, hospital associations, and other industry stakeholders were engaged to evaluate current statewide guidelines for airport infrastructure. The state of Kansas consistently ranks at the top of the list for maintaining the best roads in the nation and the desired outcome of this initiative is to lay the groundwork to elevate the aviation system and its infrastructure to the same level quality. The JTF created a strategic plan with this in mind and the plan focused the following critical tasks:

- Review the current minimum infrastructure requirements (pavement, buildings, lighting/NAVAIDS, equipment, etc.) for airports of each category and recommend revisions that better meet current airport needs and service levels.
- Evaluate the capability of the statewide airport system to support emergency management and air ambulance operations.
- Identify whether developing Kansas statewide standards for airport pavement materials, hangars, t-hangars, or terminals provides additional value and cost-efficiency for airport development.
- Consider whether it is more cost-effective to use KAIP funds to procure certain items (pavement, hangars, terminals, equipment, etc.) on a regional or statewide level rather that by individual airport sponsor.
- Identify funding programs from other states that have been implemented successfully to meet their airport's needs.
- Demonstrate the economic impact gained from investing funds in airport infrastructure.

3.0 Airport Role Analysis

One of the cornerstones of statewide aviation system planning and asset management is establishing and understanding the types of airports and their intended roles within the system. The process of evaluating and defining these roles allows the creation of specific airport categories, establishing

associated minimum infrastructure requirements, and ultimately outlining the infrastructure needs of each individual airport.

Re-evaluating the airport categories and role definitions adopted by the 2016 KASP was identified as a critical task associated with this infrastructure needs assessment initiative. The KDOT Aviation JTF worked closely through a series of meetings with stakeholders to review the following existing airport categories and role definitions to reach consensus on the recommended revisions outlined within this section.

3.1 Current Airport Categories & Role Definitions

The Statewide Aviation System Plan adopted in 2016 utilized the airport categories and corresponding role definitions that were established by the previous plan from 2008. The five airport categories and defined roles are as follows:

- Commercial Service Airports: Airports that accommodate scheduled national or regional commercial air carrier service are defined as Commercial Service Airports. Unlike other classifications, commercial Service Airports were defined in the National Plan of Integrated Airport Systems (NPIAS) as any airport with scheduled commercial airline service that enplanes 2,500 passengers or more annually.

- Regional Airports: Airports that accommodate regional economic activities, connect the state and national economies, and serve all types of general aviation aircraft are classified as Regional Airports.

- Business Airports: Airports that accommodate local business activities and general aviation users are defined as Business Airports.

- Community Airports: These airports serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying.

- Basic Airports: Airports that serve a limited role in the local economy, primarily serving recreational and personal flying are generally classified as Basic Airports.

3.2 Recommended Revisions to Airport Categories & Role Definitions

With the current system plan utilizing methodology established in 2008, the KDOT Aviation JTF established early on that reviewing and updating the categories and role definitions would be necessary to reflect the most accurate state of system inventory and needs. After careful consideration the JTF determined that the five category types accurately reflect today's airport system but the definitions for the roles of Regional Airports, Business Airports, Community Airports, and Basic Airports are recommended to be revised as shown in Table 3-1.

Table 1: Recommended Statewide System Plan Category & Role Definition Revisions

Airport Category	2016 Definition	Recommended Revision
Commercial Service Airports	Airports that accommodate scheduled national or regional commercial air carrier service are defined as Commercial Service Airports. Unlike other classifications, Commercial Service Airports were defined in the National Plan of Integrated Airport Systems (NPIAS) as any airport with scheduled commercial airline service that enplanes 2,500 passengers or more annually.	No Change Recommended
Regional Airports	Airports that accommodate regional economic activities, connect the state and national economies, and serve all types of general aviation aircraft are classified as Regional Airports.	Supports regional economies by connecting communities to statewide and interstate markets by supporting Light and Mid Jets, such as: - Raytheon/Beech Beechjet 400/T-1 - Bombardier Learjet 45 - Learjet 75 - Bae HS 125/700-800-Hawker 800
Business Airports	Airports that accommodate local business activities and general aviation users are defined as Business Airports.	Supplements local communities by providing access primarily to intrastate and some interstate markets while also supporting Emergency Management and Air Ambulance service and Very Light, and some Mid Jets, such as: - Cessna Excel/XLS - Cessna Citation V/Ultra/Encore - Cessna Citation CJ1/CJ2/CJ3/CJ4/M2 - Embraer Phenom 100 & 300
Community Airports	These airports serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying.	Supplements local communities by providing access to charter or critical passenger service, cargo operations, flight training, and personal flying. These are airports that are in the NPIAS.
Basic Airports	Airports that serve a limited role in the local economy, primarily serving recreational and personal flying are generally classified as Basic Airports.	All airports in Kansas that are NOT in the NPIAS.

3.3 Air Ambulance Service

One of the key roles airports provide as a statewide network is to support air ambulance aircraft who transport patients in need of urgent intensive care, especially in rural areas. During the JTF meetings, it was initially determined that all Commercial Service, Region, and Business airports should have facilities capable of supporting air ambulance operations, but that the medical community should be engaged to determine what airport facilities are required for these operations.

A stakeholder engagement meeting was then held with representatives of the Kansas Hospital Association, where the JTF received the following input.

- Air ambulance operations routinely use both fixed wing and rotatory wing aircraft to transport patients. A determination on which aircraft type to use is made based on location and weather conditions, so having adequate runway facilities is critical to provide rapid aircraft response.
- Air ambulance service will continue to become even more critical as rural hospitals struggle to remain open and may have to transition to emergency and out-patient services only.
- The fixed wing aircraft used for air ambulance services are a King Air and LearJet, and require a 3,500' x 60' runway, runway lighting, and AWOS. Instrument approaches are preferred to aid in landing during poor visibility conditions.

The information provided by the Kansas Hospital Association confirmed that airports in the Business category (and larger) align with the facility needs to support air ambulance operations. After reviewing the airports with runways over 3,500' x 60', the JTF made the following recommendations:

- Belleville, Clay Center, Eureka, Herington, Ness City, Oberlin, St. Francis, and Stockton (Rooks County) already meet the runway/facility requirements to support air ambulance service and are recommended to change category from Community to Business to improve statewide coverage.

- Sabetha is recommended to change category from Community to Business to improve statewide coverage for air ambulance service. The runway/facilities at these airports are recommended to be expanded to meet Kansas Hospital Association minimum requirements.

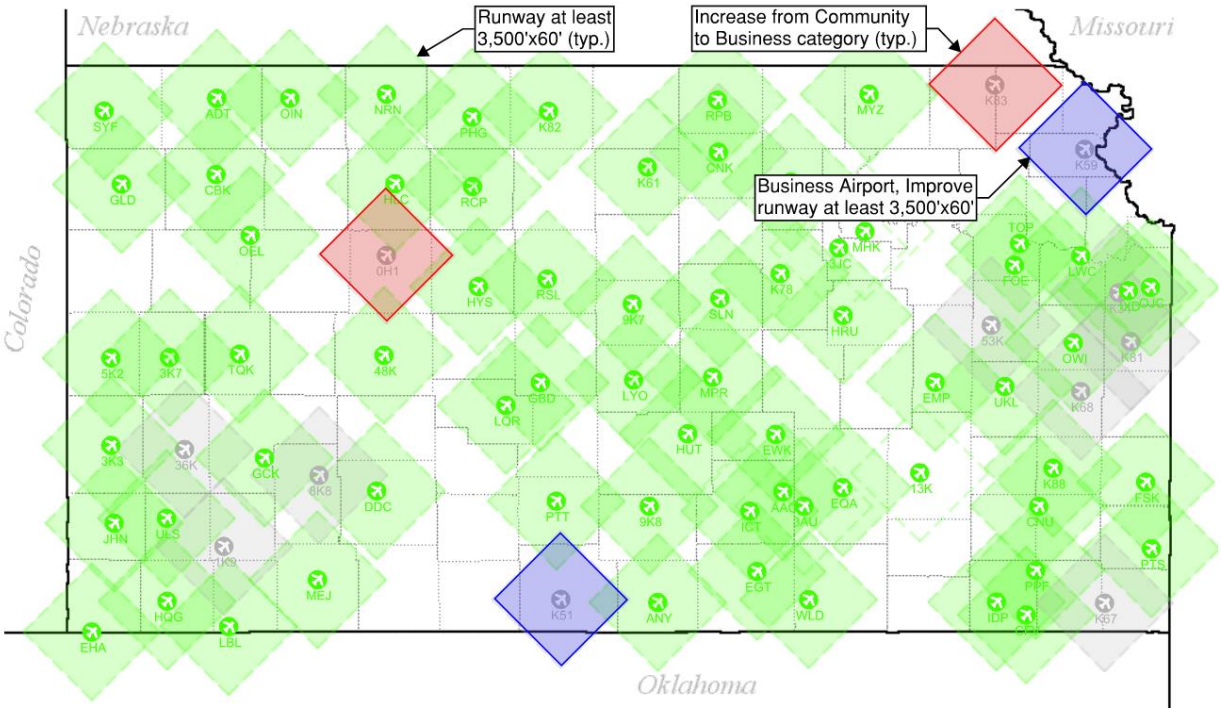


Figure 1: Airports with 3,500'x60' Runway (Min.)

3.4 Recommended Role Changes for Kansas Airports

The 2008 Statewide Aviation System Plan established a list of 14 elements that were utilized to evaluate and score each airport. These elements contemplated factors like airport infrastructure, markets served, and regional economic benefits. This methodology was used to delineate the roles and assign each airport to one of the categories outlined in the previous section of this report. The current adopted 2016 plan re-evaluated the airport category assignments utilizing the same stratification methodology from the 2008 plan but with updated data for each airport. A key difference in the previous system planning approaches is that the 2008 plan evaluated all airports within the state including non-NPIAS airports, while the 2016 plan evaluated only the 80 NPIAS airports.

For this study the KDOT JTF determined that the most accurate approach to assessing current system needs would be a holistic approach that evaluates all airports including non-NPIAS airports. The previous section of this report reflects this new approach by recommending a change to the Basic Airports category definition, making this the category for all non-NPIAS airports. Utilizing updated data for all airports and the same methodology employed in the previous system plans, the JTF recommends role changes for a total of 12 airports as outlined in Table 3.2.

- Great Bend and Topeka/Forbes no longer provide commercial service and are recommended to be reclassified as Regional airports.

- Belleville, Clay Center, Eureka, Herington, Ness City, Oberlin, Sabetha, St. Francis, and Stockton (Rooks County) are recommended to be reclassified as Business airports to improve air ambulance accessibility across the state.
- Satanta is a NPIAS airport and is recommended to be reclassified as a Community airport.

Table 2: Recommended Role Changes for Kansas Airports

Associated City	Airport	Kansas Airport System Role in 2016	Recommended Role Change
Belleville	RPB - Belleville Municipal	Community Airport	Business Airport
Clay Center	CYW - Clay Center Municipal	Community Airport	Business Airport
Eureka	13K - Lt. William M. Milliken	Community Airport	Business Airport
Great Bend	GBD - Great Bend Municipal	Commercial Service Airport	Regional Airport
Herington	HRU - Herington Regional	Community Airport	Business Airport
Ness City	48K - Ness City Memorial	Community Airport	Business Airport
Oberlin	OIN - Oberlin Municipal	Regional Airport	Business Airport
Sabetha	K83 - Sabetha Municipal	Community Airport	Business Airport
Satanta	1K9 - Satanta Municipal	Basic Airport	Community Airport
St. Francis	SYF - Saint Francis - Cheyenne County	Community Airport	Business Airport
Stockton	RCP - Rooks County Regional	Community Airport	Business Airport

Associated City	Airport	Kansas Airport System Role in 2016	Recommended Role Change
Topeka	FOE - Topeka Regional	Commercial Service Airport	Regional Airport

4.0 Facility and Service Objectives

The next critical task identified by the KDOT Aviation JTF was to evaluate the statewide facilities and service objective goals set by the previously adopted statewide system plans. The facility and service objectives establish a specific set of criteria that can be used to measure system performance and assess the needs of each individual airport across the system.

4.1 Minimum Infrastructure from the 2016 KSASP

The 2016 Kansas Statewide System Plan outlined the facility and service objectives with only minor changes to the objectives adopted by the previous plan. For example, adding non-precision GPS approaches such as the LPV approach to the Regional Airport role objective for best instrument approach was the most significant change from the 2008 plan to the 2016 plan. The following table outlines the facility and service objectives established by the 2016 KSAP.

Table 3: Minimum Infrastructure from the 2016 KSASP

Facilities	Airport Categories & Service Objectives				
	Commercial Service	Regional	Business	Community	Basic
Runway Length	5,500'	5,000'	4,000'	3,200'	Maintain Existing
Runway Width	100'	100'	75'	60'	Maintain Existing
Runway Surface	Paved	Paved	Paved	Paved	Not an Objective
Taxiway Type	Full Parallel	Full Parallel	Turnarounds	Turnarounds	Not an Objective
Best Instrument Approach	Precision	APV	Any	Any	Visual
Rotating Beacon	Yes	Yes	Yes	Not an Objective	Not an Objective
Wind Sock	Lighted Wind Sock	Lighted Wind Sock	Lighted Wind Sock	Wind Sock	Wind Sock
VGSI	PAPI or VASI	PAPI or VASI	PAPI or VASI	Not an Objective	Not an Objective
Runway Lighting	MIRL	MIRL	MIRL	MIRL	Not an Objective
ALS or REILs	ALS	ALS or REILs	ALS or REILs	Not an Objective	Not an Objective
Weather Reporting	Automated	Automated	Automated	Automated	Not an Objective
Restrooms	Yes	Yes	Yes	Yes	Yes
Link to Ground Transporation	Yes	Yes	Yes	Yes	Not an Objective
Fuel	AvGas, Jet-A, 24/7	AvGas, Jet-A, 24/7	AvGas	Not an Objective	Not an Objective
Terminal	Yes	Yes	Yes	Not an Objective	Not an Objective
Hangar Capacity	100% of Based Aircraft	100% of Based Aircraft	100% of Based Aircraft	100% of Based Aircraft	Not an Objective
Apron Capacity (sq. ft.)	10,000	10,000	10,000	10,000	Not an Objective

4.2 Recommended Facility and Service Objective Changes

The KDOT JTF evaluated the current facility and service objectives against those from system plans for the neighboring states of Colorado, Missouri, Oklahoma, and Washington. After a series of stakeholder

meetings and discussions, comments were compiled, and consensus was reached for the recommended facility and service objective changes that are highlighted in the following table.

Table 4: Recommended Changes to Facility and Service Objectives

Facilities	Airport Categories & Service Objectives				
	Commercial Service	Regional	Business	Community	Basic
Runway Length	5,500'	5,000'	4,000'	3,200'	Maintain Existing
Runway Width	100'	100'	75'	60'	E
Runway Surface	Paved	Paved	Paved	Paved	Not an Objective
Taxiway Type	Full Parallel	Full Parallel	Turnarounds	Turnarounds	Not an Objective
Best Instrument Approach	Precision	APV	**GPS**	**GPS**	Visual
Rotating Beacon	Yes	Yes	Yes	**Yes**	Not an Objective
Wind Sock	Lighted Wind Sock	Lighted Wind Sock	Lighted Wind Sock	**Lighted Wind sock**	Wind Sock
VGSI	PAPI or VASI	PAPI or VASI	PAPI or VASI	**PAPI or VASI**	Not an Objective
Runway Lighting	MIRL	MIRL	MIRL	MIRL	Not an Objective
ALS or REILs	ALS	ALS or REILs	ALS or REILs	**REILs**	Not an Objective
Weather Reporting	Automated	Automated	Automated	Automated	Not an Objective
Restrooms	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**
Link to Ground Transporation	Yes	Yes	Yes	Yes	Not an Objective
Fuel	AvGas, Jet-A, 24/7	AvGas, Jet-A, 24/7	**AvGas, Jet-A, 24/7**	**AvGas, 24/7**	Not an Objective
Terminal	Yes	Yes	Yes	Not an Objective	Not an Objective
FBO	**Yes**	**Yes**	**Yes**	**Not an Objective**	**Not an Objective**
Flight Planning Space	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**	**Yes, 24/7 Pilot Access**
Public Waiting Area	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
MRO	**Yes**	**Yes**	**Not an Objective**	**Not an Objective**	**Not an Objective**
SRE Storage	**Yes**	**Yes**	**Yes**	**Not an Objective**	**Not an Objective**
Hangar Capacity	100% of based aircraft	100% of based aircraft	100% of based aircraft	100% of based aircraft	Not an Objective
Transient Overnight Hangar Storage	**Yes**	**Yes**	**Yes**	**Based on Operations**	**Not an objective**
Apron Capacity (sq. ft.)	10,000	10,000	10,000	10,000	Not an Objective

*Recommended changes are highlighted in yellow.

5.0 Evaluation of Airport Infrastructure Needs

The airport infrastructure needed to provide a safe and efficient network of airports in Kansas has been divided into 5 categories.

- Preservation of existing airfield pavements.
- Preservation of existing publicly owned airport buildings (hangars, terminals, SRE storage, etc.)
- Preservation additional existing airport equipment & facilities (lights, signs, NAVAIDs, fuel farms, etc.)
- Modernization to meet minimum infrastructure requirements established by KDOT Aviation for each Airport's category.
- Modernization to meet airport needs justified through recent FAA planning studies.

Garver collected the following documents and data to establish baseline information and document the inventory of existing facilities and conditions at Kansas airports:

- Individual airport inventory surveys completed by airport sponsors and their engineering consultants to document current existing facilities.

- Airport layout plans, property maps, and capital improvement plans provided by airport sponsors and their engineering consultants from recent ALP updates.
- Airport pavement conditions and recommend projects in the KDOT Aviation Pavement Management Portal https://kdotaviationpowerpm.garverbi.com/
- Online databases including Airnav.com and current based aircraft data (provided by Owner through BasedAircraft.com).
- Any available topographic maps and available aerial photographs.

This inventory data was then analyzed to determine project needs and costs necessary to meet the preservation and modernization goals as described in the following section.

5.1 Goal 1 - Preserve Existing Airfield Pavements

Airfield pavement is the largest asset in the Kansas Airport System with 103.4 million square feet (1,632 lane miles) of runways, taxiways, and aprons. The Statewide NPIAS Airport Overview Report is available online at https://kdotaviationpowerpm.garverbi.com/ and a summary is included in Appendix A. This report identified a critical Pavement Condition Index (PCI) threshold of 65 to be utilized as the preferred minimum target at which to maintain pavement sections in the system. Funding Scenario 2 identified an average annual funding need of $68 million to maintain the recommended statewide PCI threshold of 65. This funding need is not anticipated to alter drastically over the next 5-10 year period.

5.2 Goal 2 - Preserve Existing Buildings

A variety of buildings are necessary at airports in order to provide storage and protection of aircraft, ARFF equipment, and snow removal equipment, as well as terminal and Fixed Base Operator (FBO) facilities to efficiently move passengers and provide necessary administration offices, flight planning, and utility support space. The FAA has established a minimum useful life of 40 years that each of these facilities are expected to serve after construction. The annual funding level needed to preserve these facilities was determined by dividing the current market price of acquisition/installation of these facilities over a 40 year useful life.

5.3 Goal 3 - Preserve Existing Lighting, NAVAIDS, & Other Facilities

Numerous lighting systems and navigational aids are available at airports to provide guidance to pilots and are especially critical during periods of darkness and low visibility weather conditions. The FAA has established the minimum useful life that each of these facilities are expected to serve after installation. These are listed in Table 5 below, along with the typical useful life seen by airport staff with regular maintenance. The annual funding level needed to preserve these facilities was determined by dividing the current market price of acquisition/installation of these facilities over the typical useful life.

Table 4: Lighting & NAVAID Useful Life

Project Type	Minimum Useful Life	Typical Useful Life (If Different)
Airfield Lighting and Signage	15 Years	20 Years

Project Type	Minimum Useful Life	Typical Useful Life (If Different)
NAVAIDS & Weather Reporting Equipment	15 Years	20 Years
Equipment & Vehicles	10 Years	
ARFF Vehicles	15 Years	
Fencing	20 Years	30 Years

5.4 Goal 4 - Modernize to Meet KDOT Aviation Minimum Infrastructure Standards

Existing infrastructure for each airport was compared to the minimum infrastructure requirements discussed in Section 4.0. Then, a list of projects was developed to eliminate any deficiencies where airports did not meet these infrastructure benchmarks. Since these benchmarks are minimum recommendations, no changes were recommended for any airport facility that exceeds the standard.

Estimates of probable costs were developed for each project and extrapolated over 5-year and 10-year programs to determine an annual funding level needed.

5.5 Goal 5 - Modernize to Meet FAA-Justified Demand

FAA Advisory Circular 15/5070-6B provides guidance on the preparation of master plans at airports of all sizes. The master planning process is utilized at all NPIAS airports to prepare development plans to meet future aviation demand. This aviation demand is based on existing aircraft operations for an individual airport and reasonable growth forecasts. From these forecasts of aviation activity, the FAA establishes the additional facilities necessary to meet FAA safety criteria.

Documentation of the projects and estimated cost for reasonable justified growth within the next 5-10 years was provided by airport sponsors through the inventory process. While all these projects have a documented need to meet safety and capacity requirements in the immediate to short-term future, they routinely go unfunded due to limited FAA funding and competition from high-priority runway preservation projects. Due to the typical timeline necessary for these large projects to go through the required environmental clearances, possible land acquisition, design, and construction; the total costs have been extrapolated over 5-year and 10-year programs to determine an annual funding level needed.

5.6 Summary of Needs - Online Dashboard

A customized web-based visualization dashboard was developed in conjunction with this report to document the needs and costs identified in Sections 5.1 through 5.5. This dashboard serves as an interactive summary of the statewide program data and provides the ability to filter the data & needs based on Goal, KDOT district, or Kansas legislative district. Additionally, an airport-specific tab is provided to allow individual airports the ability to view the needs/costs for their specific airport as well as any deficiencies to the Kansas infrastructure benchmarks.

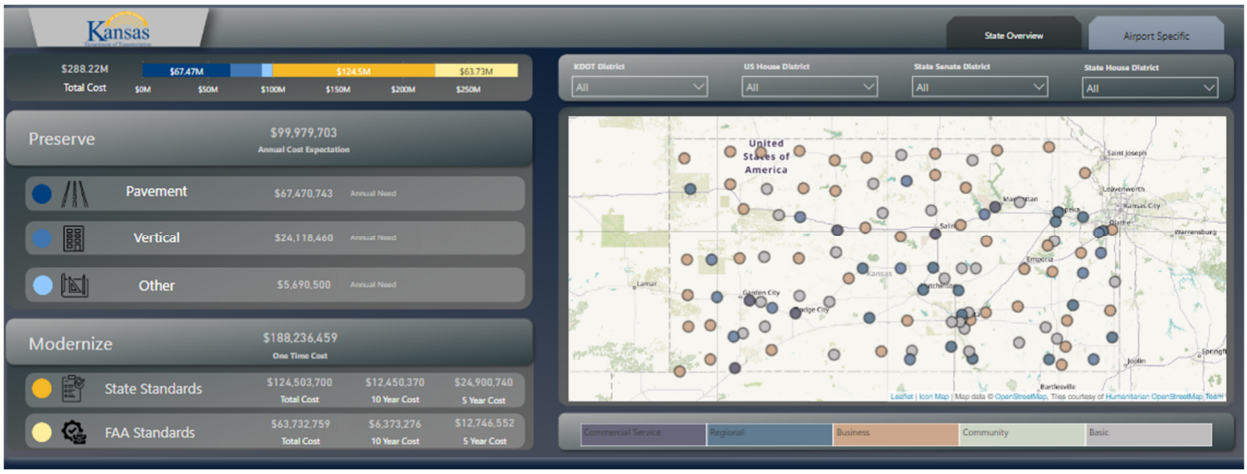


Figure 2: Statewide Needs Example (Online Dashboard)

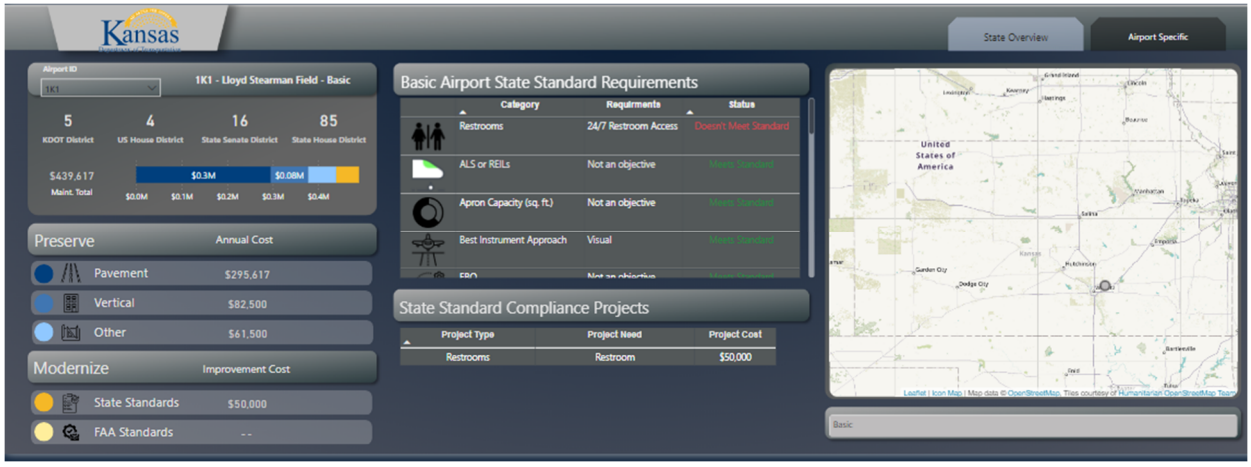


Figure 3: Airport Needs Example (Online Dashboard)

6.0 Airport Funding Available

In order to preserve existing airport infrastructure and modernize the airport system to meet current needs, dependable funding sources need to be identified and dedicated to Kansas airport infrastructure. Over the last 10 years in Kansas, airports have had two primary resources available when it comes to securing grant funding to support their growing needs. One through KDOT Division of Aviation programs and the other through the Federal Aviation Administration Airport Improvement Program.

6.1 Kansas Airport Improvement Program (KAIP)

The Kansas Airport Improvement Program (KAIP) is a grant program that typically receives $5 million annually through the bipartisan Eisenhower Legacy Transportation Program, known as IKE, and is managed by KDOT. Depending on the project type, this program provides 50-95% of the total project cost

for each awarded project grant, with the airport sponsors participating by providing 5-50% of the total project cost with local matching funds. Over the past 10 years, KAIP has typically $5 million in annual grant funds ($11 million in 2023) towards achieving the goals set by the current aviation system plan. The following bullets provide more details on the KAIP grant awards for 3 recent years.

- 2023: Awarded $11 million total for 66 approved projects, with a total project value impact of $14.4 million. KDOT received 153 KAIP grant applications seeking a combined total project value of more than $66 million.
- 2022: Awarded $4.97 million total for 36 approved projects. KDOT received 145 KAIP grant applications seeking a combined total project value of more than $78 million.
- 2020: Awarded $4.2 million for 28 approved projects. KDOT received 113 grant applications seeking a combined total project value of more than $27 million.

1.1 FAA Airport Improvement Program (AIP)

The FAA AIP provides grant funding to support the planning and development of public-use airports that are a part of the National Plan of Integrated Airport Systems (NPIAS). This funding source supports the airport master planning process and the capital projects identified and programmed by the FAA, which are limited to safety and capacity improvements for NPIAS airports only. Section 5.5 of this report describes the modernization goals that are categorized and eligible to receive project funding from this program. Over the past 10 years the state of Kansas has received a total of $340 million in FAA AIP grant funding and an average of $34 million per year. Wichita Dwight D. Eisenhower National Airport does not receive grant funding from the state so for the purposes of this assessment, FAA AIP funds for this airport are not included in the funding totals reported herein. The following table depicts a summary of the FAA AIP grant funds received in the state over the past 10 years:

Table 5: FAA AIP Funding History

Funding Year	FAA AIP Funding Type			Totals
	Entitlements	Discretionary	Supplemental Discretionary	
2022	$ 16,280,615	$ 23,595,886	$ -	$ 39,876,501
2021	$ 24,124,300	$ 4,654,069	$ 6,168,853	$ 34,947,222
2020	$ 19,953,577	$ 7,345,572	$ 14,721,155	$ 42,020,304
2019	$ 13,655,021	$ 5,953,507	$ -	$ 19,608,528
2018	$ 18,239,089	$ 13,058,875	$ -	$ 31,297,964
2017	$ 21,143,435	$ 18,255,869	$ -	$ 39,399,305
2016	$ 20,669,958	$ 20,602,228	$ -	$ 41,272,186
2015	$ 19,160,443	$ 7,474,116	$ -	$ 26,634,559
2014	$ 18,841,467	$ 19,825,078	$ -	$ 38,666,545
2013	$ 18,902,179	$ 8,052,065	$ -	$ 26,954,244
			10 Year Average Annual Funding	**$ 34,067,736**

6.2 Additional Funding Programs

A variety of additional funding programs have recently awarded grants to airport improvement project throughout Kansas. However, these programs are either not dedicated to airport infrastructure, or are not dependable as a continuing annual, funding source.

1. FAA Bipartisan Infrastructure Law (Airport Infrastructure Program) - This program **provides $15 billion** nationwide in airport infrastructure funding over a 5 year period. The money can be invested in runways, taxiways, safety and sustainability projects, as well as terminal, airport-transit connections and roadway projects. Allocations are anticipated to be continue for Kansas airport from FY 2024 through FY 2026 in a total amount of $52.5 million.

2. FAA Bipartisan Infrastructure Law (Airport Terminals Program) - This program **provides $5 billion** nationwide in airport infrastructure funding over a 5-year period. This money **has been allocated** to provide competitive grants for airport terminal development projects that address the aging infrastructure of the nation's airports. These grants will fund safe, sustainable, and accessible airport terminals, on-airport rail access projects and airport-owned airport traffic control towers. Projects may also include multimodal development. Five projects in Kansas have been awarded grants in 2022-2023 to a total amount of $14.1 million. At this rate, it is anticipated that Kansas airports will be successful in achieving a total of $21.2 million from FY 2024 through FY 2026.

3. KDOT Cost Share Program - This program provides financial assistance to local entities for transportation projects that improve safety, support job retention and growth, improve access or mobility, relieve congestion and help areas across the state improve the transportation system. Over the last 4 years, 2 airport projects have received grants for a total amount of $1,750,000. This funding program is anticipate to continue through the end of the IKE Transportation program.

4. Kansas Department of Commerce Aviation Learning Opportunities & Funded Training (ALOFT) - This program provided up to $20,000,000 in grants to aviation and aerospace manufacturers, supply chain providers, and local airports for training and workforce development initiatives. Eligible applications included city-owned airports for training needs and capital projects directly related to expansion of job opportunities. $2.21 million was awarded to Kansas airports, but this program is not anticipated to be available on an annual basis.

7.0 Additional Funding Need

Two scenarios were developed to determine the additional funding necessary to meet the unmet need for preservation and modernization of the Kansas Airport System.

- Scenario 1 provides annual funding necessary for preservation of pavements, buildings, and equipment, while completing all modernization projects within a 5 year period.

- Scenario 2 is similar to Scenario 1, except that modernization projects are completed over a 10-year period.

For both scenarios

- All cost estimates are input as 2024 dollars and assume 3% inflation over the life of the program.
- Anticipated funding sources are based on historical trends and the expected life of these programs.
- The Total Additional Funding Need and Annual Additional Funding Need are calculated by subtracting the Total Funding Available from the Total Program Need.

7.1 Recommendation

Scenario 1 is recommended as the preferred method for calculating funding for unmet needs.

- It is reasonable to anticipate that state and federal funding programs over the next 3-5 years will follow historical trends. But grant programs and funding levels beyond that point are unknown.
- The Modernization needs necessary to meet State and FAA standards are based on documented short-term (0-5 year) needs.
- All projects listed can reasonably be achieved in 5 years with the required land acquisition, environmental clearances, design, and construction if adequate funding is available.

Table 6: Scenario 1 Funding Need (Modernization Achieved Within 5 Year Program)

5-Year Annualized Costs with 3% Inflation						
System Goal	**2024**	**2025**	**2026**	**2027**	**2028**	**Total**
Preserve Pavements	$ 67,470,743	$ 69,494,865	$ 71,579,711	$ 73,727,103	$ 75,938,916	$ 358,211,338
Preserve Buildings	$ 24,118,460	$ 24,842,014	$ 25,587,274	$ 26,354,892	$ 27,145,539	$ 128,048,180
Preserve Equipment	$ 5,690,500	$ 5,861,215	$ 6,037,051	$ 6,218,163	$ 6,404,708	$ 30,211,637
Modernize for State Standards	$ 27,209,711	$ 27,209,711	$ 27,209,711	$ 27,209,711	$ 27,209,711	$ 136,048,555
Modernize per FAA Justification	$ 13,928,501	$ 13,928,501	$ 13,928,501	$ 13,928,501	$ 13,928,501	$ 69,642,507
Total Program Need	**$ 138,417,915**	**$ 141,336,306**	**$ 144,342,249**	**$ 147,438,370**	**$ 150,627,375**	**$ 722,162,216**
					Average Annual Program Need	**$ 144,432,443**
Funding Available						
Funding Source	**2024**	**2025**	**2026**	**2027**	**2028**	**Total**
FAA Entitlements & Discretionary	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 160,000,000
FAA Supplemental Discretionary	$ 7,300,000	$ -	$ -	$ -	$ -	$ 7,300,000
FAA BIL-AIG Apportionments	$ 17,519,887	$ 17,519,887	$ 17,519,887	$ -	$ -	$ 52,559,660
FAA BIL-ATP	$ 7,055,562	$ 7,055,562	$ 7,055,562	$ -	$ -	$ 21,166,686
KDOT KAIP Program	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 25,000,000
KDOT Cost Share Program	$ 875,000	$ 875,000	$ 875,000	$ 875,000	$ 875,000	$ 4,375,000
Sponsor 10% Local Match	$ 13,841,792	$ 14,133,631	$ 14,434,225	$ 14,743,837	$ 15,062,737	$ 72,216,222
Total Funding Available	**$ 83,592,240**	**$ 76,584,079**	**$ 76,884,673**	**$ 52,618,837**	**$ 52,937,737**	**$ 342,617,567**
					Average Annual Funding Available	**$ 68,523,513**
					Total Additional Funding Need Over 5 Year Period	**$ 379,544,649**
					Total Additional Annual Funding Need	**$ 75,908,930**

Table 7: Scenario 2 Funding Need (Modernization Achieved Within 10 Year Program)

10-Year Annualized Costs with 3% Inflation											
System Goal	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**Total**
Preserve Pavements	$ 67,470,743	$ 69,494,865	$ 71,579,711	$ 73,727,103	$ 75,938,916	$ 78,217,083	$ 80,563,596	$ 82,980,503	$ 85,469,919	$ 88,034,016	$ 773,476,455
Preserve Buildings	$ 24,118,460	$ 24,842,014	$ 25,587,274	$ 26,354,892	$ 27,145,539	$ 27,959,905	$ 28,798,703	$ 29,662,664	$ 30,552,544	$ 31,469,120	$ 276,491,115
Preserve Equipment	$ 5,690,500	$ 5,861,215	$ 6,037,051	$ 6,218,163	$ 6,404,708	$ 6,596,849	$ 6,794,755	$ 6,998,597	$ 7,208,555	$ 7,424,812	$ 65,235,205
Modernize for State Standards	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 14,433,391	$ 144,333,912
Modernize per FAA Justification	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 7,388,374	$ 73,883,735
Total Program Need	**$119,101,468**	**$122,019,859**	**$125,025,802**	**$128,121,923**	**$131,310,927**	**$134,595,602**	**$137,978,817**	**$141,463,529**	**$145,052,782**	**$148,749,712**	**$1,333,420,421**
										Average Annual Program Need	**$ 133,342,042**
Funding Available											
Funding Source	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**Total**
FAA Entitlements & Discretionary	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 32,000,000	$ 320,000,000
FAA Supplemental Discretionary	$ 7,300,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,300,000
FAA BIL-AIG Apportionments	$ 17,519,887	$ 17,519,887	$ 17,519,887	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 52,559,660
FAA BIL-ATP	$ 7,055,562	$ 7,055,562	$ 7,055,562	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 21,166,686
KDOT KAIP Program	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 50,000,000
KDOT Cost Share Program	$ 875,000	$ 875,000	$ 875,000	$ 875,000	$ 875,000	$ 875,000	$ -	$ -	$ -	$ -	$ 5,250,000
Sponsor 10% Local Match	$ 11,910,147	$ 12,201,986	$ 12,502,580	$ 12,812,192	$ 13,131,093	$ 13,459,560	$ 13,797,882	$ 14,146,353	$ 14,505,278	$ 14,874,971	$ 133,342,042
Total Funding Available	**$ 81,660,595**	**$ 74,652,434**	**$ 74,953,029**	**$ 50,687,192**	**$ 51,006,093**	**$ 51,334,560**	**$ 50,797,882**	**$ 51,146,353**	**$ 51,505,278**	**$ 51,874,971**	**$ 589,618,388**
										Average Annual Funding Available	**$ 58,961,839**
										Total Additional Funding Need Over 10 Year Period	**$ 743,802,034**
										Annual Additional Funding Need	**$ 74,380,203**

Appendix A

2022 KDOT Aviation Pavement Management Plan Summary

Pavement Condition vs Cost of Rehabilitation

Every 3 years, KDOT grades airport pavements on a scale of 0-100, called a Pavement Condition Index (PCI). This PCI data assists KDOT in determining appropriate pavement maintenance at airports.

PCI SCALE: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0

PCI 65-100: Good Condition

These pavements provide for safe and efficient use. Maintaining pavements in this condition is cost effective and requires little downtime for construction.

PCI 40-65: Fair Condition

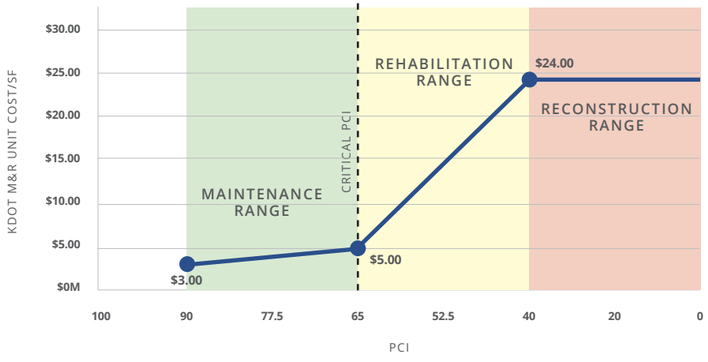
These pavements are beginning to cause loose materials to form on the surface, which can damage jet engines. Pavements deteriorate rapidly in this condition, with rehabilitation costs increasing exponentially and construction requiring lengthly closures.

PCI 0-40: Poor Condition

These pavements are not safe for regular use. Pavement is not stable, with ruts and large debris commonly found within the pavement limits. Lengthly and costly reconstruction projects are required to bring pavements back to good condition.

Pavement Asset

- KDOT's Division of Aviation Assists in Maintaining 121.2M Square feet of Airport Pavement
- Pavements are the Largest Asset in the KDOT Airport System



KDOT strives to maintain a system wide Pavement Condition Index (PCI) above the Critical PCI of 65. The costs for rehabilitation increases tremendously as the PCI falls further below this Critical PCI.

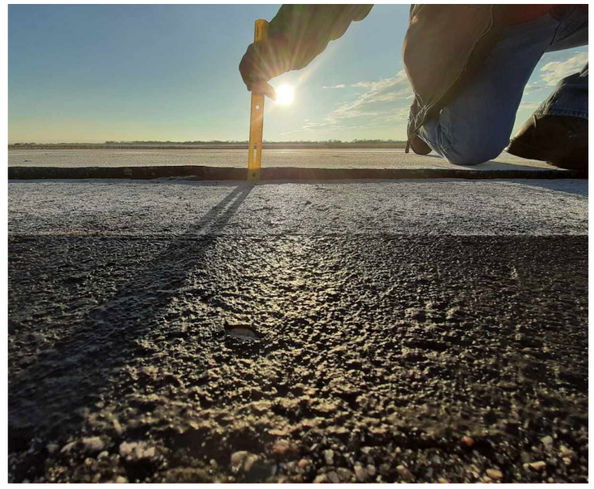
As shown within this graph, the cost to rehabilitate the system increases from $5.00/sf to $24.00/sf when the PCI drops 25 points from 65 to 40. In contrast, the cost to maintain the pavements remains at or below $5.00/sf when the PCI is between 65 to 100; a range of nearly 35 points. This represents that maintaining the system above the critical PCI results in a cost benefit of nearly 5 times versus allowing the system wide PCI to fall further below the Critical PCI.

GARVER

2023-2025

Pavement Management Plan
System Needs

Kansas Department of Transportation
Division of Aviation

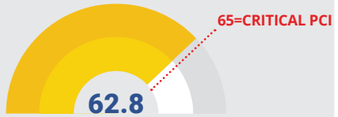


Kansas Department of Transportation

Driving economic development and enhancing critical services through infrastructure improvement

System Status

Current PCI



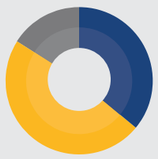
The current KDOT system-wide Pavement Condition Index (PCI) is 62.8, which is below the Critical PCI of 65. If the PCI continues decreasing below this PCI, costs to maintain the system will increase exponentially.

Current Pavement Use

43% Runway
24% Taxiway
4% Taxilane
27% Apron

Runway pavement makes up the vast majority of the system's pavement asset. Runway pavements also have the highest average PCI in the system, with an average PCI of 68.7.

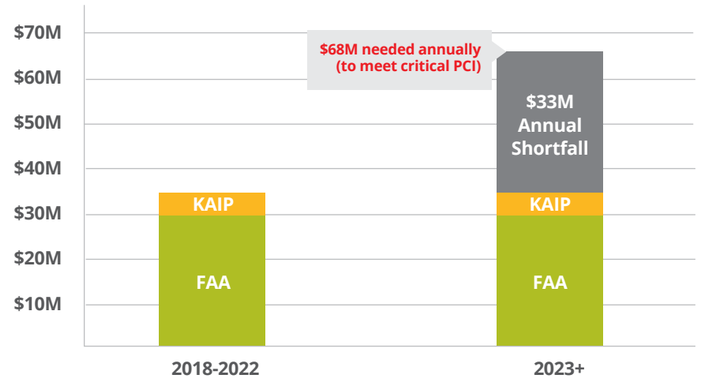
Current Maintenance Need



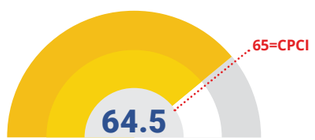
36% Pavement Maintenance
48% Rehabilitation
16% Reconstruction

Pavement distress data indicates that 36% of KDOT's airport pavements would benefit from preventative maintenance, such as crack sealing, surface treatments, or joint sealing. The remaining 64% of pavements are in need of more extensive rehabilitation, such as overlays or reconstruction.

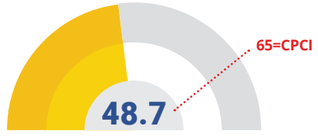
Total Annual Funding Review



NPIAS and Non-NPIAS Current Conditions

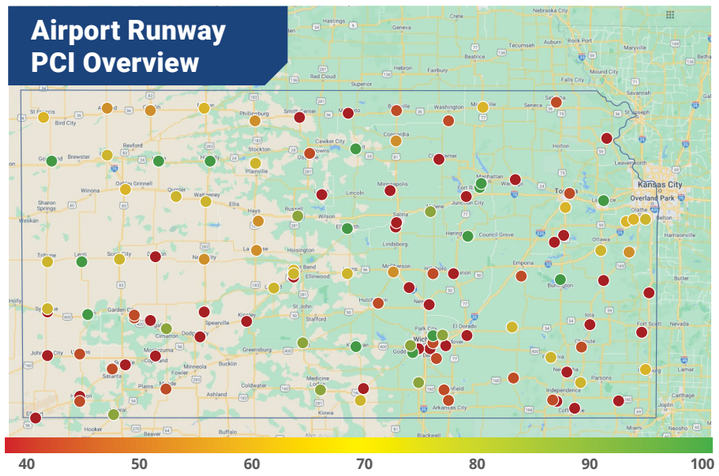


NPIAS Current PCI



Non-NPIAS Current PCI

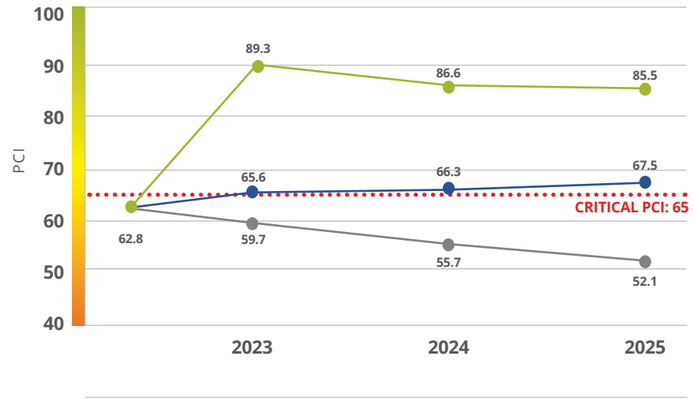
At the existing rate of funding, the combined system-wide PCI for both NPIAS and Non-NPIAS fell below the "Critical PCI" (CPCI) of 65 in 2022. The Critical PCI is the point in a pavement's life where the cost of pavement rehabilitation increases exponentially with time. It is vital to maintain an average state system PCI above the "Critical PCI" to avoid rapid pavement deterioration and future rehabilitation costs that far exceed available funding budgets.



Needs Assessment

Maintenance program scenarios were developed for the KDOT Aviation state system using standard pavement deterioration models and data analytics software. The analysis was prepared for 3 years (2023 through 2025). All types of maintenance were included in the program scenarios. It is important to note that the scenarios only include funding for NPIAS and Non-NPIAS airside pavement maintenance and rehabilitation.

Maintenance Scenario Comparison



Scenario 1 - Baseline
No Funding

This Scenario tracks the resultant annual pavement condition deterioration for the entire system if no funding was present for pavement rehabilitation.

Scenario 2 (Recommended) - Maintain PCI (65)
$68M Average Annual Funding

This Scenario evaluates the funding necessary to achieve and maintain a system wide PCI of 65.

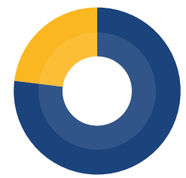
Scenario 3 - Fund All Current Needs
$183M Average Annual Funding

This Scenario evaluates the funding necessary to meet all current system needs.

	Scenario 1	Scenario 2	Scenario 3
Average Annual Funding	$0	$68M	$183M
PCI (2025)	52.1	67.5	85.5
Unmet Needs (2023 Dollars)	$548M	$345M	$0M

Scenario 2 - NPIAS/Non-NPIAS
3 Year Funding Summary ($68M Annual Average)

NPIAS Status	Project Count	Total Cost
NPIAS	443	$157M
Non-NPIAS	124	$47M
Total	**567**	**$204M**



77% NPIAS
23% Non-NPIAS

Airports are essential to the development of cities and counties within Kansas. Each airport serves as an economic gateway for the cities and counties in which they reside as well as their surrounding area. A vibrant aviation system with viable and safe pavements is key to attracting new businesses and retaining existing businesses within the great state of Kansas.

Through fiscal responsibility and prudent use of state funds, Kansas Department of Transportation is committed to maintaining the pavements and supporting the aviation infrastructure of the state to ensure that a healthy and robust environment exists for continuing economic growth across Kansas.

Appendix B

KAIP Program Guidelines

Kansas Airport Improvement Program (KAIP)

Program Guidance

Updated September 2021

KANSAS AIRPORT IMPROVEMENT PROGRAM

Program Outline

The Kansas Airport Improvement Program (KAIP) is designed to assist airport sponsors in improving and maintaining the state's system of public-use airports.

Program Strategy: Preservation and enhancement of the Kansas airport system

Program Objectives

1. Maintain the system's runway condition rating of "very good."
2. Minimize surface travel time to air ambulance pick-up locations.
3. Improve safety.
4. Enhance airport and community economic development appeal.

Airport Eligibility

The program is open to public-use airports in Kansas as defined in K.S.A. 75-5061

Project Eligibility

1. Scope of eligible projects:
   a. Projects addressing safety and preservation concerns.
   b. Projects focused on developmental needs identified in the Kansas Airport System Plan (KASP).
   c. All projects deemed by the sponsor to be critical to the airport's ability to support the community.
2. Projects should be capable of completion in one year of project start and must be started within two years of grant award.
3. State funding is not intended to be used to leverage federal assistance projects *NOTE* *: *A one-time pilot project exemption was allowed in FY 2014 for the Federal FY 2012 projects that suddenly changed cost share amount from 5% to 10% in the middle of the fiscal year due to unforeseen Congressional action.*)
4. Grant offers shall be accepted within 120 calendar days of the initial offer. Initial offer is defined as the postmarked date of the KDOT grant offer letter.
5. All airport improvements must comply with FAA standards.

Project Types

KAIP projects are categorized into four areas.

1. System Preservation Projects
   a. Infrastructure Improvements: Includes maintenance, repair and rehabilitation activities intended to keep existing landside and airside facilities in good, functioning condition. Routine pavement maintenance projects not requiring any changes in length, width or alignment will incorporate standard KDOT maintenance procedures and recommendations.

b. Vertical Development: Includes maintenance, repair and rehabilitation activities intended to keep existing vertical development structures in good, functioning condition.

2. Modernization Projects
   a. Geometric Improvements: Includes projects that increase the capacity of existing facilities, change the alignment, resolve line of sight problems or clear obstructions are considered modernization.
   b. Vertical Development: Includes projects that create new facilities/vertical development.

3. Equipment and Facilities Projects
   a. Equipment: Includes the purchase of equipment, such as snow removal equipment and mowers.
   b. Facilities
      i. Navigational: Includes airfield lighting, PAPIs, AWOS, and Ground Communications Outlets.
      ii. Non-Navigational: Includes fuel system and credit card readers.

4. Design/Planning Projects
   a. Any project that evaluates or establishes priorities for the airport's continued use and development, including aeronautical surveys and airport layout drawings. This category also includes project design efforts when required in special circumstances.

NIPIAS Note: Airports listed with the Federal Aviation Administration's (FAA), National Plan of Integrated Airport Systems (NPIAS) must comply with FAA design standards. Utilization of engineering consultants for design and construction engineering is highly recommended. KDOT Aviation will coordinate with the FAA for compliance and certification when required.

Sponsor Participation

Note: All sponsors accepting KAIP grants commit to keeping their airport open to public-use for a minimum of ten (10) years.

Funding ratio will be based on project types as listed below:

1. System Preservation Projects
   a. Infrastructure Improvements .....(90/10)
   b. Vertical Development .....(85/15)

2. Modernization Projects
   a. Geometric Improvements .....(90/10)
   b. Vertical Development .....(50/50)

3. Equipment and Facilities Projects
   a. Equipment .....(50/50)
   b. Facilities
      i. Navigational .....(90/10)
      ii. Non-Navigational .....(85/15)

4. Design/Planning Projects
   a. All planning grants .....(95/5)

Maximum State Participation

The maximum state participation in any project is $800,000 with two exceptions:

1. Projects for construction of a new paved runway are eligible for a maximum of $1,600,000.
2. Projects for full-depth reconstruction of an existing paved runway are eligible for a maximum of $1,200,000.

Project Selection

The Project Evaluation Team will be designated by the Secretary of Transportation and consist of members with aviation, construction and maintenance knowledge and expertise that will enable them to assess the applications. Projects will be evaluated utilizing an objective priority system to numerically rank the applications in the appropriate categories. The team will submit its recommendations to the Secretary for approval and grant issuance.

Priority Rating System

Factors used in evaluating projects

1. Safety
2. System Preservation
3. Kansas Airport System Plan recommendations
4. Geographic remoteness
5. Discretionary
    a. Willingness of sponsor to exceed minimum match requirements
    b. Previous project experience
    c. Economic impact
    d. Other considerations not falling under previous factors

Application Process

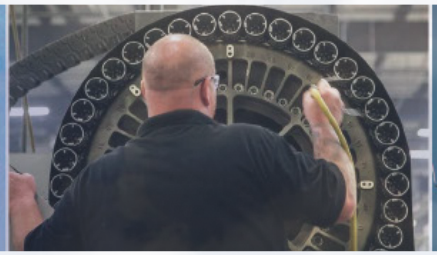
1. Project applications are solicited for submittal or resubmittal annually between September 1-September 30. (2023 FY applications are accepted through October 31). Applications may be submitted anytime during the year but will considered Out of Cycle and may be held for grant review under the September solicitation process. They are valid for 12 months only.
2. Sponsors are encouraged to review proposed projects with the Division of Aviation prior to submission of applications.
3. Out-of-cycle applications may be solicited to meet urgent program needs.
4. Certain types of critical projects with standard, defined scopes may be funded out-of-cycle if the budget allows. Examples include aeronautical surveys, AWOS systems and emergency repairs.
5. The selection process will be conducted in a timely manner to allow sponsors time to budget and solicit bids for the following construction season.

Letting Entity

Sponsors will be the letting entity for the projects.

Appendix C

2016 Kansas Aviation Economic Impact Study - Executive Summary


KANSAS AVIATION ECONOMIC IMPACT STUDY

EXECUTIVE SUMMARY

Kansas Department of Transportation
Division of Aviation

BURNS McDONNELL CDM Smith

INTRODUCTION

Aviation is deeply rooted in Kansas. The state is home to many aviation pioneers, including Clyde Cessna, Lloyd Stearman, and Walter and Olive Beech. Wichita's early commitment to aircraft manufacturing earned it the title "Air Capital of the United States." Without the rich history of aircraft manufacturing in Kansas, the aviation industry would not be what it is today, and the Kansas economy would likely be significantly smaller in size.

Air transportation remains essential to the Kansas economy and its position in the global marketplace. Airports in Kansas are the gateway to the nation's air transportation system and the world's economy. It supports the attraction and retention of aviation-related businesses throughout the state. Air transportation is not only important to businesses in Kansas, it also supports tourism, agriculture, emergency medical services, military, and public safety. Each airport is an important component of the Kansas Aviation System.

STUDY OVERVIEW

The Kansas Department of Transportation, Division of Aviation initiated this study to highlight the significant economic contributions from aviation on the state's economy. This study quantifies the economic impacts from all aspects of aviation including airports, airport-related businesses, and aerospace manufacturing throughout the state.

Economic impacts were quantified for the seven commercial and 73 general aviation airports listed in the National Plan of Integrated Airports System (NPIAS) in Kansas. This study focuses on all aviation related economic benefits associated with airports, airport businesses, tenants, and aerospace manufacturing. Moreover, visitor spending associated with air travel, whether business or recreational, provided additional economic benefits to the state.

Overall, airports throughout Kansas contribute to its economy through a variety of activities including several unique industries that are not as easily quantified however they rely on aviation to support their mission or operation. As a result, the following areas were also highlighted for their contributions to the overall benefit of aviation to Kansas and local communities:

- Medical Operations
- Agricultural Application
- Aerospace Manufacturing
- Value Added Benefits from Off-Airport Businesses
- Qualitative Airport Benefits
- Kansas City International Airport

STUDY METHODOLOGY

The Kansas Aviation Economic Impact Study uses an econometric input-output model to estimate the economic impacts of its 80 NPIAS airport. This input-output model assesses various economic impacts, such as those associated with on-airport activities, commercial service visitors, and general aviation visitors arriving at the airports. The following economic impact were measured:

FIRST ROUND IMPACTS include both direct and indirect impacts, and measures where on-airport activity (direct impacts) and visitor spending (indirect impacts) first begin circulating through the economy.

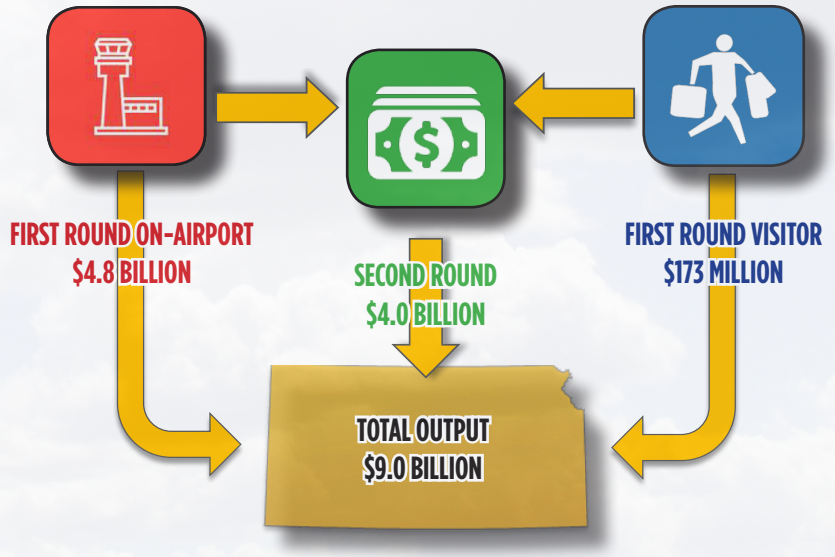
- **DIRECT IMPACTS** include employment, payroll, and spending from businesses such as fixed base operators (FBOs), flight schools, aircraft repair facilities, and on-airport government entities. Capital expenditures from these businesses and government entities are also considered direct impacts.
- **INDIRECT IMPACTS** include spending from visitors arriving in Kansas via air (both commercial service and GA), and generally occuring at off-airport locations. Visitor expenditures support employment and payroll in service-related industries such as lodging, food and beverage, retail, and entertainment.

SECOND ROUND IMPACTS, or Induced Impacts, are the economic benefits resulting from the recirculation of dollars from direct and indirect impacts within the economy, and referred to as the multiplier effect. For example, airport employees spend their salary for housing, food, and services. Portions of these dollars circulate through the economy resulting in increased spending, payroll, and employment throughout Kansas. Over time, as these dollars continue to circulate, their impact lessens as they leave the community. The economic model uses parameters specific to Kansas to estimate the leakage effect associated with these second round impacts.

TOTAL IMPACTS are the sum of all first round (direct and indirect) and second round (induced) economic activities attributable to airports or aviation-related activities. First round impacts are measured through surveys of businesses, government agencies, and visitor spending. Second round impacts are more difficult to estimate, therefore, it becomes necessary to use a reliable method for economic modeling.

Data used for economic modeling input were gathered from the airports and their tenants. A survey also sampled general aviation visitors' spending habits while traveling to determine their indirect benefits. Kansas-specific multipliers were used to convert this spending into jobs and payroll. As these first round benefits are released into the statewide economy, additional second round benefits are created. For example, when airport employees use their salary to buy groceries, their dollar supports additional economic activity. Each time this dollar is used, its effect is diminished. As a result, the dollar continues circulating throughout the economy until the benefits ultimately leak outside of Kansas.

Second round benefits were calculated using Kansas specific multipliers. For example, for every $100 of first round benefits generated by aviation-related businesses, an additional second round benefit of $55 is created. The total economic benefit is the sum of first round and second round benefits, which would equal $155.



IMPACT MEASURES

Economic impacts (output) are expressed in terms of employment, payroll, and total economic activity. For each of these activities, first round and second round impacts were calculated.

EMPLOYMENT

Thousands of jobs in Kansas are directly created by businesses, tenants, and other activities located at commercial service and general aviation airports. In addition to on-airport jobs, spending by Kansas visitors arriving via commercial service or general aviation airports support additional indirect employment. Jobs were defined in terms of full-time equivalents (FTE), while two part-time jobs equal one FTE. Overall, Kansas airports support 34,000 jobs.

PAYROLL

Each job generates annual wages, salaries, and benefits that contribute to the overall payroll impacts. These findings reveal that the commercial service and general aviation airports generate an estimated $1.8 Billion in annual payroll benefits.

OUTPUT

The value of the goods and services produced by airports and related aviation activities is the economic output of that airport. The output of on-airport businesses is estimated as the sum of annual gross revenues and average capital expenditures. For organizations that do not produce revenues (such as corporate flight departments), annual payroll and expenses are substituted for annual revenues. This study revealed that Kansas airports contribute $9.0 billion in total economic impacts each year, while Aerospace manufacturing accounts for 46 percent of this output to the state and local economies.

ANNUAL ECONOMIC IMPACT OF COMMERCIAL SERVICE AIRPORTS

Associated City	Airport	Total Employment	Total Payroll	Total Output
Dodge City	Dodge City Regional Airport	174	$6,745,000	$30,418,200
Garden City	Gardern City Regional Airport	232	$8,692,600	$36,295,900
Hays	Hays Regional	170	$4,192,400	$17,976,900
Liberal	Liberal Mid-America Regional	237	$7,711,500	$38,023,000
Manhattan	Manhattan Regional	494	$14,263,400	$56,008,200
Salina	Salina Regional	640	$26,034,500	$90,443,800
Wichita	Wichita Dwight D. Eisenhower National	20,583	$1,206,733,800	$4,978,579,200
COMMERCIAL SERVICE AIRPORTS TOTALS		**22,530**	**$1,274,373,200**	**$5,247,745,200**

ANNUAL ECONOMIC IMPACT OF GENERAL AVIATION AIRPORTS

Associated City	Airport	Total Employment	Total Payroll	Total Output
Abilene	Abilene Municipal	30	$895,200	$2,642,800
Anthony	Anthony Municipal	1	$39,700	$246,500
Atchison	Amelia Earhart Memorial	9	$224,000	$887,500
Atwood	Atwood-Rawlins County City-County	34	$966,200	$10,295,500
Augusta	Augusta Municipal	283	$13,090,200	$60,253,800
Belleville	Belleville Municipal	3	$121,200	$1,130,300
Beloit	Moritz Memorial	17	$470,200	$2,213,400
Burlington	Burlington-Coffey County	26	$1,006,900	$6,456,500
Chanute	Chanute - Martin Johnson	20	$699,000	$2,905,400
Cimarron	Cimarron Municipal	<1	$2,100	$18,200
Clay Center	Clay Center Municipal	22	$843,300	$4,076,100
Coffeyville	Coffeyville Municipal	11	$202,700	$874,300
Colby	Shalz Field	20	$631,300	$5,318,400
Concordia	Blosser Municipal	7	$206,200	$656,100
El Dorado	El Dorado/Capt. Jack Thomas Memorial	22	$879,400	$6,115,400
Elkhart	Elkhart-Morton County	6	$190,100	$1,702,500
Ellsworth	Ellsworth Municipal	5	$186,700	$1,543,900

ANNUAL ECONOMIC IMPACT OF GENERAL AVIATION AIRPORTS - *CONTINUED*

ASSOCIATED CITY	AIRPORT	TOTAL EMPLOYMENT	TOTAL PAYROLL	TOTAL OUTPUT
Emporia	Emporia Municipal	55	$2,324,000	$10,328,500
Eureka	Lt. William M. Milliken	8	$294,300	$1,148,700
Fort Scott	Fort Scott Municipal	16	$620,700	$3,472,100
Gardner	Gardner Municipal	6	$212,200	$677,300
Garnett	Garnett Industrial	8	$216,700	$905,100
Goodland	Renner Field - Goodland Municipal	128	$4,415,300	$24,320,500
Great Bend	Great Bend Municipal	137	$4,701,800	$18,128,400
Herington	Herington Regional	9	$229,200	$1,789,400
Hill City	Hill City Municipal	17	$426,600	$2,509,400
Hugoton	Hugoton Municipal	22	$649,600	$4,358,100
Hutchinson	Hutchinson Municipal	155	$4,928,800	$18,365,300
Independence	Independence Municipal	2,142	$103,305,800	$751,852,500
Iola	Allen County	5	$162,600	$767,700
Johnson	Stanton County Municipal	28	$777,500	$6,400,100
Junction City	Freeman Field	44	$2,637,400	$12,025,300
Kingman	Kingman - Clyde Cessna Field	9	$282,600	$1,057,400
Lakin	Kearny County	12	$500,400	$2,003,200
Larned	Larned - Pawnee County	17	$596,200	$5,634,600
Lawrence	Lawrence Municipal	97	$4,012,800	$13,300,200
Leoti	Mark Hoard Memorial	11	$371,600	$3,576,900
Lyons	Lyons - Rice County Municipal	24	$670,700	$4,265,600
Marysville	Marysville Municipal	8	$367,400	$1,104,700
McPherson	McPherson	33	$860,000	$2,822,500
Meade	Meade Municipal	4	$146,300	$1,288,100
Medicine Lodge	Medicine Lodge	1	$17,600	$117,000
Ness City	Ness City Memorial	<1	$4,200	$10,700
Newton	Newton City/County	781	$28,284,400	$152,784,900
Norton	Norton Municipal	12	$298,700	$3,002,200
Oakley	Oakley Municipal	26	$815,200	$5,877,200
Oberlin	Oberlin Municipal	19	$398,600	$2,370,000
Olathe	Johnson County Executive	421	$11,489,400	$51,912,400

ANNUAL ECONOMIC IMPACT OF GENERAL AVIATION AIRPORTS - *CONTINUED*

ASSOCIATED CITY	AIRPORT	TOTAL EMPLOYMENT	TOTAL PAYROLL	TOTAL OUTPUT
Olathe	New Century AirCenter	728	$34,122,800	$160,265,000
Osage City	Osage City Municipal	46	$2,372,500	$9,393,300
Oswego	Oswego Municipal	6	$254,200	$1,754,400
Ottawa	Ottawa Municipal	34	$1,424,800	$5,863,700
Paola	Miami County	29	$1,086,300	$4,299,100
Parsons	Tri-City	11	$243,800	$1,392,400
Phillipsburg	Phillipsburg Municipal	18	$692,800	$5,105,300
Pittsburg	Atkinson Municipal	47	$1,709,100	$8,945,200
Pratt	Pratt Regional	49	$1,417,800	$7,260,600
Russell	Russell Municipal	6	$179,900	$1,557,900
Sabetha	Sabetha Municipal	2	$39,600	$156,100
Satanta	Satanta Municipal	29	$1,071,700	$10,598,800
Scott City	Scott City Municipal	17	$672,700	$4,760,700
Smith Center	Smith Center Municipal	10	$312,300	$2,655,400
St. Francis	St. Francis-Cheyenne County	18	$360,500	$2,073,900
Stockton	Rooks County Regional	18	$499,400	$3,518,400
Syracuse	Syracuse - Hamilton County Municipal	19	$587,000	$4,481,300
Topeka	Philip Billard Municipal	201	$8,365,800	$20,248,700
Topeka	Topeka Regional	1,774	$77,620,800	$162,994,700
Tribune	Tribune Municipal	8	$622,400	$2,666,600
Ulysses	Ulysses	36	$1,186,500	$6,659,300
WaKeeney	Trego WaKeeney	18	$516,400	$4,779,200
Wellington	Wellington Municipal	972	$48,035,800	$197,418,700
Wichita	Col. James Jabara	1,053	$40,884,800	$156,315,600
Winfield	Strother Field	1,543	$154,489,900	$1,784,693,800
GENERAL AVIATION AIRPORTS TOTALS		**11,463**	**$574,442,600**	**$3,785,370,700**
ALL AIRPORTS TOTAL		**33,993**	**$1,848,815,800**	**$9,033,115,900**

ADDITIONAL ECONOMIC BENEFITS TO KANSANS

Airports in Kansas provide benefits beyond those directly associated with on-airport businesses or aviation. Some benefits are difficult to quantify and not included in the traditional economic model previously discussed. However, it is important to recognize these benefits because the total value of an airport system extends well beyond employment, payroll, and output impacts.

Economic Impact for Airports and Heliport Use by Hospitals

Lives, Health, Service

MEDICAL OPERATIONS

Aviation provides a critical role assisting communities, especially those in rural areas, with access to medical services. The ability to rapidly and safely move patients, medical personnel, and equipment throughout Kansas is an aviation benefit that is vital to the well-being and quality of life throughout the state. Lives are improved, and in some cases saved, however its economic value is difficult to quantify.

Patient Transfers: Nearly 94 percent of responding hospitals indicate that they regularly use air ambulance services to transport patients from a hospital helipad or local airport.

Specialty Clinics: Specialty clinics consist of consultations and treatments by doctors, nurses, and other healthcare practitioners in a variety of specialized areas. Many hospitals, especially those located in the more rural areas, find that the demand and salaries to maintain a full-time specialist on staff are not warranted. Therefore, the most cost-effective approach to provide specialized care is offering periodic on-site clinics.

Air Cargo: Hospitals also indicate they rely on aviation to transport medication and medical supplies. Approximately one-third of responding hospitals revealed that they use express air or air cargo to move a variety of medical items and important documentation from place to place.

AGRICULTURAL APPLICATION

Aviation is a critical part of the Kansas agricultural industry. Overall, aerial applicators are estimated to preserve or enhance crop value of Kansas agriculture by approximately $490.5 million. As part of the "Grain Belt," Kansas plays a major role in the production of agricultural products worldwide. Unlike ground-based rigs, aerial agricultural applicators have the ability to accurately and efficiently apply pesticides without damaging nearby plants or crops.

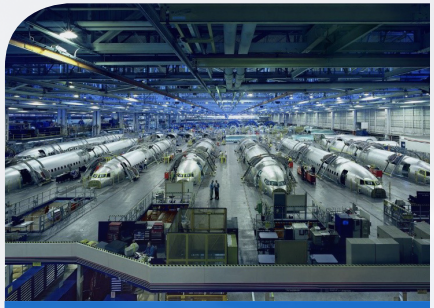
Economic Impact Attributed from Agricultural Applicators:

Up to $490.5 Million

And, aerial agricultural applicators also respond quickly to outbreaks of plant disease or insect infestation. Without these capabilities, some or even all of the economic value of a crop may be lost.

OFF-AIRPORT AEROSPACE MANUFACTURING

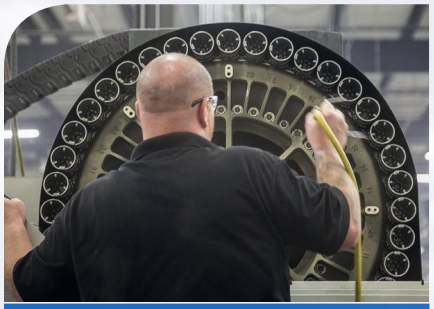
Kansas is a global leader in aerospace manufacturing. With a rich aviation history, it is no surprise that aerospace manufacturing plays such an important role in the Kansas economy. According to the Kansas Department of Commerce, nearly 70 percent of the world's embedded aircraft fleet was manufactured in Kansas, while producing over a quarter million aircraft since 1919. As such, aerospace manufacturing comprises a large sector of the Kansas economy. Many of these firms exist to support the extensive aircraft manufacturing industry in Kansas.



Off-Airport Aerospace Manufacturing

Jobs	47,000
Payroll	$1.6 Billion
Output	$9.5 Billion

VALUE-ADDED BENEFITS FROM OFF-AIRPORT BUSINESSES



Off Airport Aerpspace Manufacturing

Jobs	47,000
Payroll	$1.6 Billion
Output	$9.5 Billion

Air transportation supports business operations throughout the United States to increase productivity and meet their goals. Similarly, many businesses in Kansas, while not located at an airport, benefit from the proximity and availability of the state's NPIAS airports.

A survey of Kansas businesses found that many businesses in the region depend on the state's airports for the transport of employees, clients and suppliers as well as goods. Without access to these airports, some companies would be forced to reduce employment or possibly relocate elsewhere. Based on this survey, an estimated 253,000 jobs are linked to the airports and the efficiencies gained for their business roles.

KANSAS CITY INTERNATIONAL AIRPORT

Kansas Impacts:

Jobs	15,100
Payroll	$462 Million
Output	$1.6 Billion

Kansas City International Airport (MCI), located near the Kansas state line, draws a substantial portion of its employees and airline passengers from Kansas. Because of its proximity to Kansas, MCI provides additional economic impacts to the state and its residents. The Economic Impact of Kansas City International Airport FY 2014, was used to estimate the portion of MCI's 2015 economic impacts that benefit Kansas in terms of employment, payroll, and total output.

The results of this analysis indicated that MCI is responsible for more than 15,100 total jobs in Kansas, or more than 35 percent of the airport's total employment impact. Those Kansas-based employees earned approximately $462 million in total wages and benefits, or more than 32 percent of the payroll attributed to the airport. Finally, MCI was estimated to produce over $1.6 billion in total output for Kansas, or approximately 31 percent of the total economic output of the airport.

QUALITATIVE AIRPORT BENEFITS

Qualitative benefits are those activities which take place regularly at an airport that adds to the quality of life of Kansas' citizens. Because these benefits typically enhance the health, safety, or welfare of individuals in the airport's market area, they cannot be readily assigned a dollar value.

Qualitiative Benefits of Aviaion at Kansas System Airports

The following are examples of the qualitative benefits Kansas aviation supports:

- Agriculture (offering the option to access aerial applicators)
- Emergency medical transport
- Staging area for community events
- Prisoner transport
- Military training/exercises
- Police support
- Search-and-rescue operations
- Aerial surveying, photography, and inspection operations
- Flight training activities
- Youth education and outreach activities (e.g. Young Eagles)

SUMMARY

In 2017, $20.6 billion in annual economic benefit was supported by aviation and aviation-related activities in Kansas, supported nearly 91,300 jobs, and generated more than $4.4 billion in annual payroll. The table below provides a detailed breakdown of the impact for each sector:

ECONOMIC IMPACTS OF AVIATION ACTIVITY IN KANSAS

	First Round Impacts	Second Round Impacts	Total Impacts
EMPLOYMENT			
Employment			
Off-Airport Aerospace Manufacturing	18,610	23,538	42,148
Kansas NPIAS Airports	16,161	17,832	33,993
Kansas City International Airport Impacts in Kansas	8,560	6,578	15,138
Aerial Applicator Value to Kansas Agriculture (Note 1)	N/A	N/A	N/A
Total	**43,331**	**47,948**	**91,279**
PAYROLL			
Off-Airport Aerospace Manufacturing	$1,172,099,400	$932,261,100	$2,104,360,500
Kansas NPIAS Airports	$1,042,017,800	$806,798,000	$1,848,815,800
Kansas City International Airport Impacts in Kansas (Note 2)	$216,000,000	$246,000,000	$462,000,000
Aerial Applicator Value to Kansas Agriculture (Note 1)	N/A	N/A	N/A
Total	**$2,430,117,200**	**$1,985,059,100**	**$4,415,176,300**
OUTPUT			
Off-Airport Aerospace Manufacturing	$6,622,891,700	$2,846,686,400	$9,469,578,100
Kansas NPIAS Airports	$5,000,314,400	$4,032,801,500	$9,033,115,900
Kansas City International Airport Impacts in Kansas (Note 2)	$777,000,000	$824,000,000	$1,601,000,000
Aerial Applicator Value to Kansas Agriculture (Note 1)	N/A	N/A	$490,461,000
Total	**$12,400,206,100**	**$7,703,487,900**	**$20,594,155,000**