# South Dakota
## State Aviation System Plan 2010-2030

South Dakota DOT
Connecting South Dakota and the Nation

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# Chapter 1 - Introduction

## Introduction

South Dakota has an extensive aviation system that spans over 77,000 square miles, providing a valuable transportation resource to residents, businesses, and visitors. This diverse aviation system includes 72 public use airports (see **Figure 1.1**), which support more than 700,000 annual aircraft operations moving people and cargo around the world. Careful planning is required to ensure these facilities meet the transportation and economic needs of current and future users. Therefore, the South Dakota Department of Transportation (DOT) Office of Aeronautics, in conjunction with the Federal Aviation Administration (FAA), has developed the 2010 *South Dakota State Aviation System Plan* (SDSASP). The goal of the SDSASP is to provide the necessary guidance to manage the growth, development, and preservation of South Dakota's aviation system.

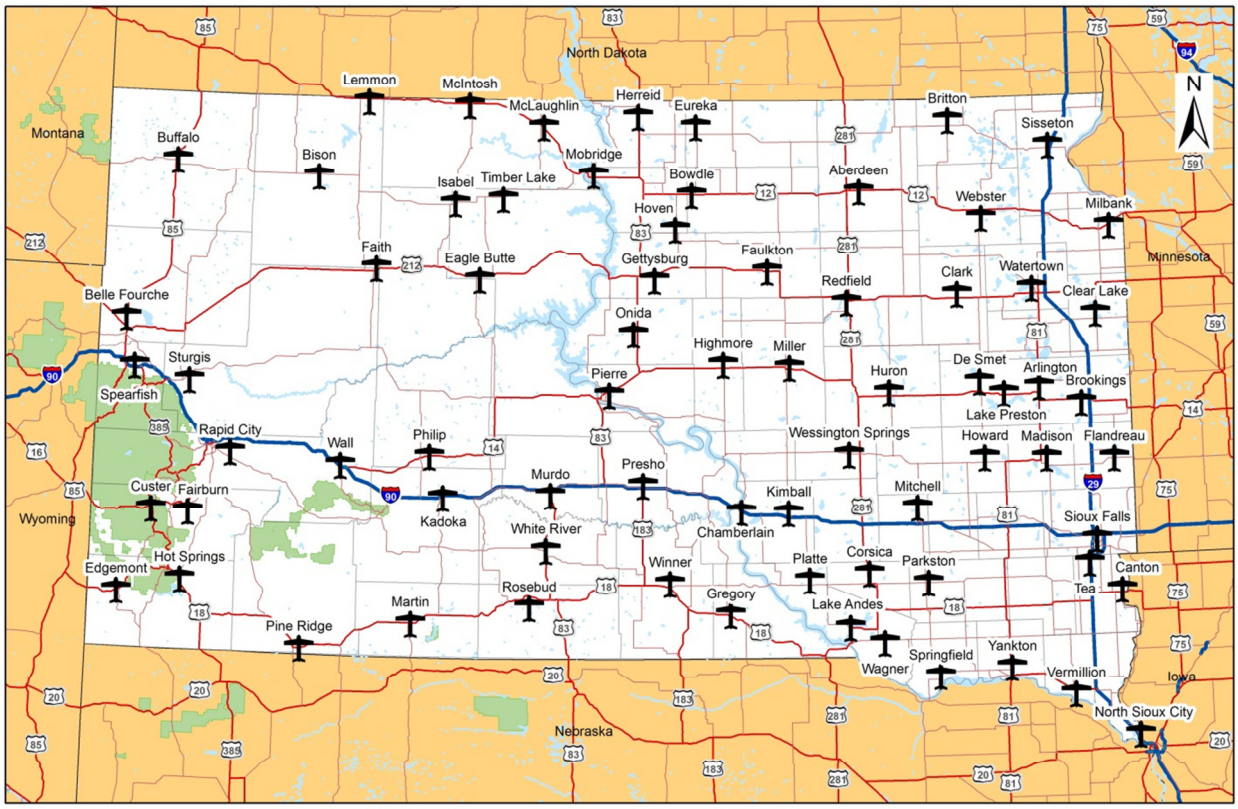
## 1.1 Purpose of Airport System Planning

The task of managing the overall system of South Dakota's airports falls to the South Dakota DOT Office of Aeronautics. The SDSASP provides a comprehensive framework to assess, manage, and develop the State's aviation system, while offering guidance to the FAA, the South Dakota DOT, local planning agencies, local decision makers, and airport sponsors to make informed decisions on the use of available resources. While recommendations for development, improvement, and expansion of facilities are identified at the state level, the implementation of these recommendations is ultimately delegated to the local level. It is for this reason that the SDSASP facilitates collaboration and cooperation between State and local levels, which is critical to individual airport development, as well as overall system growth.

Not only does system planning help guide future development, it is also required by the FAA in order to obtain federal funding. In order to appropriately allocate federal funds, the FAA requires that each state develop an aviation system plan that addresses airport growth and development needs for all public use airports within their respective state. Maintaining an updated plan that provides current guidance and

recommendations is important. As such, the FAA provides specific guidance on the development of aviation system plans in FAA Advisory Circular (AC) 150/5070-7 *The Airport System Planning Process*, which has been utilized as a resource in the development of the SDSASP.

**Figure 1.1 – Public Use Airports within South Dakota**




Source: Kirkham Michael

Generally, system plans evaluate current aviation facilities within a system and make recommendations to meet the anticipated user needs over a 20-year period. Provisions are made within the AC for states to customize their system plans to incorporate specific mission statements, as well as customized goals and policies related to the unique needs of their system users. Chapters 2 and 3 of the SDSASP define the mission, goals, and objectives of the system plan in more detail.

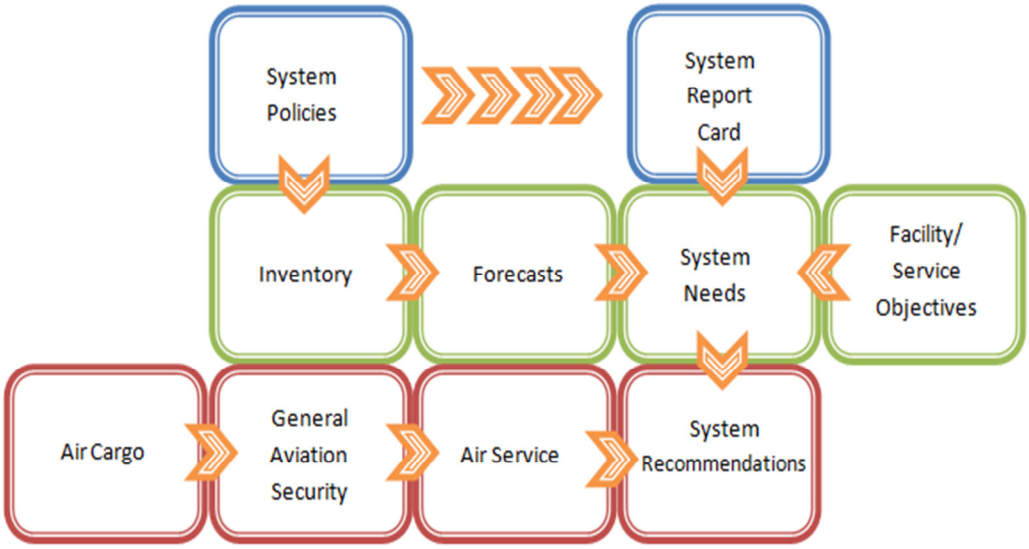
## 1.2 Plan Components and Processes

The FAA as a part of AC 150/5070-7 has identified steps to be taken in aviation system plan development (see **Figure 1.2**). While it is important that these elements be included in every system plan, it is also prudent that each plan be tailored to the diverse needs of specific system users. The needs of system users can differ dramatically from state to state depending on geographic location and major industries, among numerous other factors. Therefore, emphasis on the key industries (tourism and farming) and special events within South Dakota (including the Sturgis Motorcycle Rally and pheasant hunting season) has been placed throughout the main elements of this document:

- Chapter 1 – Introduction

- Chapter 2 – Goals & Objectives
- Chapter 3 – Inventory
- Chapter 4 – Forecasts
- Chapter 5 – System Analysis
- Chapter 6 – Economic Impact
- Chapter 7 – Trends & Technology
- Chapter 8 – Recommendations

**Figure 1.2 – System Planning Study Process**




Source: Based on FAA Advisory Circular (AC) 150/5070-7

## 1.3 National Plan of Integrated Airport Systems

The National Plan of Integrated Airport Systems (NPIAS) provides a critical connection between the FAA and South Dakota's aviation system. The NPIAS is the national plan for the development of public-use airports in the U.S. It is produced by the FAA and derived from a compilation of local, regional, and state system planning studies. Only airports included in the NPIAS are eligible for federal funding through a program called the Airport Improvement Program (AIP). Therefore, it is important to coordinate recommendations of the SDSASP with airports included in the NPIAS as funding is often necessary to implement system plan recommendations.

Of the 72 public-use airports in South Dakota, 57 are included in the NPIAS. The NPIAS classifies airports into one of three roles: primary commercial service, non-primary commercial service, and general aviation facilities. **Table 1** provides a summary of the 72 airports in the State, including NPIAS inclusion and FAA classifications, while **Figure 1.3** illustrates the locations of the existing NPIAS airports within South Dakota.

**Table 1 – South Dakota Airports by NPIAS Classifications**

| South Dakota Public Use Airports | City | NPIAS | FAA Classification |
|---|---|---|---|
| **Aberdeen Regional Airport** | Brown | x | Primary Commercial Service |
| **Arlington Municipal Airport** | Arlington | | General Aviation |
| **Belle Fourche Municipal Airport** | Belle Fourche | x | General Aviation |
| **Bison Municipal Airport** | Perkins | x | General Aviation |
| **Bowdle Municipal Airport** | Bowdle | | General Aviation |
| **Britton Municipal Airport** | Britton | x | General Aviation |
| **Brookings Regional Airport** | Brookings | x | General Aviation* |
| **Canton Municipal Airport** | Canton | x | General Aviation |
| **Chamberlain Municipal Airport** | Chamberlin | x | General Aviation |
| **Clark County Airport** | Clark | x | General Aviation |
| **Clear Lake Municipal Airport** | Clear Lake | | General Aviation |
| **Corsica Municipal Airport** | Corsica | | General Aviation |
| **Custer County Airport** | Custer | x | General Aviation |
| **Custer State Park Airport** | Fairburn | | General Aviation |
| **Wilder Airport** | DeSmet | x | General Aviation |
| **Cheyenne Eagle Butte Airport** | Eagle Butte | x | General Aviation |
| **Edgemont Municipal Airport** | Edgemont | x | General Aviation |
| **Eureka Municipal Airport** | Eureka | x | General Aviation |
| **Faith Municipal Airport** | Faith | x | General Aviation |
| **Faulkton Municipal Airport** | Faulkton | x | General Aviation |
| **Flandreau Municipal Airport** | Flandreau | x | General Aviation |
| **Gettysburg Municipal Airport** | Gettysburg | x | General Aviation |
| **Gregory Municipal Airport/Flynn Field** | Gregory | x | General Aviation |
| **Harding County Airport** | Buffalo | x | General Aviation |
| **Herreid Municipal Airport** | Herreid | | General Aviation |
| **Highmore Municipal Airport** | Highmore | x | General Aviation |
| **Hot Springs Municipal Airport** | Hot Springs | x | General Aviation |
| **Hoven Municipal Airport** | Hoven | x | General Aviation |
| **Howard Municipal Airport** | Howard | x | General Aviation |
| **Huron Regional Airport** | Huron | x | Non-Primary Commercial Service |
| **Isabel Municipal Airport** | Isabel | | General Aviation |
| **Kadoka Municipal Airport** | Kadoka | x | General Aviation |
| **Kimball Municipal Airport** | Kimball | | General Aviation |
| **Lake Andes Municipal Airport** | Lake Andes | | General Aviation |
| **Lake Preston Municipal Airport** | Lake Preston | | General Aviation |
| **Lemmon Municipal Airport** | Lemmon | x | General Aviation |
| **Madison Municipal Airport** | Madison | x | General Aviation |
| **Martin Municipal Airport** | Martin | x | General Aviation |
| **McIntosh Municipal Airport** | McIntosh | | General Aviation |
| **McLaughlin Municipal Airport** | Mclaughlin | x | General Aviation |
| **Milbank Municipal Airport** | Milbank | x | General Aviation |
| **Miller Municipal Airport** | Miller | x | General Aviation |
| **Mitchell Municipal Airport** | Mitchell | x | General Aviation |
| **Mobridge Municipal Airport** | Mobridge | x | General Aviation |
| **Murdo Municipal Airport** | Murdo | x | General Aviation |
| **Graham Field Airport (private)** | North Sioux City | | General Aviation |

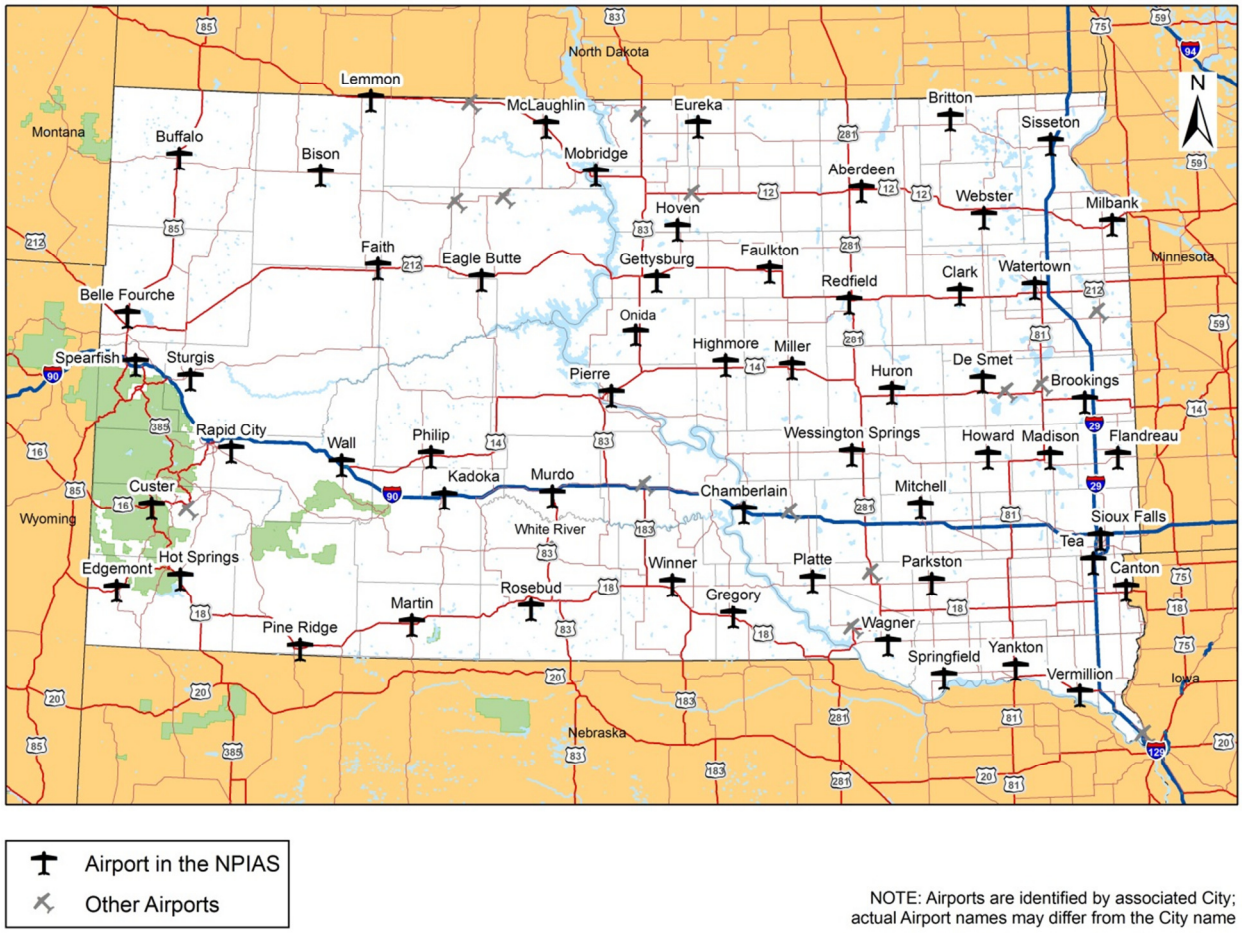
**Table 1 – South Dakota Airports by NPIAS Classifications**

| South Dakota Public Use Airports | City | NPIAS | FAA Classification |
|---|---|---|---|
| **Onida Municipal Airport** | Onida | x | General Aviation |
| **Parkston Municipal Airport** | Parkston | x | General Aviation |
| **Phillip Airport** | Philip | x | General Aviation |
| **Pierre Regional Airport** | Pierre | x | Primary Commercial Service |
| **Pine Ridge Airport** | Pine Ridge | x | General Aviation |
| **Platte Municipal Airport** | Platte | x | General Aviation |
| **Presho Municipal Airport** | Presho | | General Aviation |
| **Rapid City Regional Airport** | Rapid City | x | Primary Commercial Service |
| **Redfield Municipal Airport** | Redfield | x | General Aviation |
| **Rosebud Sioux Tribal Airport** | Rosebud | x | General Aviation |
| **Joe Foss Field/Sioux Falls Airport** | Sioux Falls | x | Primary Commercial Service |
| **Sisseton Municipal Airport** | Sisseton | x | General Aviation |
| **Black Hills / Clyde Ice Field** | Spearfish | x | General Aviation |
| **Springfield Municipal Airport** | Springfield | x | General Aviation |
| **Sturgis Municipal** | Sturgis | x | General Aviation |
| **Marv Skie-Lincoln County Airport** | Tea | x | General Aviation |
| **Timber Lake Municipal Airport** | Timber Lake | | General Aviation |
| **Harold Davidson Field Airport** | Vermillion | x | General Aviation |
| **Wagner Municipal Airport** | Wagner | x | General Aviation |
| **Wall Municipal Airport** | Wall | x | General Aviation |
| **Watertown Regional Airport** | Watertown | x | Non-Primary Commercial Service |
| **The Sigurd Andersen Airport** | Webster | x | General Aviation |
| **Wessington Springs Airport** | Wessington Springs | x | General Aviation |
| **White River Municipal Airport** | White River | | General Aviation |
| **Winner Regional Airport** | Winner | x | General Aviation |
| **Chan Gurney Municipal Airport** | Yankton | x | General Aviation |

* Brookings Regional Airport no longer serves commercial service operations as of 2010.
Source: National Plan of Integrated Airport Systems, Federal Aviation Administration

It is important to note that the 14 airports not included in the NPIAS, such as privately owned, public-use facilities, are still included in the system plan. However, non-NPIAS airports do not qualify for federal aid and are only eligible for limited State funds. Although not all of the study airports are included in the NPIAS, they constitute an important resource that should be protected just the same. Therefore, the SDSASP takes into account each of the 72 public use airports within the State, regardless of inclusion in the NPIAS, to ensure an adequate, efficient, and accessible system for airport users.

**Figure 1.3 – Location of NPIAS Airports**




Source: National Plan of Integrated Airport Systems adapted by Kirkham Michael

## 1.4 Importance of Aviation to the State of South Dakota

With airports spanning across 77,000 square miles, aviation plays a critical role not only in connecting South Dakota's overall transportation system, but also in supporting the State and local economies. As such, it is crucial to protect and preserve aviation facilities within the State as they sustain some of South Dakota's largest industries and support a variety of uses. Airports which are included in the aviation system support both commercial service and general aviation (GA) operations. By supporting both types of service, the system is able to serve a variety of users with diverse interests including recreational flying, cargo shipping, search-and-rescue operations, and agricultural uses. The following sections define in greater detail the importance of both commercial service and general aviation to the State, while Chapter 6 provides a summary of the economic impact of the aviation system as a whole.

### 1.4.a Commercial Service

Six airports support commercial service operations within South Dakota, providing an important link for the flying public to destinations across the U.S. These commercial service airports are located across the State and vary in size and capacity. The two largest facilities, Sioux Falls Regional Airport (known as Joe Foss Field) and Rapid City Regional Airport (RAP), are located on opposite sides of the State, serving a large regional area.

The largest airport in the State, Joe Foss Field, provides service to residents in southeast South Dakota, southwest Minnesota, and northwest Iowa. The proximity of Joe Foss Field to the State's largest

metropolitan area is important as it provides access to a large concentrated population. Thirteen airlines operate at Joe Foss Field, providing access to several major U.S. cities including Los Angeles, Orlando, and Detroit. As a U.S Customs Port of Entry, Joe Foss Field also supports international flights, as well as GA operations.

RAP is located in the second most populated area of the State and provides a link to seven major cities across the country. Located near the Black Hills and Mount Rushmore, RAP provides convenient access to several tourist attractions in the region. RAP also provides full service GA facilities, with over 60 percent of total operations being generated by non-commercial aircraft.

Other areas of the State are served by the remaining four commercial service airports: Aberdeen Regional, Huron Regional, Pierre Regional, and Watertown Regional. These smaller commercial service airports are dispersed across the State, providing access to users located outside of the Sioux Falls and Rapid City metropolitan areas. **Table 2** lists the numerous non-stop destinations that can be reached through the six commercial service airports in South Dakota.

**Table 2 – Commercial Service Destinations**

| Non-Stop Commercial Service Offered as of September 2010 | |
|---|---|
| • **Salt Lake City, Utah** | • **Chicago, Illinois** |
| • **Denver, Colorado** | • **Louisville, Kentucky** |
| • **Minneapolis, Minnesota** | • **Los Angeles, California** |
| • **Las Vegas, Nevada** | • **Appleton/Fox, Wisconsin** |
| • **Phoenix, Arizona** | • **Detroit, Michigan** |
| • **Dallas/Ft. Worth, Texas** | • **Cleveland, Ohio** |
| • **Indianapolis, Indiana** | • **Memphis, Tennessee** |
| • **Boise, Idaho** | • **Knoxville, Tennessee** |

Source: Airport websites as of September 2010

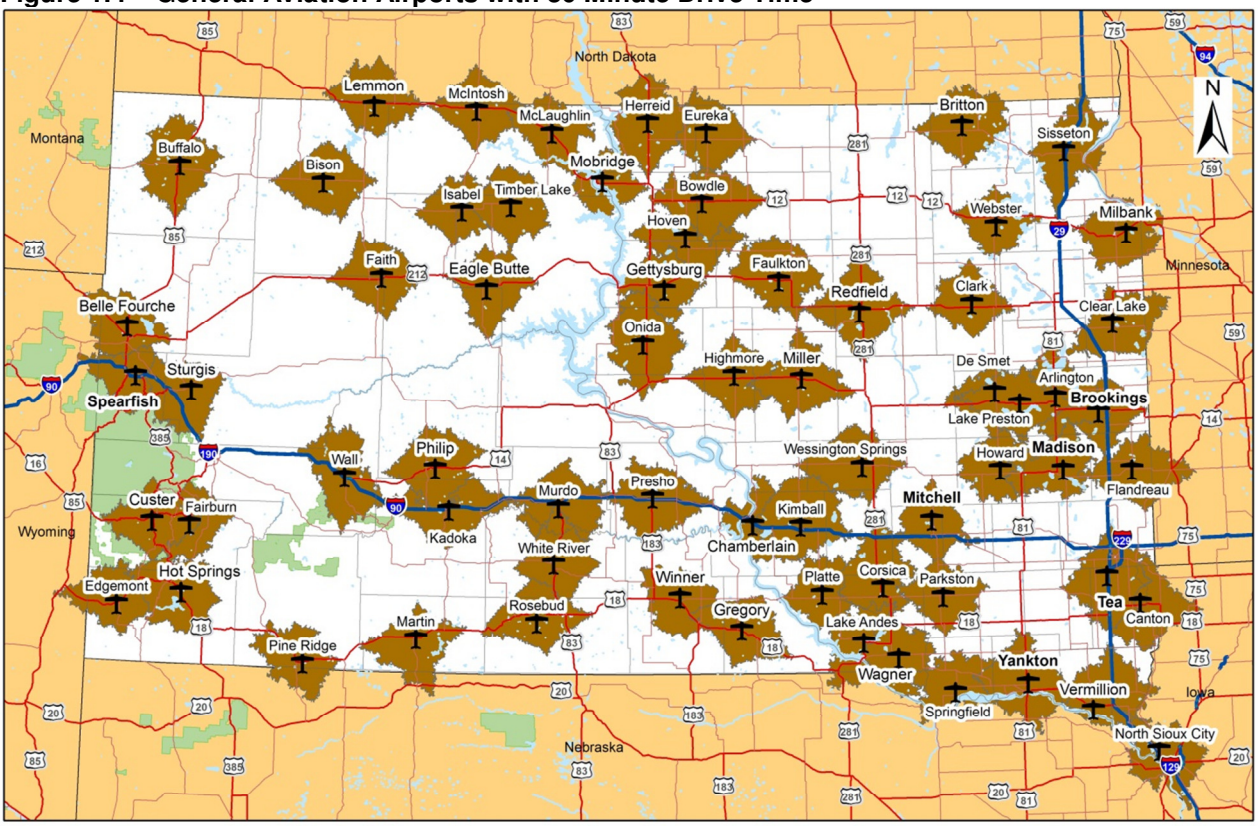
Commercial service airports are critical to the overall aviation system within South Dakota, because they serve a variety of operations including public, corporate, international, and cargo, as well as support the State's second largest industry: tourism. According to the *Airline Origin and Destination Survey (2009)*, a survey conducted at Joe Foss Field and RAP by the Bureau of Transportation Statistics, approximately 28 percent of travelers were visitors. South Dakota's numerous national parks, monuments, and events draw in thousands of people and millions of dollars each year. The annual Sturgis Motorcycle Rally attracts over 400,000 people for the week-long event and has taxable sales of nearly 10.5 million dollars alone.

### 1.4.b General Aviation

All 72 airports serve general aviation in one way or another by supporting a wealth of different operations, including agricultural spraying, search-and-rescue operations, emergency medical operations, aerial firefighting, corporate and cargo operations, and many others. Sixty six airports only serve GA operations and provide vital access to rural regions that would otherwise not be served. **Figure 1.4** shows the area that is accessible to GA only airports within an estimated drive time of 30 minutes or less. This illustrates a significant portion of the State with the highest population is covered by these airports. **Figure 1.5** by comparison, shows the 30 minute drive time for all 72 airports within the State.

Airports in South Dakota have long served agricultural spraying activities with more than 31,000 farms covering 43.7 million acres of land, making up the State's largest industry. GA airports provide farmers with an efficient way to meet agricultural production needs that may not be accessible from the ground. Roughly 67 percent of the State's airports host agricultural spraying activities, which is critical for the industry's survival.

**Figure 1.4 – General Aviation Airports with 30 Minute Drive Time**

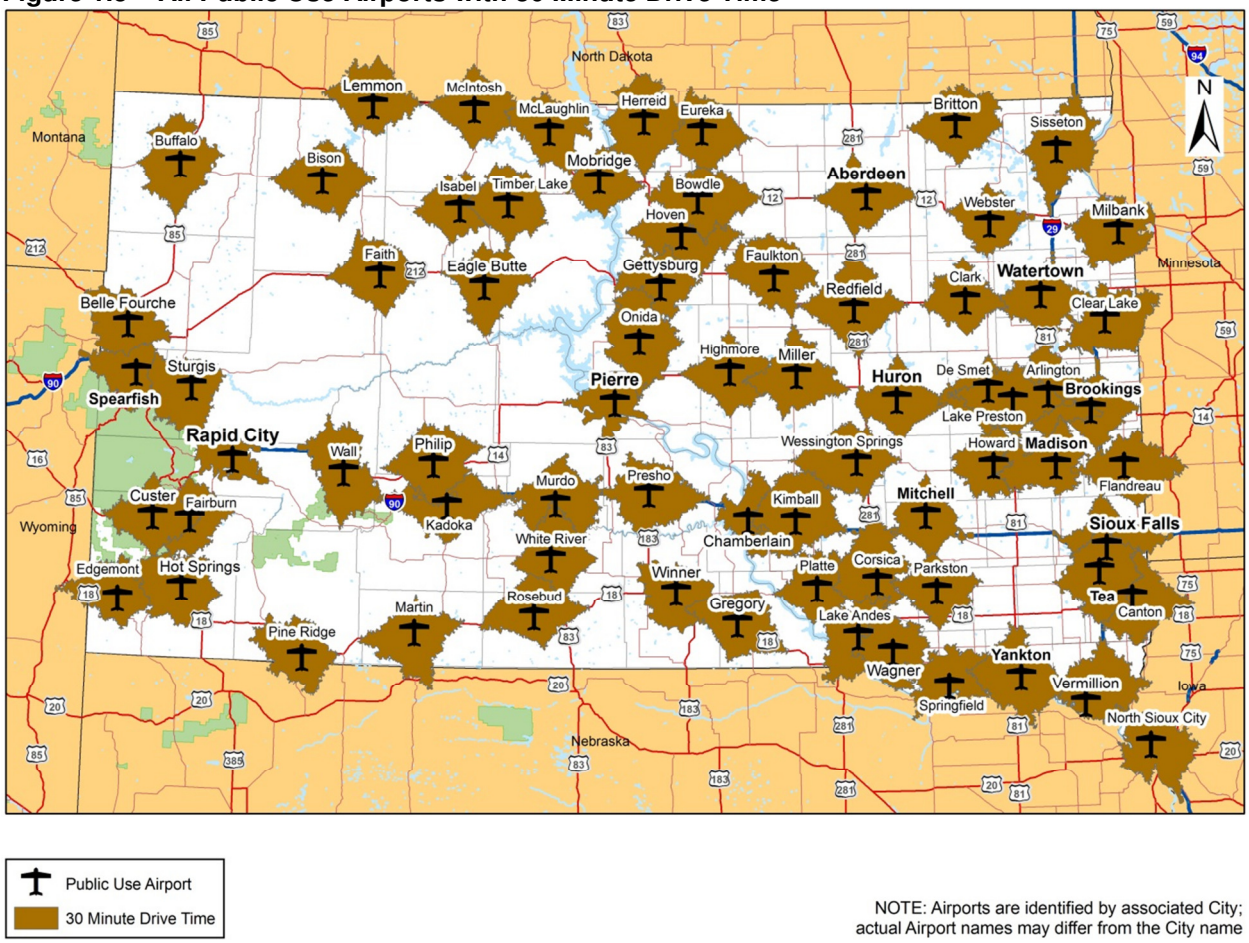



NOTE: Airports are identified by associated City; actual Airport names may differ from the City name

Source: Kirkham Michael

Tourism is also supported through the use of GA facilities, especially during the pheasant hunting season, the Sturgis Motorcycle Rally, and at airports near the Black Hills. Specific airports and communities in the central and eastern portion of the State cater to the pheasant hunting population which travels from across the nation to hunt in South Dakota. GA traffic is boosted at nearby airports during the Sturgis Motorcycle Rally, which attracts visitors, vendors, celebrities, and musical artists. Airports near the Black Hills and Mount Rushmore support tourist traffic to the national parks and monuments in the nearby area.

**Figure 1.5 – All Public Use Airports with 30 Minute Drive Time**




NOTE: Airports are identified by associated City; actual Airport names may differ from the City name

Source: Kirkham Michael

GA airports across the State provide different levels of service and facilities, with some of the smallest airstrips supporting operations that would otherwise be unavailable, such as emergency airlifts, and some of the largest facilities supporting corporate aircraft and cargo operations. GA airports within the State play an important role in the aviation system; therefore, it is vital that these airports be protected so they may continue to serve critical operations.

## 1.5 Summary

South Dakota's aviation system plays a critical part in serving the overall transportation system, and supporting the State and local economies. The SDSASP provides a blueprint to prioritize and coordinate funding and development needs for the facilities included in South Dakota's aviation system. As operational standards and technology continue to change, infrastructure and facility needs may change as well. By providing the necessary entities with guidance for future system development, it is hoped that the evolution of South Dakota's aviation system will take place in a coordinated and efficient manner.

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# Chapter 2 – Goals & Objectives

## Introduction

The development of goals provides the base upon which the *South Dakota State Aviation System Plan* (SDSASP) is built. These goals have been identified in order to meet existing and future system needs, and to provide guidance for planning, decision making, and investment over the next 20 years. It is the mission of the South Dakota Department of Transportation (DOT) to provide for the diverse mobility needs in the most cost effective manner. The SDSASP works to achieve this mission with goals that maximize efficiency and improve the safety of existing and future infrastructure.

**South Dakota**
**Department of Transportation**
**Mission Statement**

"We provide a quality transportation system to satisfy diverse mobility needs in a cost effective manner while retaining concern for safety and the environment.

To accomplish this mission we must maximize the use of our assets, which include: tax dollars, buildings, equipment, supplies, and people."

Objectives have been established in order to evaluate the system's performance in meeting each goal. By combining both the goals and objectives, a platform for system development and evaluation is created.

The development of specific airport roles has been completed through the system planning process, as many of the goals and objectives of the SDSASP are based upon a particular role that an airport plays within the system.

Five airport roles have been established including:

- Commercial Service
- Large General Aviation
- Medium General Aviation
- Small General Aviation
- Basic Service

Each role has a unique set of criteria including airport size, facilities, services, and the types of operations supported which is used to group airports. Section 2.6 outlines the criteria of each airport role, along with a listing of system airports and their associated role.

## 2.1 Definition of Goals and Objectives

Staff members from the South Dakota DOT Office of Aeronautics were involved in the development of the goals and objectives identified below. Since the State has such a diverse group of airports serving a geographically dispersed area, it was determined that focusing on a few key goals and associated objectives was more desirable than developing a long list of goals and objectives that may have limited application for a number of the 72 airports. Consequently, the focus was placed on several main ideas.

The purpose of system goals is to provide structure for existing and future planning. Goals are broad based and reflect core elements that apply to all airports within South Dakota's aviation system. Implementation of the goals will be carried out by defined objectives which vary in scope and size.

Since limited system planning efforts have been made prior to the development of the SDSASP, it is prudent that the appropriate goals are developed to protect the investment that has already been made in existing airport facilities. The following three goals have been established in an effort to do so:

- **Safety & Security**
  - *To provide a safe and secure system of airports*
- **Maintenance & Development of Infrastructure**
  - *To provide an airport system that meets current and future user needs*
- **Accessibility to Users**
  - *To provide a system of airports that is accessible from the ground and the air*

Objectives define the means and methods in which to achieve the established goals through an assessment of current and future needs. Objectives target facilities and services and help to identify gaps where goals are not being met. They provide a way to quantify the success in achieving each goal. Since each airport is unique and fills a different role in the overall aviation system, objectives are modified based upon each airport's role.

## 2.2 Safety and Security Goal and Objectives

Maintaining a safe and secure system of airports is an important goal of the SDSASP. By protecting existing facilities and the area surrounding each airport, airports can continue to function while maintaining the safety of passengers, nearby residents, and aircraft.

The following have been identified as the key objectives to achieve this goal in South Dakota. Implementation of the objectives is dependent upon the applicable role of individual airports as discussed later in this Chapter.

**Safety & Security**
To maintain a safe and secure system of airports.

### 2.2.a Clear Approaches to Runway Ends

Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*, commonly known as the FAR Part 77 Surfaces, establishes five imaginary surfaces including the primary surface, transitional surface, horizontal surface, conical surface, and approach surface which are to be considered for obstruction determination. The approach surface includes the areas extending out from each runway end which should be protected and kept clear of obstructions and incompatible uses. By requiring clear take-off and landing areas, the safety of those in an aircraft and on the ground is enhanced. Providing compatible land uses within the vicinity of airports is important for not only safety, but allows for development or expansion of airport facilities, should the need arise.

### 2.2.b Emergency Response Plans

Emergency response plans identify procedures and guidelines for airport responses to emergencies, such as accidents and natural disasters, and suggest a predetermined course of action. While only the commercial service airports are required by the Federal Aviation Administration (FAA) to have an emergency response plan, it is an objective for each airport in the system to have an emergency response plan which is appropriate to the size and type of operations the airport serves. FAA Advisory Circular (AC) 150/5200-31 *Airport Emergency Plan* outlines components which should be included in the plan including command, communication, protective action, security, firefighting and rescue, medical services, resource management, operation, and maintenance.

### 2.2.c Airfield Access

Airfield access to an airport should be properly controlled through the use of fencing and gates, and should be appropriate to the size and type of operations that an individual airport serves. Larger airports and those that serve commercial airlines typically require a higher level of security that those that serve a smaller user group.

## 2.3 Maintenance and Development of Infrastructure Goal and Objectives

Maintaining and developing the State's aviation infrastructure to meet the existing and future user needs, requires evaluation of the existing system and allocation of resources. Fundamental to all airports in the system is the ability to meet general FAA criteria for airport design set forth in FAA's Advisory Circular 150/5300-13 *Airport Design,* which includes design criteria for runways, taxiways, safety areas, and other critical airport infrastructure. Furthermore, the provision of services at airports in the system is critical to the operation of aircraft and is important to meet user needs.

**Maintenance & Development of Infrastructure**
To provide an airport system that meets current and future user needs

The following objectives were identified to maintain and develop adequate system infrastructure. Implementation of the objectives is dependent upon the applicable role of individual airports.

### 2.3.a Infrastructure

Existing aviation facilities such as runways, taxiways, and navigational aids (NAVAIDS) are part of the system infrastructure. It is important that each element continue to meet user needs, therefore Chapter 5 outlines several targets which have been established to provide adequate infrastructure according to airport role. Specific landside and airside facility targets include:

- Airport Reference Code
- Primary Runway Length
- Primary Runway Width
- Primary Runway Surface
- Type of Parallel Taxiway
- Type of Runway Approach
- Runway Lighting
- Taxiway Lighting
- Visual Guidance Slope Indicator
- Runway End Identifier Lights - as required
- Rotating Beacon
- Lighted Wind Indicator
- RCO Facilities
- Wind coverage or crosswind runway
- Covered storage
- Overnight storage for business aircraft
- Aircraft apron
- Terminal/administration building
- Paved entry/terminal parking

### 2.3.b Services

Through the provision of services, airports can serve a wide user base and multiple types of operations. Services such as fuel, aircraft maintenance and repair, and ground transportation should be made available where possible, as appropriate to the airport size and type of operations supported. The following list includes service targets, which can be found in Chapter 5, that are suggested but not mandated as a part of the SDSASP.

- Fuel
- Height zoning
- Comp plan define land uses
- Emergency plan
- Airport Layout Plan
- Weekday hours of operation
- Weekend hours of operation
- Ground transportation
- Food & Beverage
- Posted contact info
- Internet access
- Restroom
- Pilot area
- Security
- Rental aircraft
- Flight training
- Aircraft maintenance/repair
- Aircraft charter
- Minimum FBO Standards
- Weather reporting

### 2.3.c Pavement PCI

The pavement condition index (PCI), is an indicator of the pavement condition (for runways, taxiways, and aprons) and is on a scale of 0-100, where 100 is the best condition, and 0 is the worst. An airport with a rating of 100 is considered to be in optimal condition, whereas an airport with a PCI of 70 or greater is considered acceptable, and a PCI of less than 70 should be considered for maintenance such as rehabilitation or reconstruction. The objective is to maintain system pavement (runways, taxiways, and aprons) at a score of 70 or higher, especially at the airports that support higher operational levels and larger aircraft.

## 2.4 Accessibility to Users Goal and Objectives

An important element in the success of any air transportation system is the accessibility of an airport to its users from both the air and the ground. Providing airport access within a reasonable drive for users is vital to achieve this goal. Furthermore, providing adequate accessibility to airports equipped with services such as weather reporting, and instrument approaches allows an airport to serve a larger group of aircraft and population and support alternate types of operations in varying weather conditions.

The following objectives have been identified to ensure adequate system accessibility from both the ground and the air. Implementation of the objectives is dependent upon the applicable role of individual airports.

**Accessibility to Users**

To provide a system of airports that is accessible from the ground and the air

### 2.4.a Reasonable Drive Time

Airports that are located within a reasonable drive time for users, provide a greater level of accessibility. Commercial service airports that are within a two-hour drive time from users, and general aviation airports that are within a 30-minute drive time are considered adequate to serve system users.

### 2.4.b Access to Weather Reporting

Weather reporting equipment at airports across the State allows pilots to operate aircraft in changing weather conditions, including those that may be adverse. Access to weather reporting equipment is critical as it provides up to the minute information for pilots navigating across the State, as well as pilots who are filing flight plans and determining a flight course.

### 2.4.c Access to Non-Precision or Instrument Approaches

By providing more precise navigational aids, such as non-precision and instrument approaches – coupled with weather reporting equipment – an airport can support operations from a variety of aircraft in varying weather conditions, thus enhancing the utility of an airport.

## 2.5 Airport Roles

Each airport within the system is unique and has a different set of services and facilities available. Because of this, airports are organized into a variety of roles based upon the users they serve and support. As a part of the system planning process, five roles have been developed, each with a unique set of characteristics and Airport Reference Code (ARC), see **Figure 2.1**. Each of the following paragraphs describes each role while **Table 1** provides a summary of each role. **Table 2** lists each airport included in the system as well as their associated role and **Figure 2.2** illustrates the location of each system airport with corresponding role.

**Figure 2.1 – Airport Reference Codes**

**AIRPORT REFERENCE CODES**

***Aircraft Approach Category***

Category A: Speed less than 91 knots
Category B: Speed 91 knots or more but less than 121 knots.
Category C: Speed 121 knots or more but less than 141 knots.
Category D: Speed 141 knots or more but less than 166 knots.
Category E: aircraft approach speed 166 knots or more.

***Airplane Design Group***

Group I: Wingspan up to but not including 49 feet.
Group II: Wingspan 49 feet up to but not including 79 feet.
Group III: Wingspan 79 feet up to but not including 118 feet.
Group IV: Wingspan 118 feet up to but not including 171 feet.
Group V: Wingspan 171 feet up to but not including 214 feet.
Group VI: Wingspan greater than 214 feet.

Commercial Service: These airports support some level of scheduled commercial airline service in addition to a full range of general aviation aircraft. This includes both domestic and international destinations. Airports in this category typically have a minimum runway length of 6,500 feet, with precision approaches, weather reporting equipment, major repair service, and Jet A/100 LL fuel available 24 hours. They typically have an ARC of C-II or greater.

Large General Aviation: These airports support all general aviation aircraft and accommodate corporate aviation activity, including business jets, helicopters, and other general aviation activity. These airports' primary users are business related and service a large geographic region or they experience high levels of general aviation activity. Airports in this category typically have a minimum runway length of 5,000

feet, with non-precision approaches, weather reporting equipment, minor repair service, and JetA/100LL fuel available. These will typically have an ARC of C-I.

Medium General Aviation: These airports support most twin and single engine aircraft and may accommodate occasional business jets. These airports support a regional transportation need. Airports in this category typically have a runway length of at least 4,200 feet, with non-precision or GPS approaches, weather reporting equipment, on-call repair service, 100LL fuel available, and an ARC of B-II.

Small General Aviation: These airports support primarily single-engine, general aviation aircraft, but are capable of accommodating smaller twin-engine general aviation aircraft. These airports support local air transportation needs and special use aviation activities. Airports in this category typically have a minimum runway length of 3,000 feet, with visual approaches, and an ARC of B-I.

Basic General Aviation: These airports support primarily single-engine, general aviation aircraft, special use aviation activities, and access to remote areas or provide emergency service access. Airports in this category are generally not included in the NPIAS, have visual approaches, have an ARC of A-I and may have turf runways.

**Table 1 – Role Summary**

| Role | Runway (min) | Approach | Weather | Services | Fuel | ARC |
|---|---|---|---|---|---|---|
| Commercial Service | 6,500ft+ | precision | yes | major | JetA/100LL | C-II |
| Large General Aviation | 5,000ft | non-precision | yes | minor | Jet A/100LL | C-I |
| Medium General Aviation | 4,200ft | non-precision | yes | on-call | 100LL | B-II |
| Small General Aviation | 3,000ft | visual | no | no | no | B-I |
| Basic General Aviation | no min | visual | no | no | no | A-I |

**Table 2 – SDSASP Airport Roles**

| Role | Airport | Associated City |
|---|---|---|
| Commercial Service | Aberdeen Regional Airport | Aberdeen |
| Commercial Service | Huron Regional Airport | Huron |
| Commercial Service | Pierre Regional Airport | Pierre |
| Commercial Service | Rapid City Regional Airport | Rapid City |
| Commercial Service | Joe Foss Field | Sioux Falls |
| Commercial Service | Watertown Regional Airport | Watertown |
| Large General Aviation | Brookings Regional Airport | Brookings |
| Large General Aviation | Madison Municipal Airport | Madison |
| Large General Aviation | Mitchell Municipal Airport | Mitchell |
| Large General Aviation | Black Hills Airport/Clyde Ice Field | Spearfish |
| Large General Aviation | Marv-Skie Lincoln County Airport | Tea |
| Large General Aviation | Chan Gurney Municipal Airport | Yankton |
| Medium General Aviation | Belle Fourche Municipal Airport | Belle Fourche |
| Medium General Aviation | Britton Municipal Airport | Britton |
| Medium General Aviation | Chamberlain Municipal Airport | Chamberlain |
| Medium General Aviation | Custer County Airport | Custer |

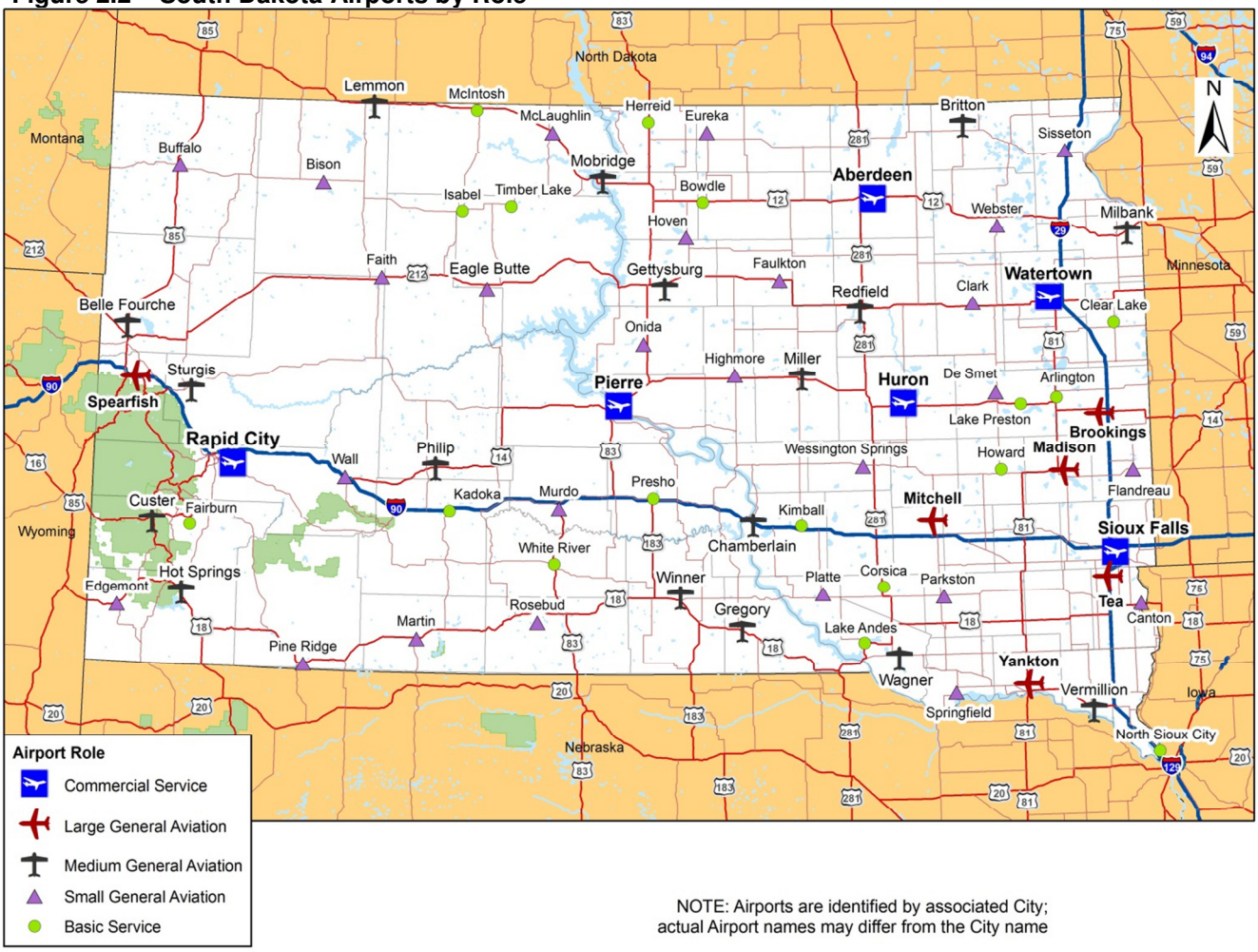
**Table 2 – SDSASP Airport Roles**

| Role | Airport | Associated City |
|---|---|---|
| Medium General Aviation | Gettysburg Municipal Airport | Gettysburg |
| Medium General Aviation | Gregory Municipal Airport/Flynn Field | Gregory |
| Medium General Aviation | Hot Springs Municipal Airport | Hot Springs |
| Medium General Aviation | Lemmon Municipal Airport | Lemmon |
| Medium General Aviation | Milbank Municipal Airport | Milbank |
| Medium General Aviation | Miller Municipal Airport | Miller |
| Medium General Aviation | Mobridge Municipal Airport | Mobridge |
| Medium General Aviation | Philip Airport | Philip |
| Medium General Aviation | Redfield Municipal Airport | Redfield |
| Medium General Aviation | Sturgis Municipal Airport | Sturgis |
| Medium General Aviation | Harold Davidson Field Airport | Vermillion |
| Medium General Aviation | Wagner Municipal Airport | Wagner |
| Medium General Aviation | Winner Regional Airport | Winner |
| Small General Aviation | Bison Municipal Airport | Bison |
| Small General Aviation | Harding County Airport | Buffalo |
| Small General Aviation | Canton Municipal Airport | Canton |
| Small General Aviation | Clark County Airport | Clark |
| Small General Aviation | Wilder Airport | De Smet |
| Small General Aviation | Cheyenne Eagle Butte Airport | Eagle Butte |
| Small General Aviation | Edgemont Municipal Airport | Edgemont |
| Small General Aviation | Eureka Municipal Airport | Eureka |
| Small General Aviation | Faith Municipal Airport | Faith |
| Small General Aviation | Faulkton Municipal Airport | Faulkton |
| Small General Aviation | Flandreau Municipal Airport | Flandreau |
| Small General Aviation | Highmore Municipal Airport | Highmore |
| Small General Aviation | Hoven Municipal Airport | Hoven |
| Small General Aviation | Martin Municipal Airport | Martin |
| Small General Aviation | McLaughlin Municipal Airport | McLaughlin |
| Small General Aviation | Murdo Municipal Airport | Murdo |
| Small General Aviation | Onida Municipal Airport | Onida |
| Small General Aviation | Parkston Municipal Airport | Parkston |
| Small General Aviation | Pine Ridge Airport | Pine Ridge |
| Small General Aviation | Platte Municipal Airport | Platte |
| Small General Aviation | Rosebud Sioux Tribal Airport | Rosebud |
| Small General Aviation | Sisseton Municipal Airport | Sisseton |
| Small General Aviation | Springfield Municipal Airport | Springfield |
| Small General Aviation | Wall Municipal Airport | Wall |
| Small General Aviation | The Sigurd Andersen Airport | Webster |
| Small General Aviation | Wessington Springs Airport | Wessington Springs |
| Basic Service | Arlington Municipal Airport | Arlington |
| Basic Service | Bowdle Municipal Airport | Bowdle |
| Basic Service | Clear Lake Municipal Airport | Clear Lake |
| Basic Service | Corsica Municipal Airport | Corsica |
| Basic Service | Custer State Park Airport | Fairburn |
| Basic Service | Herreid Municipal Airport | Herreid |

**Table 2 – SDSASP Airport Roles**

| Role | Airport | Associated City |
|---|---|---|
| Basic Service | Howard Municipal Airport | Howard |
| Basic Service | Isabel Municipal Airport | Isabel |
| Basic Service | Kadoka Municipal Airport | Kadoka |
| Basic Service | Kimball Municipal Airport | Kimball |
| Basic Service | Lake Andes Municipal Airport | Lake Andes |
| Basic Service | Lake Preston Municipal Airport | Lake Preston |
| Basic Service | McIntosh Municipal Airport | McIntosh |
| Basic Service | Graham Field Airport | North Sioux City |
| Basic Service | Presho Municipal Airport | Presho |
| Basic Service | Timber Lake Municipal Airport | Timber Lake |
| Basic Service | White River Municipal Airport | White River |

**Figure 2.2 – South Dakota Airports by Role**




Source: Kirkham Michael

## 2.6 Summary

The safety and security, maintenance and development, and accessibility goals described in this Chapter provide the framework for the 2010 South Dakota State Aviation Plan. The goals reflect the vision of the South Dakota DOT and have been developed in an effort to protect and preserve the existing system and allow for future development as warranted. The objectives set forth in this Chapter provide criteria for the analysis in subsequent chapters of the SDSASP, and allow for system recommendations based on existing development and future needs. Airport roles have been established in order to create an organized system which can serve the needs of a variety of users as well as meet any future needs. Airport roles, coupled with the goals and objectives, set the stage for the creation of a blueprint for future development.

# Chapter 3 – Inventory

## Introduction

An important element in the system planning process involves a facility and service inventory for the aviation system. Through the creation of an inventory database, aviation agencies such as the DOT and FAA can identify the status of the system as a whole and recognize areas for improvement. This inventory serves as a platform for the development of a long-range plan for future system improvement, and can be utilized by the DOT Office of Aeronautics in the allocation of resources as they become available to ensure that the system remains viable and efficient.

Several methods were used to create the inventory of facilities and services. An airport manager survey was developed and pre-populated with information available from the Airport Master Records (5010 Form) for each airport regarding existing facilities and services. Airport managers verified this information and provided additional information, when necessary, to create a database of current information. An overall response rate of 94% was reached through this process. Other sources were utilized to supplement the information provided as a part of the airport manager survey effort including:

- Existing Airport Layout Plans (ALPs)
- 2010 South Dakota Airport Directory
- Office of Aeronautics staff
- Google Maps
- Airport websites

When the requested data was not provided, and other methods of determination were unsuccessful, a “no response” category was developed and is utilized where necessary in this Chapter. The information collected during the inventory effort is summarized in the following pages. Individual discussions of facilities and services are available, along with summary tables by topic including:

- Airport design
- Runways
- Taxiways
- Navigational aids
- Aircraft storage
- Terminal facilities
- Services
- Runway approaches
- Planning

Detailed inventory tables are available at the end of each section.

## 3.1 General Airport Information

Several fields of airport specific information were collected and have been catalogued. These fields include the airport name, FAA identifier, airport reference code (ARC), inclusion in the National Plan of Integrated Airport Systems (NPIAS), airport reference point (ARP), and airport elevation. Each of these fields are discussed in more detail in the following sections. A comprehensive listing of airport-specific information can be found in **Table 2** at the end of this section.

### 3.1.a FAA Airport Identifier

An airport is typically identified by one of three ways: airport name, the associated city where the airport is located, and by a three letter airport identification code assigned by the FAA. These methods of identification are often used interchangeably when referring to an airport. For example, Sioux Falls Regional Airport - Joe Foss Field is often referred to as Sioux Falls, or FSD.

### 3.1.b Airport Reference Code (ARC)

FAA Advisory Circular (AC) 150/5300-13 – *Airport Design* establishes a set of airport classifications known as Airport Reference Codes (ARC) to relate airport design criteria to the operational and physical characteristics of airplanes intended to operate on a runway, taxiway, or taxilane at an airport. The ARC has two components relating to the design aircraft, including the aircraft approach category and the airplane design group, as seen in **Figure 3.1**.

- Aircraft Approach Category (AAC) is designated by a letter (A-E). This component relates to the operational characteristic of aircraft approach speed, with “A” being the slowest and “E” being the fastest.
- Airplane Design Group (ADG) is designated by a Roman numeral (I-VI), related to the physical characteristics of airplane wingspan, with “I” being the smallest and “VI” being the largest.

**Table 1** summarizes the ARC of each of the 72 public use airports in the State which support small A-I aircraft up to large D-V aircraft. Nearly half (48.6%) of the airports have an ARC of B-I.

**Figure 3.1 – Airport Reference Codes**

**AIRPORT REFERENCE CODES**

***Aircraft Approach Category***

Category A: Speed less than 91 knots
Category B: Speed 91 knots or more but less than 121 knots.
Category C: Speed 121 knots or more but less than 141 knots.
Category D: Speed 141 knots or more but less than 166 knots.
Category E: aircraft approach speed 166 knots or more.

***Airplane Design Group***

Group I: Wingspan up to but not including 49 feet.
Group II: Wingspan 49 feet up to but not including 79 feet.
Group III: Wingspan 79 feet up to but not including 118 feet.
Group IV: Wingspan 118 feet up to but not including 171 feet.
Group V: Wingspan 171 feet up to but not including 214 feet.
Group VI: Wingspan greater than 214 feet.

**Table 1 – South Dakota ARC Summary**

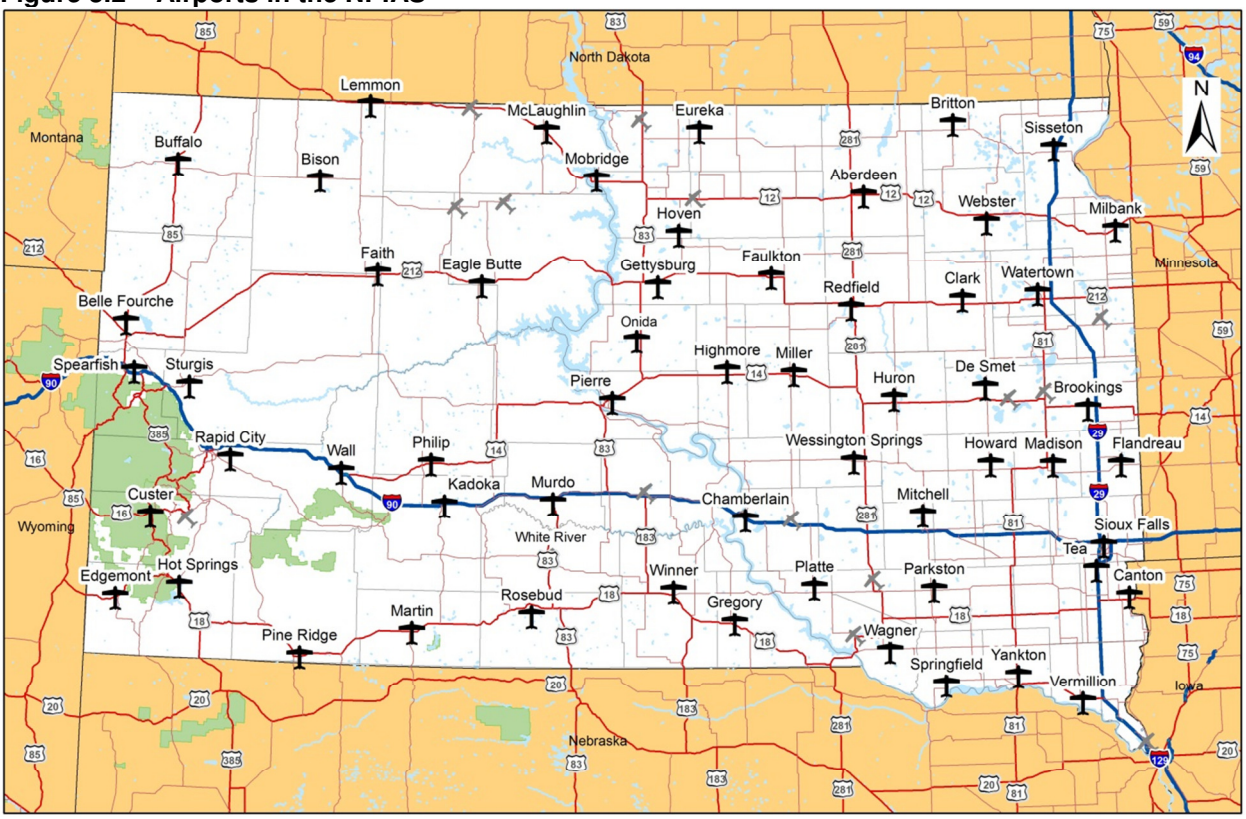
| Airport Reference Code | Number of System Airports | Percentage of System Airports |
|---|---|---|
| D-IV | 1 | 1.4% |
| C-III | 7 | 9.7% |
| B-II | 11 | 15.3% |
| B-I | 35 | 48.6% |
| A-I | 18 | 25% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.1.c National Plan of Integrated Airport Systems (NPIAS)

There are 59 airports within the South Dakota system which are included in the NPIAS. The NPIAS is a national published plan for the development of public-use airports within the U.S. Only airports included in the NPIAS are eligible for federal funding through the Airport Improvement Plan (AIP). **Figure 3.2** highlights the location of airports included in the NPIAS.

**Figure 3.2 – Airports in the NPIAS**




Source: NPIAS adapted by Kirkham Michael

### 3.1.d Airport Reference Point (ARP)

The ARP is a coordinate that is used to identify the geographical location of an airport. It is determined using a process which is outlined in FAA Advisory Circular 150/5300-13 *Airport Design.* The latitude and longitude coordinates of the ARP are listed in **Table 2**, for each airport.

### 3.1.e Airport Elevation

Each airport has an established ground elevation based upon the mean sea level (MSL) which is determined at the highest point of the runway surface for each individual airport.

**Table 2 – General Airport Information**

| Associated City | Airport | FAA Identifier | ARC | NPIAS | Latitude | Longitude | Elevation (MSL) |
|---|---|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | ABR | C-III | Y | 45° 26' 56" N | 98° 25' 20" W | 1301' |
| **Arlington** | Arlington Municipal | 3A9 | A-I | N | 43° 23' 40" N | 97° 07' 22" W | 1818' |
| **Belle Fourche** | Belle Fourche Municipal | EFC | B-I | Y | 44° 44' 28" N | 103° 51' 40" W | 3109' |
| **Bison** | Bison Municipal | 6V5 | B-I | Y | 45° 31' 38" N | 102° 28' 24" W | 2786' |
| **Bowdle** | Bowdle Municipal | 5P3 | A-I | N | 45° 26' 24" N | 99° 40' 31" W | 1967' |
| **Britton** | Britton Municipal | BTN | A-I | Y | 45° 48' 57" N | 97° 44' 37" W | 1318' |
| **Brookings** | Brookings Regional | BKX | C-III | Y | 44° 18' 12" N | 96° 48' 40" W | 1646' |
| **Buffalo** | Harding County | 9D2 | B-I | Y | 45° 34' 45" N | 103° 31' 37" W | 2889' |
| **Canton** | Canton Municipal | 7G9 | B-I | Y | 43° 18' 43" N | 96° 34' 25" W | 1289' |
| **Chamberlain** | Chamberlain Municipal | 9V9 | B-II | Y | 43° 45' 58" N | 99° 19' 16" W | 1696' |
| **Clark** | Clark County | 8D7 | B-I | Y | 44° 53' 44" N | 97° 42' 43" W | 1793' |
| **Clear Lake** | Clear Lake Municipal | 5H3 | A-I | N | 44° 46' 17" N | 96° 41' 17" W | 1801' |
| **Corsica** | Corsica Municipal | D65 | A-I | N | 43° 26' 04" N | 98° 23' 53" W | 1579' |
| **Custer** | Custer County | CUT | B-I | Y | 43° 44' 00" N | 103° 37' 04" W | 5602' |
| **De Smet** | Wilder | 6E5 | B-I | Y | 44° 25' 55" N | 97° 33' 31" W | 1729' |
| **Eagle Butte** | Cheyenne Eagle Butte | 84D | B-I | Y | 44° 59' 09" N | 101° 15' 19" W | 2447' |
| **Edgemont** | Edgemont Municipal | 6V0 | B-I | Y | 43° 17' 45" N | 103° 50' 40" W | 3605' |
| **Eureka** | Eureka Municipal | 3W8 | B-I | Y | 45° 48' 00" N | 99° 38' 36" W | 1935' |
| **Fairburn** | Custer State Park | 3V0 | A-I | N | 43° 43' 30" N | 103° 21' 00" W | 3980' |
| **Faith** | Faith Municipal | D07 | B-I | Y | 45° 02' 09" N | 102° 01' 09" W | 2582' |
| **Faulkton** | Faulkton Municipal | 3FU | B-I | Y | 45° 01' 47" N | 99° 06' 40" W | 1569' |
| **Flandreau** | Flandreau Municipal | 4P3 | B-I | Y | 44° 00' 15" N | 96° 35' 34" W | 1644' |
| **Gettysburg** | Gettysburg Municipal | 0D8 | B-II | Y | 44° 59' 20" N | 99° 57' 15" W | 2061' |
| **Gregory** | Gregory Municipal Airport/Flynn Field | 9D1 | B-I | Y | 43° 13' 17" W | 99° 24' 10" W | 2168' |
| **Herreid** | Herreid Municipal | 5T4 | A-I | N | 45° 50' 00" N | 101° 04' 00" W | 1725' |
| **Highmore** | Highmore Municipal | 9D0 | A-I | Y | 44° 32' 20" N | 99° 26' 47" W | 1851' |
| **Hot Springs** | Hot Springs Municipal | HSR | B-II | Y | 43° 22' 15" N | 103° 22' 45" W | 3148' |
| **Hoven** | Hoven Municipal | 9F8 | B-I | Y | 45° 15' 23" N | 99° 47' 51" W | 1884' |
| **Howard** | Howard Municipal | 8D9 | A-I | Y | 44° 01' 45" N | 97° 32' 15" W | 1582' |
| **Huron** | Huron Regional | HON | C-III | Y | 44° 23' 07" N | 98° 13' 42" W | 1288' |
| **Isabel** | Isabel Municipal | SD26 | A-I | N | 45° 23' 23" N | 101° 26' 15" W | 2386' |
| **Kadoka** | Kadoka Municipal | 5V8 | A-I | Y | 43° 45' 00" N | 101° 29' 45" W | 2460' |
| **Kimball** | Kimball Municipal | SD27 | A-I | N | 43° 45' 40" N | 98° 58' 35" W | 1755' |
| **Lake Andes** | Lake Andes Municipal | 8D8 | B-I | N | 43° 09' 00" N | 98° 32' 28" W | 1475' |
| **Lake Preston** | Lake Preston Municipal | Y34 | A-I | N | 44° 22' 00" N | 97° 23' 00" W | 1725' |
| **Lemmon** | Lemmon Municipal | LEM | B-II | Y | 45° 55' 40" N | 102° 06' 15" W | 2572' |
| **Madison** | Madison Municipal | MDS | B-II | Y | 44° 01' 00" N | 97° 05' 00" W | 1714' |
| **Martin** | Martin Municipal | 9V6 | B-I | Y | 43° 09' 55" N | 101° 42' 52" W | 3293' |
| **McIntosh** | McIntosh Municipal | 8D6 | A-I | N | 45° 54' 40" N | 101° 20' 33" W | 2269' |
| **McLaughlin** | McLaughlin Municipal | 5P2 | B-I | Y | 45° 48' 00" N | 100° 47' 12" W | 2006' |
| **Milbank** | Milbank Municipal | 1D1 | B-I | Y | 45° 13' 50" N | 96° 33' 57" W | 1118' |
| **Miller** | Miller Municipal | MKA | B-I | Y | 44° 31' 33" N | 98° 57' 29" W | 1569' |

**Table 2 – General Airport Information**

| Associated City | Airport | FAA Identifier | ARC | NPIAS | Latitude | Longitude | Elevation (MSL) |
|---|---|---|---|---|---|---|---|
| **Mitchell** | Mitchell Municipal | MHE | C-III | Y | 43° 46' 29" N | 98° 02' 17" W | 1303' |
| **Mobridge** | Mobridge Municipal | MBG | B-II | Y | 43° 32' 46" N | 100° 24' 21" W | 1715' |
| **Murdo** | Murdo Municipal | 8F6 | B-I | Y | 43° 51' 08" N | 100° 42' 45" W | 2263' |
| **N. Sioux City** | Graham Field | 7K7 | A-I | N | 42° 32' 25" N | 96° 29' 05" W | 1106' |
| **Onida** | Onida Municipal | 98D | B-I | Y | 44° 42' 01" N | 100° 05' 59" W | 1874' |
| **Parkston** | Parkston Municipal | 8V3 | B-I | Y | 43° 22' 39" N | 97° 59' 22" W | 1415' |
| **Philip** | Philip | PHP | B-I | Y | 44° 02' 55" N | 101° 35' 56" W | 2207' |
| **Pierre** | Pierre Regional | PIR | C-III | Y | 44° 22' 53" N | 100° 17' 01" W | 1742' |
| **Pine Ridge** | Pine Ridge | IEN | B-I | Y | 43° 01' 24" N | 102° 30' 50" W | 3334' |
| **Platte** | Platte Municipal | 1D3 | B-I | Y | 43° 24' 19" N | 98° 49' 50" W | 1618' |
| **Presho** | Presho Municipal | 5P5 | A-I | N | 43° 54' 22" N | 100° 02' 10" W | 1756' |
| **Rapid City** | Rapid City Regional | RAP | C-III | Y | 44° 02' 43" N | 103° 03' 44" W | 3204' |
| **Redfield** | Redfield Municipal | 1D8 | B-I | Y | 44° 51' 36" N | 98° 31' 48" W | 1308' |
| **Rosebud** | Rosebud Sioux Tribal Airport | SUO | B-II | Y | 43° 15' 31" N | 100° 51' 34" W | 2724' |
| **Sioux Falls** | Joe Foss Field | FSD | D-IV | Y | 43° 34' 53" N | 96° 44' 29" W | 1428' |
| **Sisseton** | Sisseton Municipal | 8D3 | B-I | Y | 45° 40' 15" N | 96° 59' 45" W | 1161' |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | SPF | B-II | Y | 44° 29' 14" N | 103° 47' 19" W | 3929' |
| **Springfield** | Springfield Municipal | Y03 | B-I | Y | 42° 52' 54" N | 97° 54' 04" W | 1324' |
| **Sturgis** | Sturgis Municipal | 49B | B-I | Y | 44° 25' 06" N | 103° 22' 36" W | 3243' |
| **Tea** | Marv-Skie Lincoln County | Y14 | B-I | Y | 43° 27' 16" N | 96° 48' 09" W | 1510' |
| **Timber Lake** | Timber Lake Municipal | D58 | A-I | N | 45° 24' 54" N | 101° 05' 02" W | 2193' |
| **Vermillion** | Harold Davidson Field | VMR | B-II | Y | 42° 45' 53" N | 96° 56' 06" W | 1145' |
| **Wagner** | Wagner Municipal | AGZ | B-I | Y | 43° 03' 50" N | 98° 17' 32" W | 1479' |
| **Wall** | Wall Municipal | 6V4 | B-I | Y | 44° 00' 01" N | 102° 15' 12" W | 2811' |
| **Watertown** | Watertown Regional | ATY | C-III | Y | 44° 54' 51" N | 97° 09' 14" W | 1748' |
| **Webster** | The Sigurd Andersen | 1D7 | B-I | Y | 45° 17' 36" N | 97° 30' 51" W | 1854' |
| **Wessington Springs** | Wessington Springs | 4X4 | B-I | Y | 44° 03' 39" N | 98° 31' 51" W | 1545' |
| **White River** | White River Municipal | 7Q7 | A-I | N | 43° 33' 36" N | 100° 45' 48" W | 2151' |
| **Winner** | Winner Regional | ICR | B-II | Y | 43° 23' 27" N | 99° 50' 28" W | 2032' |
| **Yankton** | Chan Gurney Municipal | YKN | B-II | Y | 42° 55' 01" N | 97° 23' 11" W | 1305' |

Source: 2009/10 Survey Data

## 3.2 Runways

The FAA defines runways as rectangular surfaces on an airport which are prepared or suitable for the landing or takeoff of airplanes. Runway length and construction vary based upon the performance criteria of the critical aircraft which utilize them, as well as the design criteria defined in AC 150/5300-13 *Airport Design.* Characteristics of runways that can differ include the type of surface, along with the length, and width of the surface which are discussed in more detail below. Airport-specific information can be found in **Table 7**.

### 3.2.a Primary Runway Length

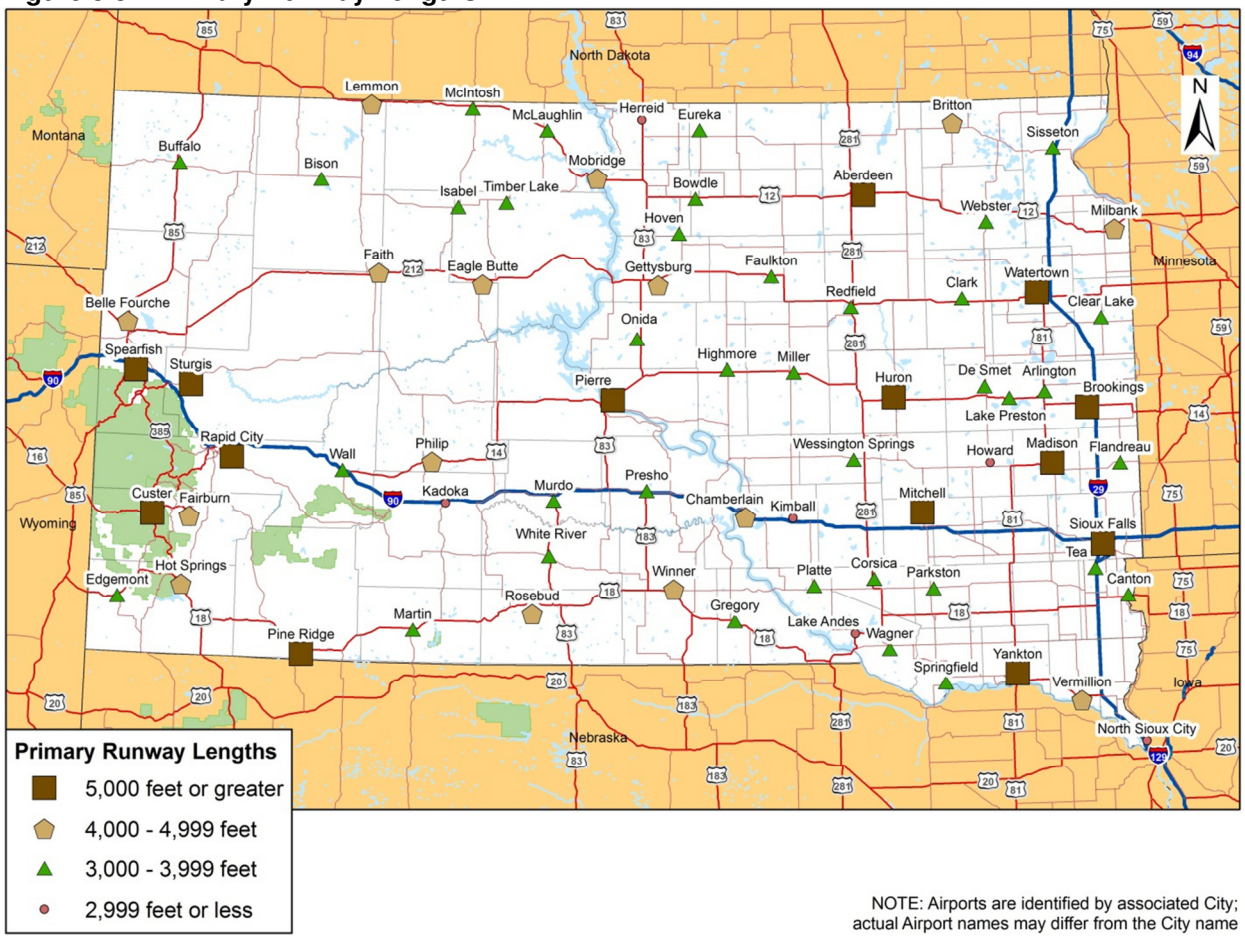
A primary runway is traditionally the principal and longest surface capable of meeting the landing and takeoff requirements of the most demanding aircraft operating at an airport. The length of a runway is largely based upon the performance characteristics of the critical aircraft which will use the surface. Information provided by FAA AC 150/5325-4 *Runway Length Requirements for Airport Design*, as well as aircraft manufacturers, provides guidance and recommendations in determining the preferred length of a primary runway. **Table 3** summarizes the lengths of the primary runways at each of the 72 public use airports in the State, while **Figure 3.3** illustrates the location of runways at various lengths. The majority of the runways have lengths between 3,000 and 3,999 feet.

**Table 3 – Summary of Primary Runway Lengths**

| Primary Runway Length | Number of System Airports | Percentage of System Airports |
|---|---|---|
| 5,000 feet or greater | 14 | 19.4% |
| 4,000 – 4,999 feet | 15 | 20.8% |
| 3,000 – 3,999 feet | 37 | 51.4% |
| 2,999 feet or less | 6 | 8.3% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.3 – Primary Runway Lengths**



### 3.2.b Primary Runway Width and Surface Type

The width of a runway is based upon criteria defined in FAA AC 150/5300-13, *Airport Design*, along with the wingspan and approach speed of the critical aircraft intended to use the surface. The visibility minimums of a runway's approach also factor into the recommended width of a runway. **Table 4** summarizes the primary runway widths for system airports. Just over half of system airports have runway widths of 60 feet or less.

**Table 4 – Summary of Primary Runway Widths**

| Primary Runway Width | Number of System Airports | Percentage of System Airports |
|---|---|---|
| 100+ feet | 24 | 33.3% |
| 75 feet | 11 | 15.3% |
| 60 feet or less | 37 | 51.4% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

While the majority of the primary runways at these airports are paved, there are some which are composed of either gravel or turf. Although turf runway widths are subject to the same design criteria as paved runways, they are often constructed wider than required to provide a larger margin of safety since lateral control on a turf or gravel runway may be less than what is experienced on a paved runway. There are 14 turf runways and one gravel runway in the system.

### 3.2.c Primary Runway Pavement Condition Index Rating

The Pavement Condition Index (PCI) rating system established by paving industry associations assigns a score from 0 to 100 to the condition of a pavement surface. Surfaces found to be in "excellent" condition assigned a score of 100. **Table 5** summarizes the data collected on the PCI of each of the paved primary runways within the system, as turf or gravel runways are not subject to a PCI rating. Nearly 65% of primary runway PCIs have a score of 80 or better.

**Table 5 – Summary of Primary Runway PCIs**

| Primary Runway PCI Rating | Number of System Airports | Percentage of System Airports |
|---|---|---|
| 90+ | 24 | 42.9% |
| 89-80 | 12 | 21.4% |
| 79-70 | 10 | 17.9% |
| Less than 70 | 10 | 17.9% |
| **Total Paved Primary Runways** | **56** | **100%** |
| | | |
| Turf Runways | 14 | |
| Gravel Runways | 1 | |
| Private Airports | 1 | |
| **Total System Airports** | **72** | |

Source: South Dakota DOT data as of 2010 on a rolling 3-year inspection cycle

### 3.2.d Primary Runway Lighting

Runway lighting defines the edges of a runway surface during nighttime and low visibility conditions as well as provides a visual cue to pilots of the runway distance remaining. Runway lighting is classified into three types based upon illumination intensity: High Intensity Runway Lighting (HIRL), Medium Intensity Runway Lighting (MIRL), and Low Intensity Runway Lighting (LIRL). HIRL systems offer pilots the greatest lighting intensity while LIRL systems have a lower lighting intensity. **Table 6** summarizes the lighting systems on the primary runways at each airport, and indicates that over 50 percent (61%) of the airports have at least MIRL systems.

**Table 6 – Primary Runway Lighting Summary**

| Primary Runway Lighting System | Number of System Airports | Percentage of System Airports |
|---|---|---|
| High Intensity Runway Lighting (HIRL) | 10 | 13.8% |
| Medium Intensity Runway Lighting (MIRL) | 34 | 47.2% |
| Low Intensity Runway Lighting | 20 | 27.8% |
| Non-standard Runway Lighting | 1 | 1.4% |
| No Runway Lighting | 7 | 9.7% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Table 7 – Summary of Runway Data**

| Associated City | Airport | Primary Runway Length | Primary Runway Width | Primary Runway PCI | Runway Lighting |
|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | 6,901’ | 100’ | 92 | HIRL |
| **Arlington** | Arlington Municipal | 3,000’ | 250’ | Turf | None |
| **Belle Fourche** | Belle Fourche Municipal | 4,501’ | 60’ | 96 | MIRL |
| **Bison** | Bison Municipal | 3,500’ | 60’ | 100 | MIRL |
| **Bowdle** | Bowdle Municipal | 3,600’ | 150’ | Turf | None |
| **Britton** | Britton Municipal | 4,210’ | 75’ | 55 | MIRL |
| **Brookings** | Brookings Regional | 5,231’ | 100’ | 92 | HIRL |
| **Buffalo** | Harding County | 3,900’ | 60’ | 100 | LIRL |
| **Canton** | Canton Municipal | 3,600’ | 60’ | 50 | LIRL |
| **Chamberlain** | Chamberlain Municipal | 4,300’ | 75’ | 84 | MIRL |
| **Clark** | Clark County | 3,700’ | 60’ | 68 | MIRL |
| **Clear Lake** | Clear Lake Municipal | 3,000’ | 150’ | Turf | None |
| **Corsica** | Corsica Municipal | 3,400’ | 150’ | Turf | MIRL |
| **Custer** | Custer County | 5,500’ | 60’ | 95 | MIRL |
| **De Smet** | Wilder | 3,700’ | 60’ | 100 | MIRL |
| **Eagle Butte** | Cheyenne Eagle Butte | 4,200’ | 60’ | 83 | MIRL |
| **Edgemont** | Edgemont Municipal | 3,900’ | 60’ | 77 | LIRL |
| **Eureka** | Eureka Municipal | 3,100’ | 60’ | 81 | LIRL |
| **Fairburn** | Custer State Park | 4,000’ | 50’ | 92 | LIRL |
| **Faith** | Faith Municipal | 4,200’ | 60’ | 89 | MIRL |
| **Faulkton** | Faulkton Municipal | 3,000’ | 60’ | 72 | LIRL |
| **Flandreau** | Flandreau Municipal | 3,100’ | 60’ | 66 | LIRL |
| **Gettysburg** | Gettysburg Municipal | 4,400’ | 75’ | 82 | MIRL |

**Table 7 – Summary of Runway Data**

| Associated City | Airport | Primary Runway Length | Primary Runway Width | Primary Runway PCI | Runway Lighting |
|---|---|---|---|---|---|
| **Gregory** | Gregory Municipal Airport/Flynn Field | 3,800’ | 60’ | 89 | MIRL |
| **Herreid** | Herreid Municipal | 2,230’ | 30’ | Asphalt/Turf | None |
| **Highmore** | Highmore Municipal | 3,700’ | 60’ | 91 | MIRL |
| **Hot Springs** | Hot Springs Municipal | 4,505’ | 100’ | 93 | MIRL |
| **Hoven** | Hoven Municipal | 3,700’ | 60’ | 64 | MIRL |
| **Howard** | Howard Municipal | 2,672’ | 150’ | Turf | LIRL |
| **Huron** | Huron Regional | 7,201’ | 100’ | 96 | HIRL |
| **Isabel** | Isabel Municipal | 3,000’ | 150’ | Turf | LIRL |
| **Kadoka** | Kadoka Municipal | 2,600’ | 150’ | Turf | LIRL |
| **Kimball** | Kimball Municipal | 2,600’ | 250’ | Turf | None |
| **Lake Andes** | Lake Andes Municipal | 2,600’ | 250’ | Turf | None |
| **Lake Preston** | Lake Preston Municipal | 3,500’ | 250’ | Turf | Non-standard |
| **Lemmon** | Lemmon Municipal | 4,501’ | 75’ | 82 | MIRL |
| **Madison** | Madison Municipal | 5,000’ | 75’ | 98 | MIRL |
| **Martin** | Martin Municipal | 3,709’ | 60’ | 100 | MIRL |
| **McIntosh** | McIntosh Municipal | 3,700’ | 150’ | Turf | LIRL |
| **McLaughlin** | McLaughlin Municipal | 3,800’ | 60’ | 87 | LIRL |
| **Milbank** | Milbank Municipal | 4,000’ | 60’ | 95 | MIRL |
| **Miller** | Miller Municipal | 3,600’ | 60’ | 72 | MIRL |
| **Mitchell** | Mitchell Municipal | 6,700’ | 100’ | 100 | HIRL |
| **Mobridge** | Mobridge Municipal | 4,411’ | 75’ | 79 | MIRL |
| **Murdo** | Murdo Municipal | 3,400’ | 60’ | 95 | MIRL |
| **N. Sioux City** | Graham Field | 2,237’ | 36’ | N/A | None |
| **Onida** | Onida Municipal | 3,810’ | 60’ | 89 | MIRL |
| **Parkston** | Parkston Municipal | 3,600’ | 60’ | 91 | MIRL |
| **Philip** | Philip | 4,000’ | 75’ | 75 | HIRL |
| **Pierre** | Pierre Regional | 6,900’ | 100’ | 99 | HIRL |
| **Pine Ridge** | Pine Ridge | 5,000’ | 60’ | 70 | MIRL |
| **Platte** | Platte Municipal | 3,100’ | 60’ | 77 | LIRL |
| **Presho** | Presho Municipal | 3,350’ | 150’ | Gravel | LIRL |
| **Rapid City** | Rapid City Regional | 8,701’ | 150’ | 97 | HIRL |
| **Redfield** | Redfield Municipal | 3,300’ | 60’ | 57 | LIRL |
| **Rosebud** | Rosebud Sioux Tribal Airport | 4,800’ | 75’ | 100 | MIRL |
| **Sioux Falls** | Joe Foss Field | 8,999’ | 150’ | 78 | HIRL |
| **Sisseton** | Sisseton Municipal | 3,400’ | 60’ | 70 | MIRL |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | 6,400’ | 75’ | 100 | MIRL |
| **Springfield** | Springfield Municipal | 3,500’ | 60’ | 81 | MIRL |
| **Sturgis** | Sturgis Municipal | 5,100’ | 60’ | 46 | MIRL |
| **Tea** | Marv-Skie Lincoln County Airport | 3,650’ | 60’ | 55 | MIRL |
| **Timber Lake** | Timber Lake Municipal | 3,300’ | 150’ | Turf | LIRL |
| **Vermillion** | Harold Davidson Field | 4,105’ | 75’ | 100 | MIRL |
| **Wagner** | Wagner Municipal | 3,500’ | 60’ | 68 | MIRL |
| **Wall** | Wall Municipal | 3,500’ | 60’ | 82 | LIRL |

**Table 7 – Summary of Runway Data**

| Associated City | Airport | Primary Runway Length | Primary Runway Width | Primary Runway PCI | Runway Lighting |
|---|---|---|---|---|---|
| **Watertown** | Watertown Regional | 6,894' | 100' | 88 | HIRL |
| **Webster** | The Sigurd Andersen | 3,700' | 60' | 65 | LIRL |
| **Wessington Springs** | Wessington Springs | 3,600' | 60' | 73 | LIRL |
| **White River** | White River Municipal | 3,000' | 150' | Turf | LIRL |
| **Winner** | Winner Regional | 4,500' | 75' | 98 | MIRL |
| **Yankton** | Chan Gurney Municipal | 6,095' | 100' | 99 | HIRL |

Source: 2009/10 Survey Data
N/A = Privately Owned Airport
LIRL = Low Intensity Runway Lighting
MIRL = Medium Intensity Runway Lighting
HIRL = High Intensity Runway Lighting

## 3.3 Taxiways

Taxiways are defined pavements which are established for the taxiing of aircraft from one part of an airport to another. Similar to runways, taxiways are also designed based upon the ARC of the critical aircraft which utilizes an airport, along with design criteria set forth in AC 150/5300-13 *Airport Design.* Taxiways are used by aircraft to enter and exit a runway, as well as to reach terminal or apron areas for parking which minimizes the time that aircraft are on a runway. The following sections summarize the important elements of taxiways in the system. Airport specific information regarding taxiways is available in **Table 10**.

### 3.3.a Primary Runway Taxiway Type

There are several types of taxiways that are developed at airports, depending on the needs of critical airport users. The most common type is a full parallel taxiway which extends parallel to the entire length of the primary runway, minimizing the time an aircraft occupies a runway when preparing for takeoff or upon landing. In addition to full parallel taxiways, there are also partial parallel taxiways which typically extend from a ramp or terminal area to a single runway end. The third type of taxiway is a connector taxiway which provides direct access to a runway at an airport without a parallel taxiway. **Table 8** summarizes the types of taxiways found at airports within the system. Over half of the system airports (65.3%) have only connector taxiways providing access to the runways from hangar and terminal areas.

**Table 8 – Parallel Taxiway Summary**

| Parallel Taxiway Type | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Full Parallel Taxiway | 10 | 13.8% |
| Partial Parallel Taxiway | 9 | 12.5% |
| Connector Taxiway(s) | 47 | 65.3% |
| No Taxiway System | 6 | 8.3% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.3.b Primary Taxiway Lighting

Similar to runway lighting, taxiway lighting outlines the edges of the taxiway surfaces which assists pilots in identifying the locations of taxiways during times of reduced visibility and at nighttime. Taxiway lighting is classified in the same way as runway lighting including High Intensity Taxiway Lighting (HITL), Medium Intensity Taxiway Lighting (MITL), and Low Intensity Taxiway Lighting (LITL). HITL provides the highest level of illumination, while LITL provides a lower lighting intensity. **Table 9** provides a summary of the taxiway lighting found in South Dakota's aviation system, which illustrates that more than 80% of airports do not have a taxiway lighting system at all.

**Table 9 – Taxiway Lighting Summary**

| Taxiway Lighting System | Number of System Airports | Percentage of System Airports |
|---|---|---|
| High Intensity Taxiway Lighting (HITL) | 0 | 0% |
| Medium Intensity Taxiway Lighting (MITL) | 13 | 18.1% |
| Low Intensity Taxiway Lighting | 1 | 1.4% |
| No Taxiway Lighting System | 58 | 80.6% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Table 10 – Summary of Taxiway Data**

| Associated City | Airport | Taxiway Type | Taxiway Lighting |
|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | Full | MITL |
| **Arlington** | Arlington Municipal | Connecting | None |
| **Belle Fourche** | Belle Fourche Municipal | Connecting | None |
| **Bison** | Bison Municipal | Connecting | None |
| **Bowdle** | Bowdle Municipal | Connecting | None |
| **Britton** | Britton Municipal | Partial | None |
| **Brookings** | Brookings Regional | Full | MITL |
| **Buffalo** | Harding County | Partial | None |
| **Canton** | Canton Municipal | Connecting | None |
| **Chamberlain** | Chamberlain Municipal | Connecting | None |
| **Clark** | Clark County | Partial | None |
| **Clear Lake** | Clear Lake Municipal | Connecting | None |
| **Corsica** | Corsica Municipal | Connecting | None |
| **Custer** | Custer County | Connecting | None |
| **De Smet** | Wilder | Connecting | None |
| **Eagle Butte** | Cheyenne Eagle Butte | Connecting | None |
| **Edgemont** | Edgemont Municipal | Connecting | None |
| **Eureka** | Eureka Municipal | Connecting | None |
| **Fairburn** | Custer State Park | Connecting | None |
| **Faith** | Faith Municipal | Connecting | None |
| **Faulkton** | Faulkton Municipal | Connecting | None |
| **Flandreau** | Flandreau Municipal | Connecting | None |
| **Gettysburg** | Gettysburg Municipal | Partial | None |
| **Gregory** | Gregory Municipal Airport/Flynn Field | Connecting | None |

**Table 10 – Summary of Taxiway Data**

| Associated City | Airport | Taxiway Type | Taxiway Lighting |
|---|---|---|---|
| **Herreid** | Herreid Municipal | Connecting | None |
| **Highmore** | Highmore Municipal | Connecting | None |
| **Hot Springs** | Hot Springs Municipal | Connecting | None |
| **Hoven** | Hoven Municipal | Connecting | None |
| **Howard** | Howard Municipal | None | None |
| **Huron** | Huron Regional | Full | MITL |
| **Isabel** | Isabel Municipal | Connecting | None |
| **Kadoka** | Kadoka Municipal | None | None |
| **Kimball** | Kimball Municipal | Connecting | None |
| **Lake Andes** | Lake Andes Municipal | None | None |
| **Lake Preston** | Lake Preston Municipal | None | None |
| **Lemmon** | Lemmon Municipal | Connecting | None |
| **Madison** | Madison Municipal | Connecting | None |
| **Martin** | Martin Municipal | None | None |
| **McIntosh** | McIntosh Municipal | Connecting | None |
| **McLaughlin** | McLaughlin Municipal | Connecting | None |
| **Milbank** | Milbank Municipal | Connecting | None |
| **Miller** | Miller Municipal | Connecting | None |
| **Mitchell** | Mitchell Municipal | Full | MITL |
| **Mobridge** | Mobridge Municipal | Connecting | None |
| **Murdo** | Murdo Municipal | Connecting | None |
| **N. Sioux City** | Graham Field | Connecting | None |
| **Onida** | Onida Municipal | Connecting | None |
| **Parkston** | Parkston Municipal | Partial | LITL |
| **Philip** | Philip | Connecting | None |
| **Pierre** | Pierre Regional | Full | MITL |
| **Pine Ridge** | Pine Ridge | Connecting | None |
| **Platte** | Platte Municipal | Connecting | None |
| **Presho** | Presho Municipal | None | None |
| **Rapid City** | Rapid City Regional | Full | MITL |
| **Redfield** | Redfield Municipal | Connecting | None |
| **Rosebud** | Rosebud Sioux Tribal Airport | Connecting | None |
| **Sioux Falls** | Joe Foss Field | Full | MITL |
| **Sisseton** | Sisseton Municipal | Connecting | MITL |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | Partial | MITL |
| **Springfield** | Springfield Municipal | Connecting | None |
| **Sturgis** | Sturgis Municipal | Partial | None |
| **Tea** | Marv-Skie Lincoln County Airport | Full | None |
| **Timber Lake** | Timber Lake Municipal | Connecting | None |
| **Vermillion** | Harold Davidson Field | Partial | MITL |
| **Wagner** | Wagner Municipal | Connecting | None |
| **Wall** | Wall Municipal | Partial | None |
| **Watertown** | Watertown Regional | Full | MITL |
| **Webster** | The Sigurd Andersen | Connecting | None |

**Table 10 – Summary of Taxiway Data**

| Associated City | Airport | Taxiway Type | Taxiway Lighting |
|---|---|---|---|
| **Wessington Springs** | Wessington Springs | Connecting | None |
| **White River** | White River Municipal | Connecting | None |
| **Winner** | Winner Regional | Connecting | MITL |
| **Yankton** | Chan Gurney Municipal | Full | MITL |

LITL = Low Intensity Taxiway Lighting MITL = Medium Intensity Taxiway Lighting HITL = High Intensity Taxiway Lighting
Source: 2009/10 Survey Data

## 3.4 Navigational Aids

Navigational Aids (NAVAIDs) are ground based equipment at an airport that helps pilots identify the location of an airport, the location of a runway's threshold, and the proper slope of decent upon approach for landing. There are several types of NAVAID equipment including lighting systems, radio transmitters, and visual devices. The following discussions provide a more detailed look at specific NAVAID equipment found at system airports. Airport specific NAVAID information can be found in **Table 16**.

### 3.4.a Visual Guidance Slope Indicator

A Visual Guidance Slope Indicator (VGSI) is a lighting system which is placed at the approach end of a runway which assists pilots in determining the correct glide path upon approach for landing at an airport. VGSIs include a series of angled red and white colored lights which compose different lighting patterns that indicate the angle of approach for a pilot when locating the proper glide path. Visual Approach Slope Indicators (VASI) and Precision Approach Path Indicators (PAPI) are the most common VGSI systems. **Table 11** includes a summary of the VGSI systems found at public use airports in the State. Nearly 40 percent (37.5%) of the airports do not have a VGSI system.

**Table 11 – Visual Guidance Slope Indicator Summary**

| Visual Guidance Slope Indicator | Number of System Airports | Percentage of System Airports |
|---|---|---|
| VASI – 4 Box | 2 | 2.8% |
| VASI – 2 Box | 0 | 0.0% |
| PAPI – 4 Box | 16 | 22.2% |
| PAPI – 2 Box | 27 | 37.5% |
| No VGSI Equipment | 27 | 37.5% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.4.b. Runway End Identifier Lights

Runway End Identifier Lights (REILs) are a system of synchronized, high-intensity, flashing lights which are located on either side of a runway end which provides a positive indication of the runway threshold for a pilot. These lights are especially helpful for pilots operating in times of decreased visibility, or in urban environments with an abundance of additional lighting nearby. **Table 12** summarizes the availability of REILs at system airports, and indicates that the majority of airports do not have REILs.

**Table 12 – REIL Equipment Summary**

| REIL Equipment Condition | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Equipped with REIL | 8 | 11.1% |
| Not Equipped with REILs | 64 | 88.9% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.4.c. Rotating Beacon

Rotating beacons are lights which rotate 360 degrees that identify the location and type of airport. Airports open for civilian use have beacons which alternate one green flash followed by one white flash. Beacons at military airports flash green followed by two white flashes. Rotating beacons aid pilots in identifying the location of an airport or airports when en route to a destination. **Table 13** provides a summary of the availability of rotating beacons at airports within the aviation system, which indicates the majority of airports have a rotating beacon (94.4%)

**Table 13 – Rotating Beacon Summary**

| Rotating Beacon Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Airports with Rotating Beacons | 68 | 94.4% |
| Airports without Rotating Beacons | 4 | 5.6% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.4.d. Lighted Wind Indicators

Wind indicators are conical fabric tubes which indicate wind direction and intensity, as they fill with air in windy conditions. This NAVAID is typically located near runway ends as they provide pilots with important wind information which is utilized to make course adjustments if needed prior to landing or after takeoff. Often these wind indicators are lighted which allows them to be used by pilots in times of reduced visibility or at nighttime. **Table 14** provides a summary of the availability of lighted wind indicators at airports across the State. Nearly all system airports are equipped with a lighted wind indicator.

**Table 14– Summary of Lighted Wind Indicators**

| Lighted Wind Indicator | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Lighted Wind Indicator | 68 | 94.4% |
| No Lighted Wind Indicator | 4 | 5.6% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.4.e. Remote Communication Outlets

Remote Communication Outlets (RCOs) are radio receiver equipment which allows pilots to contact Flight Service Stations (FSS) for weather and flight planning information. This equipment increases the normal signal range of on-aircraft radios through ultra-high frequency (UHF) and/or very high frequency (VHF) signals. This communication equipment is especially useful for pilots in areas that experience radio interference due to either environmental conditions, or other radio frequency bands. It is also useful for

airports which are located outside of the normal radio range needed to make contact with an FSS. **Table 15** provides a summary of RCO equipment available at system airports.

**Table 15 – Summary of Remote Communication Outlets**

| RCO Equipment Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Airports with RCO Equipment | 8 | 11.1% |
| Airports without RCO Equipment | 20 | 27.8% |
| No Response | 44 | 61.1% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Table 16 – Summary of Navigational Aids**

| Associated City | Airport | VGSI | REILS | Beacon | Lighted Wind Indicator | RCO |
|---|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | V4L/P4L | Yes | White-Green | Yes | Yes |
| **Arlington** | Arlington Municipal | None | No | White-Green | Yes | NR |
| **Belle Fourche** | Belle Fourche Municipal | P4L/P4L | No | White-Green | Yes | NR |
| **Bison** | Bison Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Bowdle** | Bowdle Municipal | None | No | White-Green | Yes | NR |
| **Britton** | Britton Municipal | P4L/P4L | No | White-Green | Yes | NR |
| **Brookings** | Brookings Regional | P4L/P4L | Yes | White-Green | Yes | NR |
| **Buffalo** | Harding County | None | No | White-Green | Yes | NR |
| **Canton** | Canton Municipal | None | No | White-Green | Yes | No |
| **Chamberlain** | Chamberlain Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Clark** | Clark County | P2L/P2L | No | White-Green | Yes | No |
| **Clear Lake** | Clear Lake Municipal | None | No | White-Green | Yes | NR |
| **Corsica** | Corsica Municipal | None | No | White-Green | Yes | No |
| **Custer** | Custer County | P4L/P4L | No | White-Green | Yes | No |
| **De Smet** | Wilder | P2L/P2L | No | White-Green | Yes | No |
| **Eagle Butte** | Cheyenne Eagle Butte | None | No | White-Green | Yes | NR |
| **Edgemont** | Edgemont Municipal | None | No | White-Green | Yes | NR |
| **Eureka** | Eureka Municipal | None | No | White-Green | Yes | NR |
| **Fairburn** | Custer State Park | None | No | White-Green | Yes | NR |
| **Faith** | Faith Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Faulkton** | Faulkton Municipal | None | No | White-Green | Yes | No |
| **Flandreau** | Flandreau Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Gettysburg** | Gettysburg Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Gregory** | Gregory Municipal Airport/Flynn Field | P2L/P2L | No | White-Green | Yes | Yes |
| **Herreid** | Herreid Municipal | None | No | None | Yes | NR |
| **Highmore** | Highmore Municipal | None | No | White-Green | Yes | NR |
| **Hot Springs** | Hot Springs Municipal | P2L/P2L | No | White-Green | Yes | No |
| **Hoven** | Hoven Municipal | None/P2L | No | White-Green | Yes | NR |
| **Howard** | Howard Municipal | None | No | White-Green | Yes | NR |
| **Huron** | Huron Regional | P4L/P4L | Yes | White-Green | Yes | Yes |
| **Isabel** | Isabel Municipal | None | No | White-Green | Yes | NR |
| **Kadoka** | Kadoka Municipal | None | No | White-Green | Yes | NR |

**Table 16 – Summary of Navigational Aids**

| Associated City | Airport | VGSI | REILS | Beacon | Lighted Wind Indicator | RCO |
|---|---|---|---|---|---|---|
| **Kimball** | Kimball Municipal | None | No | None | No | NR |
| **Lake Andes** | Lake Andes Municipal | None | No | None | No | NR |
| **Lake Preston** | Lake Preston Municipal | None | No | White-Green | Yes | NR |
| **Lemmon** | Lemmon Municipal | P2L/P2L | No | White-Green | Yes | No |
| **Madison** | Madison Municipal | P2L/P2L | No | White-Green | Yes | No |
| **Martin** | Martin Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **McIntosh** | McIntosh Municipal | None | No | White-Green | Yes | NR |
| **McLaughlin** | McLaughlin Municipal | None | No | White-Green | Yes | No |
| **Milbank** | Milbank Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Miller** | Miller Municipal | P2L | No | White-Green | Yes | No |
| **Mitchell** | Mitchell Municipal | P2L/P2R | Yes | White-Green | Yes | Yes |
| **Mobridge** | Mobridge Municipal | P2L/P2L | No | White-Green | Yes | Yes |
| **Murdo** | Murdo Municipal | None | No | White-Green | Yes | NR |
| **N. Sioux City** | Graham Field | P2L/P2L | No | None | No | NR |
| **Onida** | Onida Municipal | P2L/P2L | No | White-Green | Yes | No |
| **Parkston** | Parkston Municipal | P2L/P2L | No | White-Green | Yes | No |
| **Philip** | Philip | P4L/P4L | No | White-Green | Yes | Yes |
| **Pierre** | Pierre Regional | P4L/P4L | Yes | White-Green | Yes | Yes |
| **Pine Ridge** | Pine Ridge | P2L/P2L | No | White-Green | Yes | NR |
| **Platte** | Platte Municipal | None | No | White-Green | Yes | No |
| **Presho** | Presho Municipal | P4L/P4L | No | White-Green | Yes | No |
| **Rapid City** | Rapid City Regional | P4L | Yes | White-Green | Yes | No |
| **Redfield** | Redfield Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Rosebud** | Rosebud Sioux Tribal Airport | P2L/P2L | No | White-Green | Yes | NR |
| **Sioux Falls** | Joe Foss Field | P2L/P2L | No | White-Green | Yes | No |
| **Sisseton** | Sisseton Municipal | P4L/P4L | No | White-Green | Yes | No |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | VGL | No | White-Green | Yes | Yes |
| **Springfield** | Springfield Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Sturgis** | Sturgis Municipal | P4L/P4L | No | White-Green | Yes | NR |
| **Tea** | Marv-Skie Lincoln County Airport | P4L/P4L | No | White-Green | Yes | NR |
| **Timber Lake** | Timber Lake Municipal | None | No | White-Green | Yes | NR |
| **Vermillion** | Harold Davidson Field | P4L/P4L | No | White-Green | Yes | NR |
| **Wagner** | Wagner Municipal | P2L/P2L | No | White-Green | Yes | NR |
| **Wall** | Wall Municipal | P4L/P4L | No | White-Green | Yes | NR |
| **Watertown** | Watertown Regional | P4L/P4L | Yes | White-Green | Yes | NR |
| **Webster** | The Sigurd Andersen | None | No | White-Green | Yes | No |
| **Wessington Springs** | Wessington Springs | None | No | White-Green | No | NR |
| **White River** | White River Municipal | None | No | White-Green | Yes | NR |
| **Winner** | Winner Regional | P2L/P2L | No | White-Green | Yes | NR |
| **Yankton** | Chan Gurney Municipal | V4L/V4L | Yes | White-Green | Yes | No |

Source: 2009/10 Survey Data
NR = No Response
VGSI = Visual Guidance Slope Indicator
REIL = Runway End Identifier Lights

## 3.5 Aircraft Storage

Aircraft storage can take many forms, whether it be totally enclosed structures such as hangars which provide protection from weather and other environmental factors, to paved apron areas with areas for parking. Aircraft storage needs vary from one airport to another based upon the types and sizes of based aircraft and airport user needs. A listing of airport specific storage facilities can be found in **Table 18**.

### 3.5.a. Covered Overnight Storage

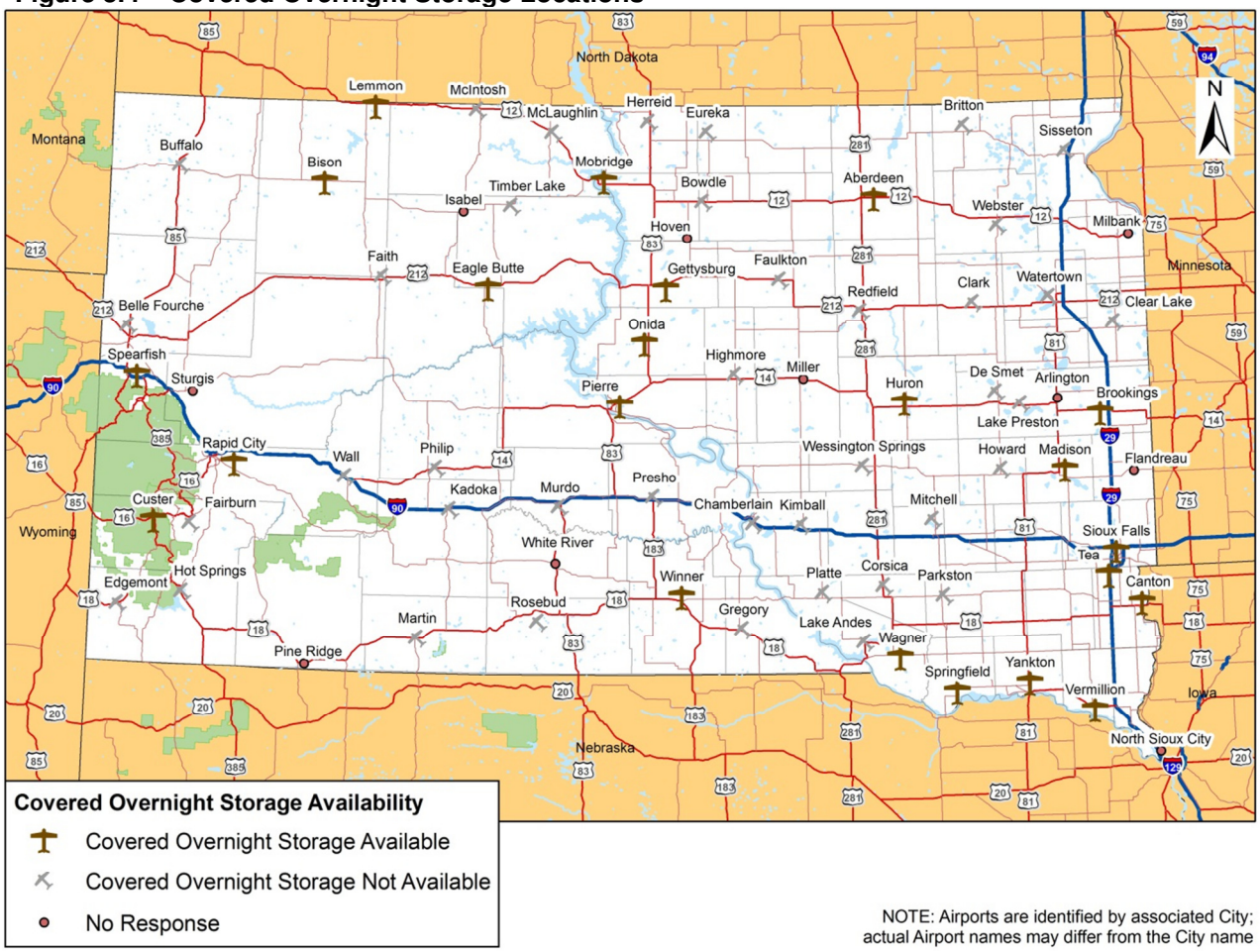
Providing covered storage for aircraft helps to protect them from environmental factors such as precipitation, sunlight, wildlife, and debris. Often, aircraft owners require covered storage for their aircraft at the airport they base at to help preserve the condition of their investment and to reduce repair and maintenance costs. **Table 17** provides a summary of the airports in the system which provide covered overnight storage, while **Figure 3.4** illustrates the locations where it is available. Over half of the airports do not have covered overnight storage available at their facility.

**Table 17 – Summary of Covered Overnight Aircraft Storage Availability**

| Covered Overnight Storage Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Covered Overnight Storage Available | 22 | 30.6% |
| Covered Overnight Storage Not Available | 40 | 55.6% |
| No Response | 10 | 13.9% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.4 – Covered Overnight Storage Locations**




Source: Kirkham Michael

**Table 18 – Summary of Overnight Storage**

| Associated City | Airport | Covered Overnight Storage |
|---|---|---|
| **Aberdeen** | Aberdeen Regional | Yes |
| **Arlington** | Arlington Municipal | NR |
| **Belle Fourche** | Belle Fourche Municipal | No |
| **Bison** | Bison Municipal | Yes |
| **Bowdle** | Bowdle Municipal | No |
| **Britton** | Britton Municipal | No |
| **Brookings** | Brookings Regional | Yes |
| **Buffalo** | Harding County | No |
| **Canton** | Canton Municipal | Yes |
| **Chamberlain** | Chamberlain Municipal | No |
| **Clark** | Clark County | No |
| **Clear Lake** | Clear Lake Municipal | No |
| **Corsica** | Corsica Municipal | No |
| **Custer** | Custer County | Yes |
| **De Smet** | Wilder | No |

**Table 18 – Summary of Overnight Storage**

| Associated City | Airport | Covered Overnight Storage |
|---|---|---|
| **Eagle Butte** | Cheyenne Eagle Butte | Yes |
| **Edgemont** | Edgemont Municipal | No |
| **Eureka** | Eureka Municipal | No |
| **Fairburn** | Custer State Park | No |
| **Faith** | Faith Municipal | No |
| **Faulkton** | Faulkton Municipal | No |
| **Flandreau** | Flandreau Municipal | NR |
| **Gettysburg** | Gettysburg Municipal | Yes |
| **Gregory** | Gregory Municipal Airport/Flynn Field | No |
| **Herreid** | Herreid Municipal | No |
| **Highmore** | Highmore Municipal | No |
| **Hot Springs** | Hot Springs Municipal | No |
| **Hoven** | Hoven Municipal | NR |
| **Howard** | Howard Municipal | No |
| **Huron** | Huron Regional | Yes |
| **Isabel** | Isabel Municipal | NR |
| **Kadoka** | Kadoka Municipal | No |
| **Kimball** | Kimball Municipal | No |
| **Lake Andes** | Lake Andes Municipal | No |
| **Lake Preston** | Lake Preston Municipal | No |
| **Lemmon** | Lemmon Municipal | Yes |
| **Madison** | Madison Municipal | Yes |
| **Martin** | Martin Municipal | No |
| **McIntosh** | McIntosh Municipal | No |
| **McLaughlin** | McLaughlin Municipal | No |
| **Milbank** | Milbank Municipal | NR |
| **Miller** | Miller Municipal | NR |
| **Mitchell** | Mitchell Municipal | No |
| **Mobridge** | Mobridge Municipal | Yes |
| **Murdo** | Murdo Municipal | No |
| **N.Sioux City** | Graham Field | NR |
| **Onida** | Onida Municipal | Yes |
| **Parkston** | Parkston Municipal | No |
| **Philip** | Philip | No |
| **Pierre** | Pierre Regional | Yes |
| **Pine Ridge** | Pine Ridge | NR |
| **Platte** | Platte Municipal | No |
| **Presho** | Presho Municipal | No |
| **Rapid City** | Rapid City Regional | Yes |
| **Redfield** | Redfield Municipal | No |
| **Rosebud** | Rosebud Sioux Tribal Airport | No |
| **Sioux Falls** | Joe Foss Field | Yes |
| **Sisseton** | Sisseton Municipal | No |

**Table 18 – Summary of Overnight Storage**

| Associated City | Airport | Covered Overnight Storage |
|---|---|---|
| **Spearfish** | Black Hills Airport/Clyde Ice Field | Yes |
| **Springfield** | Springfield Municipal | Yes |
| **Sturgis** | Sturgis Municipal | NR |
| **Tea** | Marv-Skie Lincoln County Airport | Yes |
| **Timber Lake** | Timber Lake Municipal | No |
| **Vermillion** | Harold Davidson Field | Yes |
| **Wagner** | Wagner Municipal | Yes |
| **Wall** | Wall Municipal | No |
| **Watertown** | Watertown Regional | No |
| **Webster** | The Sigurd Andersen | No |
| **Wessington Springs** | Wessington Springs | No |
| **White River** | White River Municipal | NR |
| **Winner** | Winner Regional | Yes |
| **Yankton** | Chan Gurney Municipal | Yes |

Source: 2009/10 Survey Data
NR = No Response

## 3.6 Terminal Building Facilities

Terminal buildings provide essential services for passengers and pilots, as well as provide a facility for the transfer of passengers and flight crews to and from the aircraft. Facilities can range in size based upon several factors, most important being the type of airport users and whether an airport serves general aviation or commercial service operations. Buildings can range from a small pilot room for flight planning and resting, to a large multi-terminal building serving several commercial service airlines. Often the associated services provided along with terminal facilities are directly related to the type of facility present. A listing of airport-specific terminal facilities can be found in **Table 25**.

### 3.6.a. Terminal/Administration Building

A terminal or administration building can take several forms, whether it is connected to a hangar, or is free standing. During the inventory process, terminal facilities were cataloged as either free standing, attached to a hangar, attached to an on-airport residence, or not present at all. **Table 19** summarizes the type of terminal/administration structure. Just over 60% of system airports have a terminal or administration building, in some form.

**Table 19 – Summary Terminal/Administration Buildings**

| Terminal/Administration Building | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Free Standing Structure | 29 | 40.3% |
| Attached to Hangar | 15 | 20.8% |
| Attached to On-Airport Residence | 1 | 1.4% |
| No Terminal/Administration Building | 27 | 37.5% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.6.b. Ground Transportation

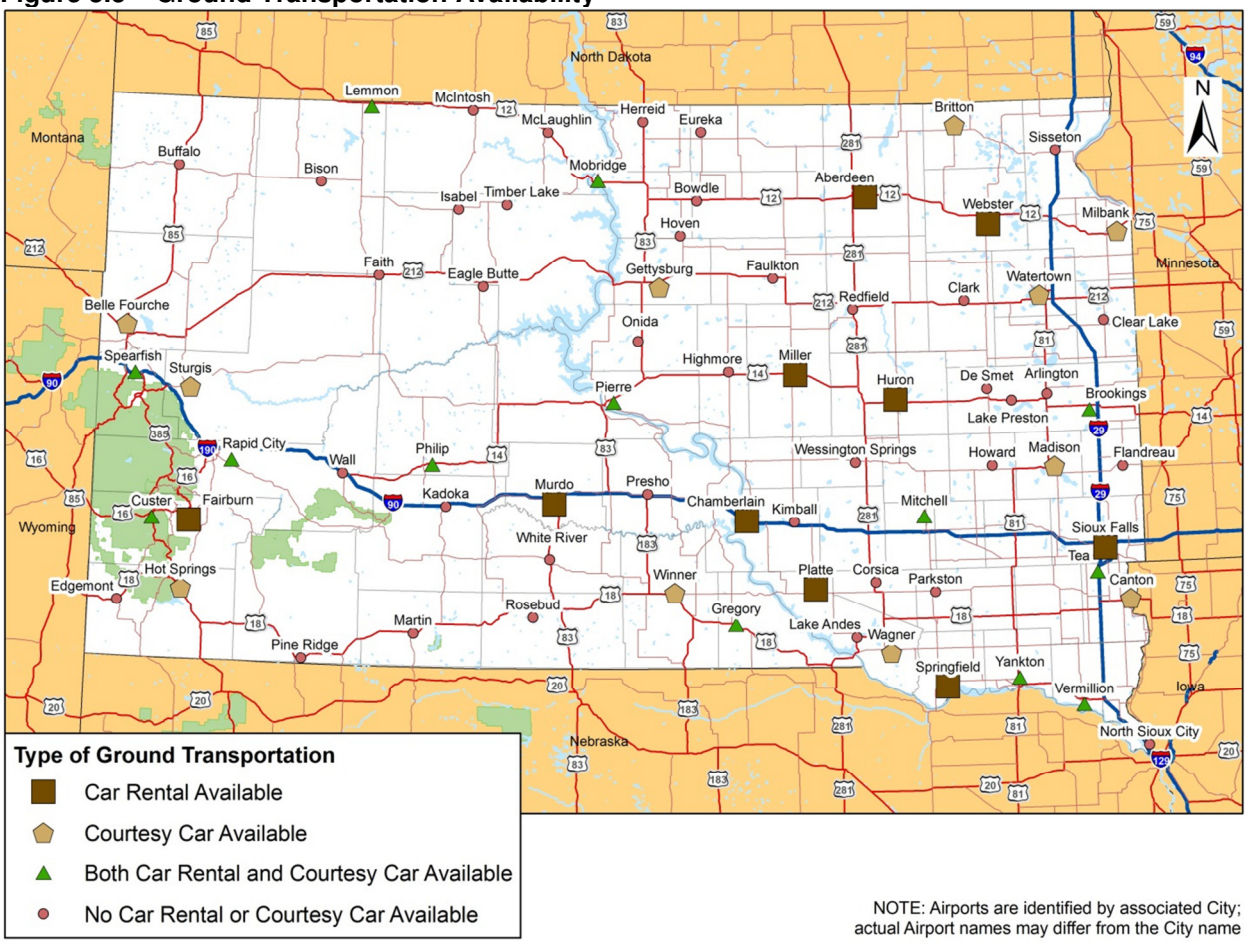
Often the final destination for passengers is not the airport itself, therefore the provision of vehicular transportation is critical for users to reach their destination(s). Ground transportation can be provided through a rental car service, or the availability of a courtesy car(s) which can be used temporarily. **Table 20** summarizes the availability of ground transportation at airports across the State and indicates that just over half of the airports do not offer ground transportation in any form. **Figure 3.5** illustrates the locations of airports where ground transportation is available.

**Table 20 – Summary of Ground Transportation**

| Type of Ground Transportation | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Car Rental Available | 10 | 13.9% |
| Courtesy Car Available | 11 | 15.3% |
| Both Car Rental and Courtesy Car Available | 13 | 18.1% |
| No Car Rental or Courtesy Car Available | 38 | 52.8% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.5 – Ground Transportation Availability**




Source: Kirkham Michael

### 3.6.c. Food and Beverage

In a terminal facility, the provision of a food and beverage source is preferred to cater to pilots and passengers who may be traveling for long periods of time, or during meal times. As a part of the inventory process, food and beverage availability was cataloged to include restaurants, vending machines, and the sale of food and beverages at airport shops. **Table 21** summarizes the availability of food and beverages at airports within the system; nearly 70 percent (69.4%) of the airports do not offer any type of food and beverage options.

**Table 21 – Food and Beverage Availability**

| Availability of Food/Beverage | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Food & Beverage Available | 22 | 30.6% |
| Food & Beverage Not Available | 50 | 69.4% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.6.d. Internet Access

The availability of internet access at airports is important for pilots, flight crews, and passengers alike, whether they use it to conduct business, pass time waiting for a flight, or to get critical flight-related information including weather and notices to airmen (NOTAMs). **Table 22** summarizes the availability of internet access wirelessly and through a dedicated computer. Two-thirds of airports in the system do not offer internet access in any form.

**Table 22 – Summary of Internet Access Availability**

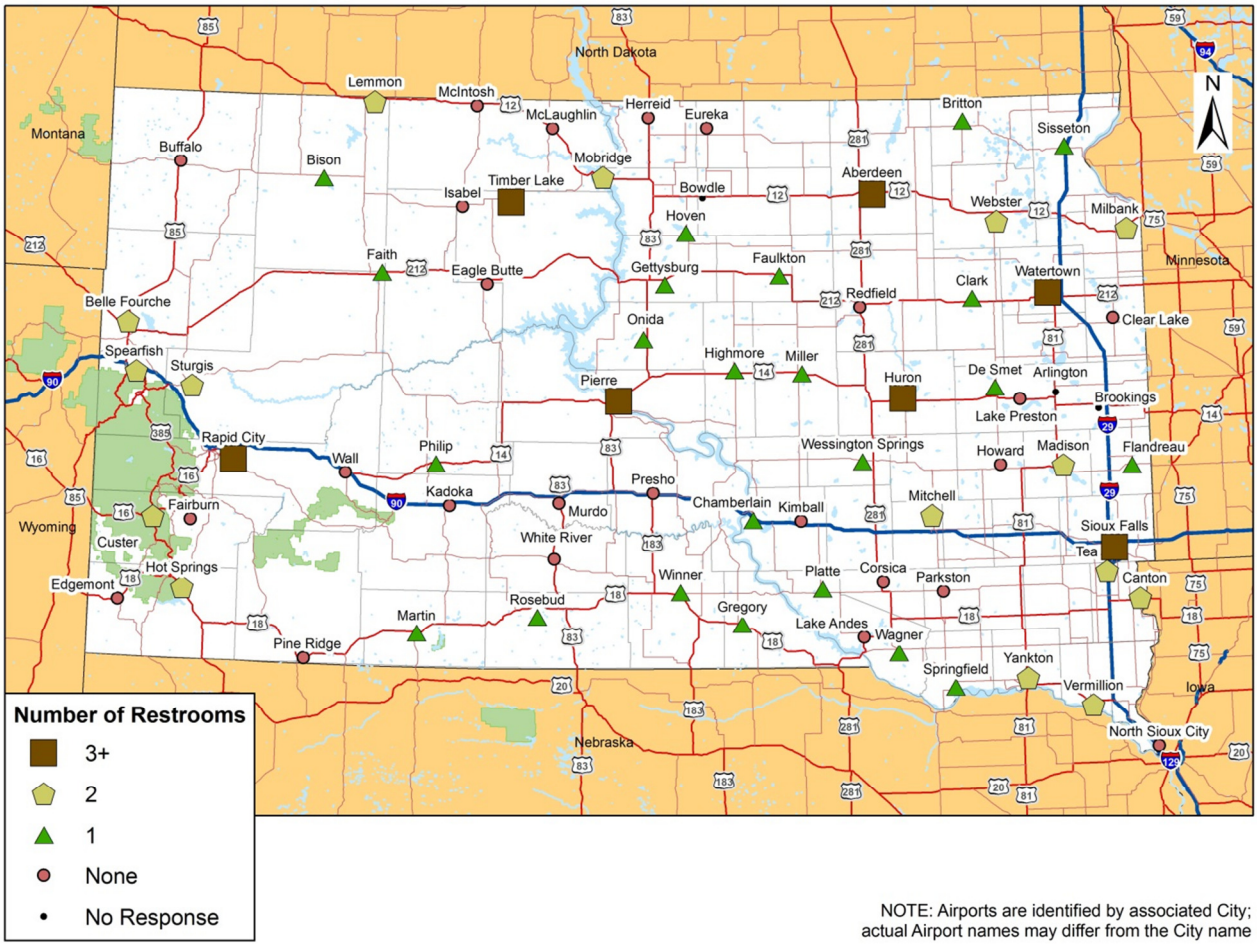
| Form of Internet Access | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Wireless Internet & Dedicated Computer | 12 | 16.7% |
| Dedicated Computer Only | 2 | 2.8% |
| Wireless Internet Only | 10 | 13.9% |
| No Internet Access Available | 48 | 66.7% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.6.e. Restrooms

The availability of restrooms at terminal facilities is often dependent upon the size of the terminal facility and the number of users which may pass through on any given day. Terminal buildings which support commercial service airlines typically have more restrooms than a smaller terminal servicing general aviation pilots. **Table 23** summarizes the availability of restrooms at airports across the State, showing over half of the airports have at least one restroom. **Figure 3.6** illustrates the location and number of restrooms at system airports.

**Figure 3.6 – Restrooms at System Airports**




Source: Kirkham Michael

**Table 23 – Restroom Summary**

| Number of Restrooms | Number of System Airports | Percentage of System Airports |
|---|---|---|
| 3+ | 7 | 9.7% |
| 2 | 15 | 20.8% |
| 1 | 23 | 31.9% |
| None | 24 | 33.3% |
| No Response | 3 | 4.2% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.6.f. Pilot Areas

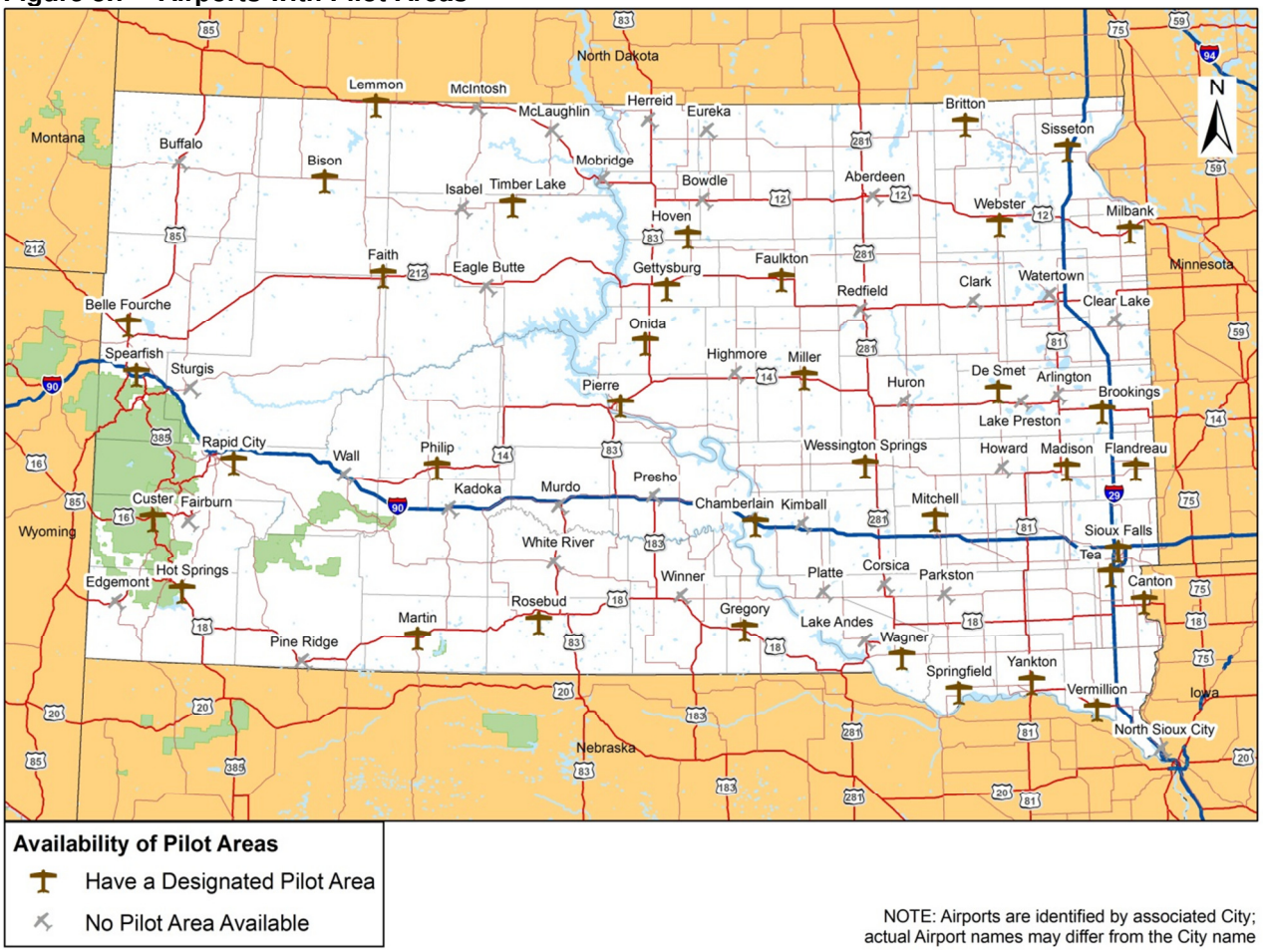
Terminal facilities or Fixed Base Operator (FBO) facilities often have pilot areas where pilots can rest, eat, and prepare for their next flight. These areas may include couches, chairs, TVs, computers, printers, desks, and/or kitchen areas. **Table 24** summarizes the availability of pilot areas, indicating that just over half of airports in the system have a designated pilot area as illustrated in **Figure 3.7**.

**Table 24 – Summary of Pilot Area Availability**

| Availability of Pilot Areas | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Have a Designated Pilot Area | 37 | 51.4% |
| No Pilot Area Available | 35 | 48.6% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.7 – Airports with Pilot Areas**




Source: Kirkham Michael

**Table 25 – Summary of Terminal Building Facilities**

| Associated City | Airport | Structure | Ground Transportation | Food & Beverage | Internet Access | Restrooms | Pilot Area |
|---|---|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | Free standing | Rental | Yes | Wireless | 5 | No |
| **Arlington** | Arlington Municipal | None | None | No | None | NR | No |
| **Belle Fourche** | Belle Fourche Municipal | Attached Hangar | Courtesy Car | Yes | Wireless | 2 | Yes |

**Table 25 – Summary of Terminal Building Facilities**

| Associated City | Airport | Structure | Ground Transportation | Food & Beverage | Internet Access | Restrooms | Pilot Area |
|---|---|---|---|---|---|---|---|
| **Bison** | Bison Municipal | Free standing | None | No | None | 1 | Yes |
| **Bowdle** | Bowdle Municipal | None | None | No | None | NR | No |
| **Britton** | Britton Municipal | Free standing | Courtesy Car | No | None | 1 | Yes |
| **Brookings** | Brookings Regional | Attached hangar | Both | Yes | Dedicated Computer | NR | Yes |
| **Buffalo** | Harding County | None | None | No | None | 0 | No |
| **Canton** | Canton Municipal | Attached hangar | Courtesy Car | No | None | 2 | Yes |
| **Chamberlain** | Chamberlain Municipal | Attached residence | Rental | Yes | None | 1 | Yes |
| **Clark** | Clark County | Free standing | None | No | None | 1 | No |
| **Clear Lake** | Clear Lake Municipal | None | None | No | None | 0 | No |
| **Corsica** | Corsica Municipal | None | None | No | None | 0 | No |
| **Custer** | Custer County | Free standing | Both | Yes | Both | 2 | Yes |
| **De Smet** | Wilder | Free standing | None | No | None | 1 | Yes |
| **Eagle Butte** | Cheyenne Eagle Butte | Free standing | None | No | None | 0 | No |
| **Edgemont** | Edgemont Municipal | Free standing | None | No | None | 0 | No |
| **Eureka** | Eureka Municipal | None | None | No | None | 0 | No |
| **Fairburn** | Custer State Park | None | Rental | No | None | 0 | No |
| **Faith** | Faith Municipal | Attached hangar | None | No | None | 1 | Yes |
| **Faulkton** | Faulkton Municipal | None | None | No | None | 1 | Yes |
| **Flandreau** | Flandreau Municipal | Attached hangar | None | No | None | 1 | Yes |
| **Gettysburg** | Gettysburg Municipal | Free standing | Courtesy Car | No | Both | 1 | Yes |
| **Gregory** | Gregory Municipal Airport/Flynn Field | Free standing | Both | No | Both | 1 | Yes |
| **Herreid** | Herreid Municipal | None | None | No | None | 0 | No |
| **Highmore** | Highmore Municipal | None | None | No | None | 1 | No |
| **Hot Springs** | Hot Springs Municipal | Free standing | Courtesy Car | Yes | Both | 2 | Yes |
| **Hoven** | Hoven Municipal | Free standing | None | No | None | 1 | Yes |
| **Howard** | Howard Municipal | None | None | No | None | 0 | No |
| **Huron** | Huron Regional | Free standing | Rental | Yes | Wireless | 4 | No |
| **Isabel** | Isabel Municipal | None | None | No | None | 0 | No |
| **Kadoka** | Kadoka Municipal | None | None | No | None | 0 | No |
| **Kimball** | Kimball Municipal | None | None | No | None | 0 | No |
| **Lake Andes** | Lake Andes Municipal | None | None | No | None | 0 | No |
| **Lake Preston** | Lake Preston Municipal | Attached hangar | None | No | None | 0 | No |
| **Lemmon** | Lemmon Municipal | Attached hangar | Both | No | Wireless | 2 | Yes |
| **Madison** | Madison Municipal | Attached hangar | Courtesy Car | Yes | Both | 2 | Yes |
| **Martin** | Martin Municipal | None | None | No | None | 1 | Yes |

**Table 25 – Summary of Terminal Building Facilities**

| Associated City | Airport | Structure | Ground Transportation | Food & Beverage | Internet Access | Restrooms | Pilot Area |
|---|---|---|---|---|---|---|---|
| **McIntosh** | McIntosh Municipal | None | None | No | None | 0 | No |
| **McLaughlin** | McLaughlin Municipal | None | None | No | None | 0 | No |
| **Milbank** | Milbank Municipal | Free standing | Courtesy Car | Yes | None | 2 | Yes |
| **Miller** | Miller Municipal | Free standing | Rental | Yes | Wireless | 1 | Yes |
| **Mitchell** | Mitchell Municipal | Free standing | Both | Yes | Both | 2 | Yes |
| **Mobridge** | Mobridge Municipal | Attached hangar | Both | Yes | Both | 2 | No |
| **Murdo** | Murdo Municipal | None | Rental | No | None | 0 | No |
| **N. Sioux City** | Graham Field | None | None | No | None | 0 | No |
| **Onida** | Onida Municipal | Free standing | None | No | None | 1 | Yes |
| **Parkston** | Parkston Municipal | None | None | No | None | 1 | No |
| **Philip** | Philip | Attached hangar | Both | No | None | 1 | Yes |
| **Pierre** | Pierre Regional | Free standing | Both | Yes | Wireless | 3 | Yes |
| **Pine Ridge** | Pine Ridge | None | None | No | None | 0 | No |
| **Platte** | Platte Municipal | Free standing | Rental | No | None | 1 | No |
| **Presho** | Presho Municipal | None | None | No | None | 0 | No |
| **Rapid City** | Rapid City Regional | Free standing | Both | Yes | Both | 4 | Yes |
| **Redfield** | Redfield Municipal | None | None | No | None | 0 | No |
| **Rosebud** | Rosebud Sioux Tribal Airport | Free standing | None | No | None | 1 | Yes |
| **Sioux Falls** | Joe Foss Field | Free standing | Rental | Yes | Wireless | 6 | Yes |
| **Sisseton** | Sisseton Municipal | Free standing | None | No | None | 1 | Yes |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | Attached hangar | Both | Yes | Wireless | 2 | Yes |
| **Springfield** | Springfield Municipal | None | Rental | No | None | 1 | Yes |
| **Sturgis** | Sturgis Municipal | Attached hangar | Courtesy Car | No | Wireless | 2 | No |
| **Tea** | Marv-Skie Lincoln County Airport | Free standing | Both | Yes | Dedicated Computer | 2 | Yes |
| **Timber Lake** | Timber Lake Municipal | Attached hangar | None | No | Wireless | 3 | Yes |
| **Vermillion** | Harold Davidson Field | Free standing | Both | Yes | Both | 2 | Yes |
| **Wagner** | Wagner Municipal | Attached hangar | Courtesy Car | Yes | None | 1 | Yes |
| **Wall** | Wall Municipal | None | None | No | None | 0 | No |
| **Watertown** | Watertown Regional | Free standing | Courtesy Car | Yes | Both | 3 | No |
| **Webster** | The Sigurd Andersen | Free standing | Rental | No | None | 2 | Yes |
| **Wessington Springs** | Wessington Springs | Free standing | None | No | None | 1 | Yes |
| **White River** | White River Municipal | None | None | No | None | 0 | No |
| **Winner** | Winner Regional | Attached hangar | Courtesy Car | Yes | Both | 1 | No |
| **Yankton** | Chan Gurney Municipal | Free standing | Both | Yes | Both | 2 | Yes |

Source: 2009/10 Survey Data
NR = No Response

## 3.7 Services

The availability of services in an aviation system is important for the continued operation and maintenance of aviation facilities. The South Dakota system offers a wide variety of services at airports depending on the function of a particular airport and the needs of its users. Typically airports that serve a larger user base or commercial service operators will have a greater variety of services available than smaller general aviation airports that have a more limited user base. The following sections summarize the availability of a variety of services across the State. Airport-specific services can be found in **Table 35** and **Table 36**.

### 3.7.a. Airport Operation Hours

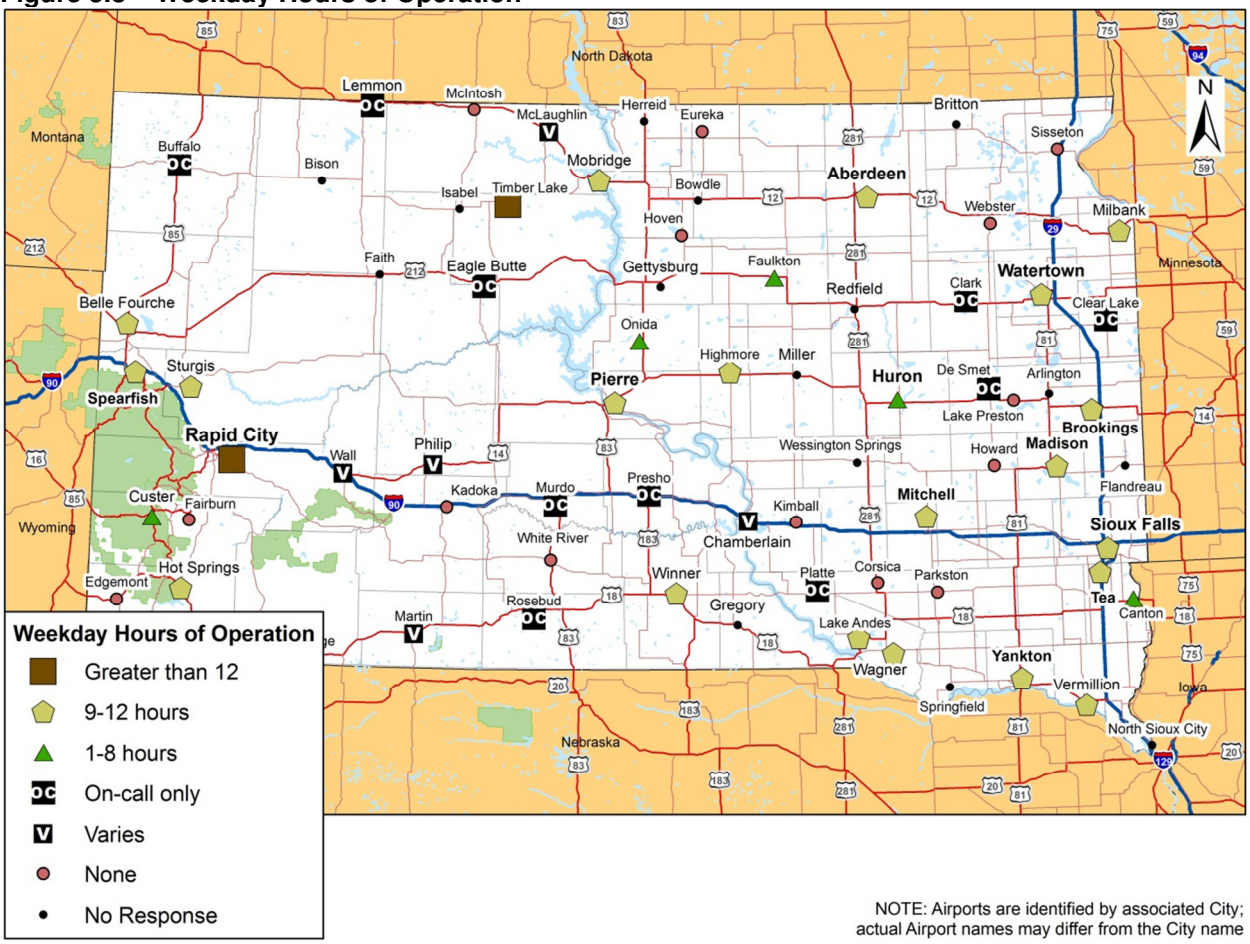
The availability of airport staff or Fixed Base Operator (FBO) staff is important for users as they can assist in answering questions, providing service, and responding to requests. Both weekday and weekend hours of operation were cataloged and are summarized in **Table 26.** Nearly 20 percent (19.4%) of airports do not have staff available during the week, while 30 percent (30.5%) do not have staff available during the weekend. **Figure 3.8** and **Figure 3.9** illustrate the hours of operation at airports in the system.

**Table 26 – Summary of Airport Operation Hours**

| Weekday Hours of Operation | | | Weekend Hours of Operation | | |
|---|---|---|---|---|---|
| **Hours** | **# of Airports** | **% of Airports** | **Hours** | **# of Airports** | **% of Airports** |
| Greater than 12 | 2 | 2.7% | Greater than 12 | 3 | 4.2% |
| 9-12 | 20 | 27.8% | 9-12 | 5 | 5.6% |
| 1-8 hours | 5 | 6.9% | 1-8 hours | 3 | 4.2% |
| On-call only | 10 | 13.9% | On-call only | 17 | 23.6% |
| Varies | 5 | 6.9% | Varies | 5 | 6.9% |
| None | 14 | 19.4% | None | 22 | 30.5% |
| No Response | 16 | 22.2% | No Response | 17 | 30.5% |
| **TOTAL** | **72** | **100%** | **TOTAL** | **72** | **100%** |

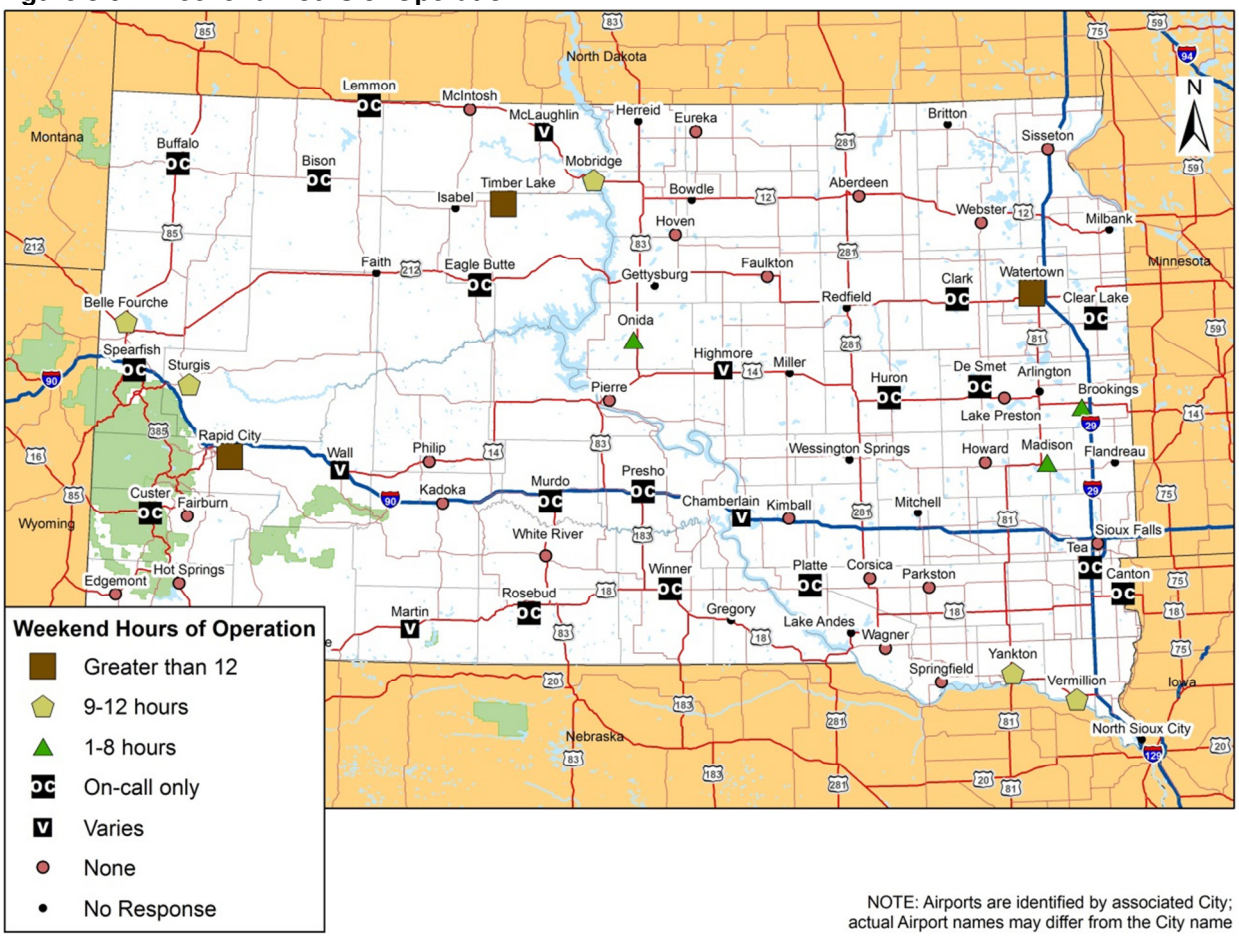
Source: 2009/10 Survey Data

**Figure 3.8 – Weekday Hours of Operation**




Source: Kirkham Michael

**Figure 3.9 – Weekend Hours of Operation**




Source: Kirkham Michael

### 3.7.b. Fuel Type and Availability

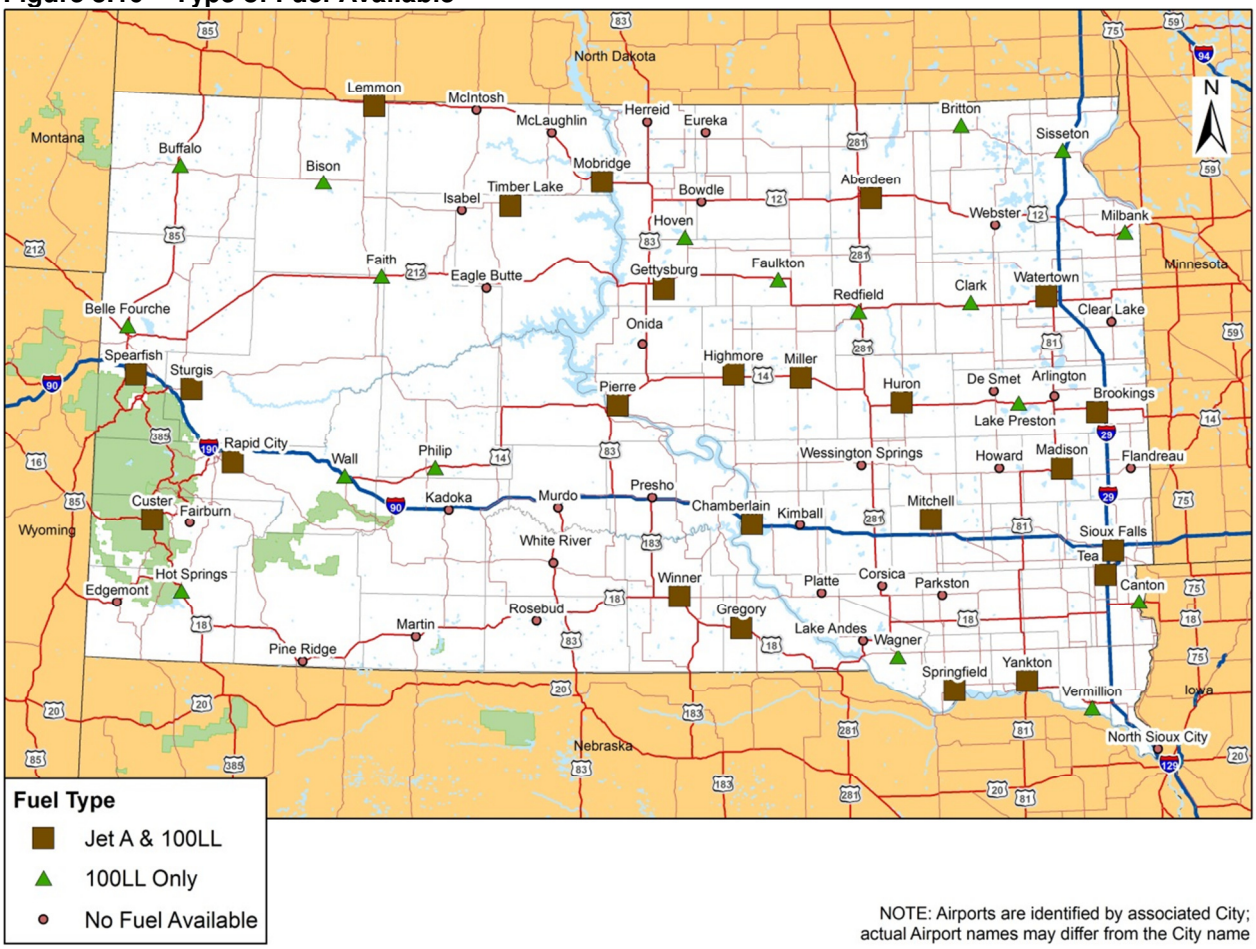
An essential service for aircraft operation is the availability of aircraft fueling facilities. **Table 27** and **Table 28** summarize the fuel type and hours of availability at system airports. Nearly 60 percent (58.3%) of the airports have at least 100LL fuel available, while one-third offer fueling 24 hours a day. Fuel types and hours of fuel availability at each airport are illustrated in **Figure 3.10** and **Figure 3.11**.

**Table 27 – Summary of Fuel Type**

| Fuel Type | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Jet A & 100LL | 24 | 33.3% |
| 100LL Only | 18 | 25.0% |
| No Fuel Available | 30 | 41.7% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.10 – Type of Fuel Available**



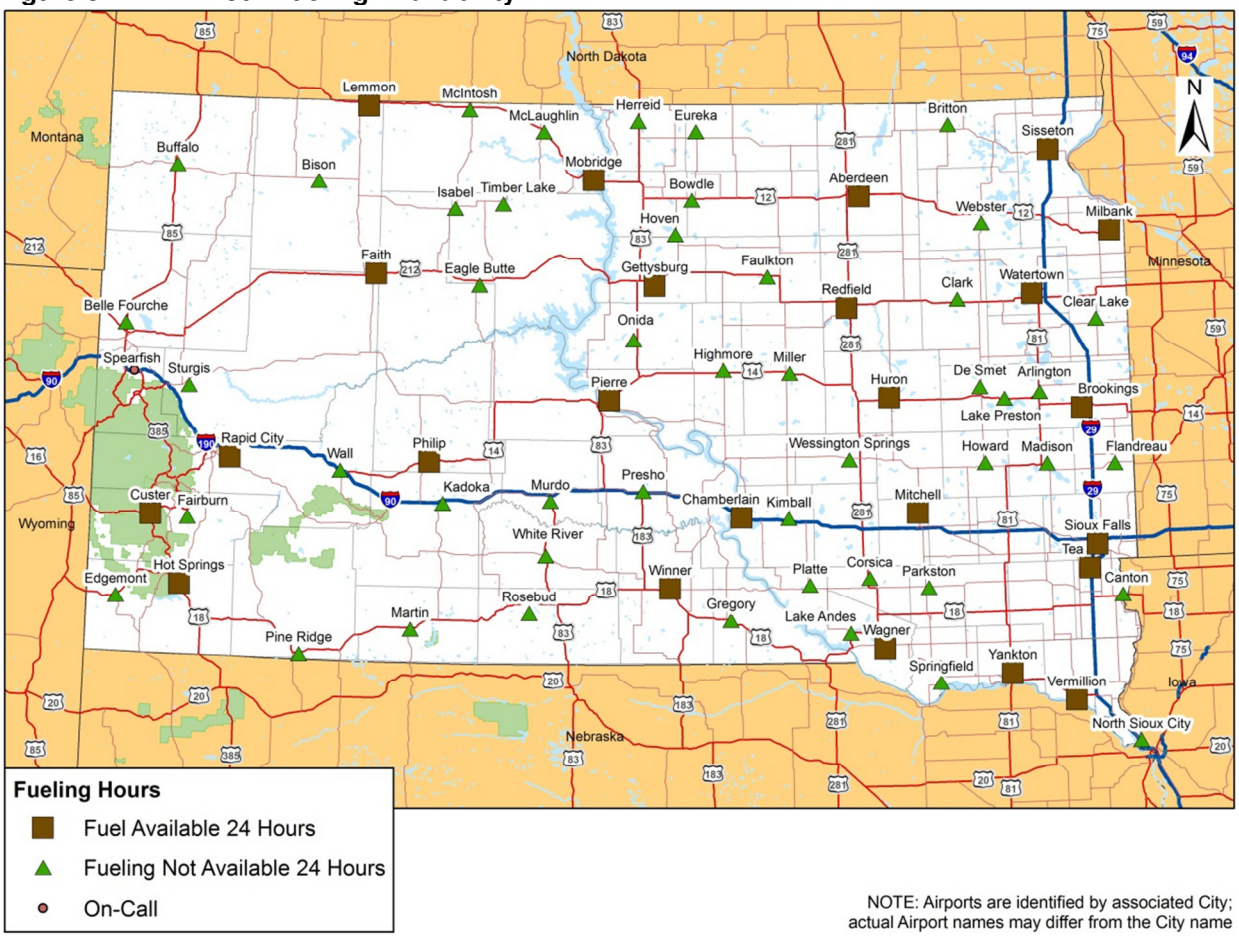

Source: Kirkham Michael

**Table 28 – Summary of Fueling Hours**

| Fueling Hours | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Fuel Available 24 Hours | 24 | 33.3% |
| Fueling Not Available 24 Hours | 47 | 65.3% |
| On-Call | 1 | 1.4% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.11 – 24 Hour Fueling Availability**




Source: Kirkham Michael

### 3.7.c. Snow Removal

In order to keep runways open during winter months, the availability of snow removal equipment and the capability of personnel to clear the runways are critical. Typical winter weather in South Dakota can produce varying amounts of snow, therefore snow removal is important for the operation of aircraft both locally, and for itinerant flights. **Table 29** indicates the majority of system airports have snow removal capability.

**Table 29 – Summary of Snow Removal**

| Snow Removal Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Snow Removal Available | 61 | 84.7% |
| No Snow Removal Available | 9 | 12.5% |
| No Response | 2 | 2.8% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.7.d. Rental Aircraft

The availability of rental aircraft at system airports supports pilots who do not own their own aircraft, as well as students who are learning to become pilots. Since aircraft are costly to purchase, the option of

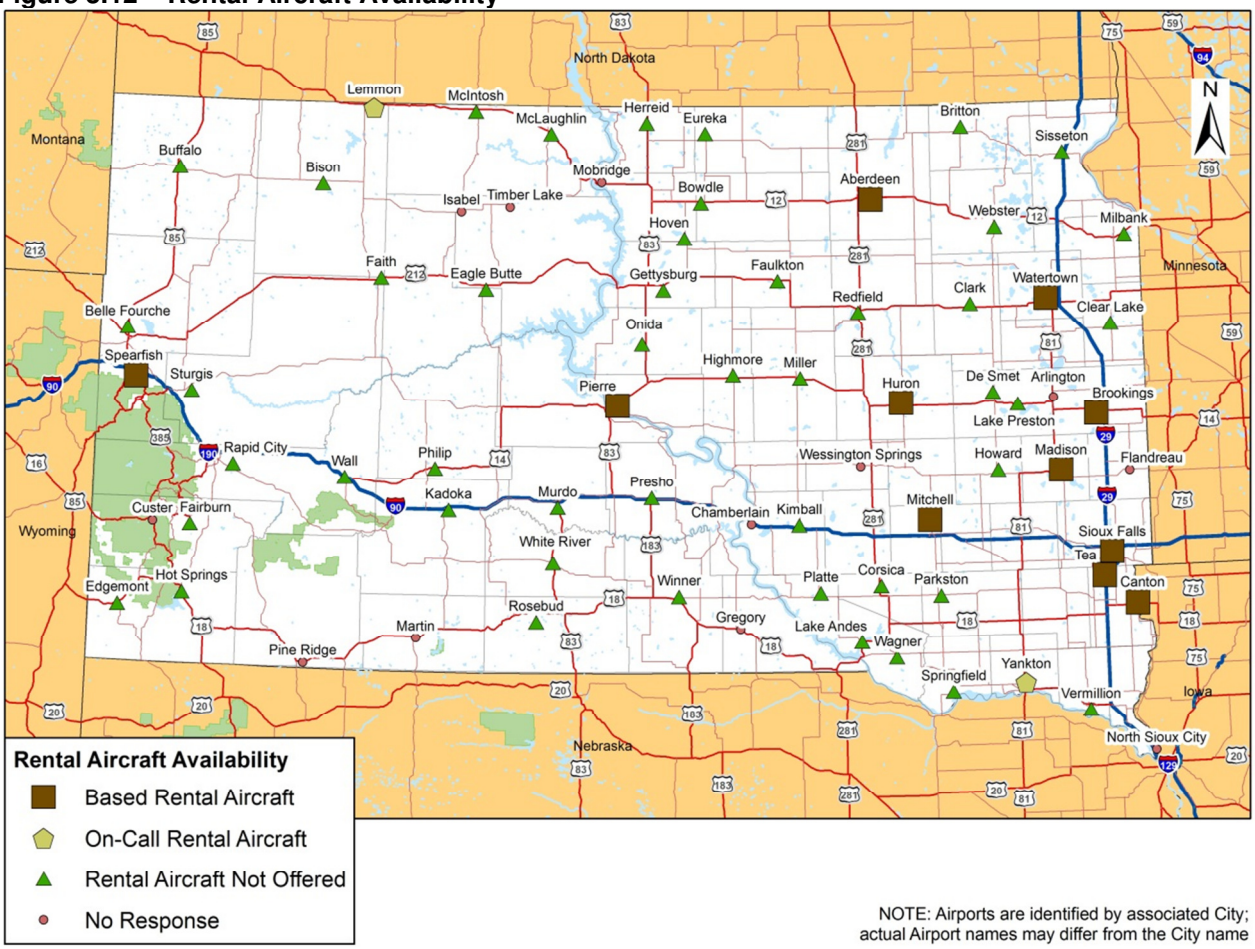
renting aircraft provides an alternative for pilots to access the air transportation system without having to own their own aircraft. Furthermore, students in flight school need to have access to rental aircraft to train in. **Table 30** shows that just over 18 percent of the airports offer either based rental aircraft or have access to rental aircraft on an on-call basis. **Figure 3.12** illustrates rental aircraft availability at airports across the State.

**Table 30 – Summary of Rental Aircraft Availability**

| Rental Aircraft Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Based Rental Aircraft | 11 | 15.3% |
| On-Call Rental Aircraft | 2 | 2.8% |
| Rental Aircraft Not Offered | 47 | 65.3% |
| No Response | 12 | 16.7% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.12 – Rental Aircraft Availability**




Source: Kirkham Michael

### 3.7.e. Flight Instruction

Offering flight instruction at airports often contributes to the growth of the aviation community by educating the next generation of pilots, both recreational and professional. Flight instruction, if available,

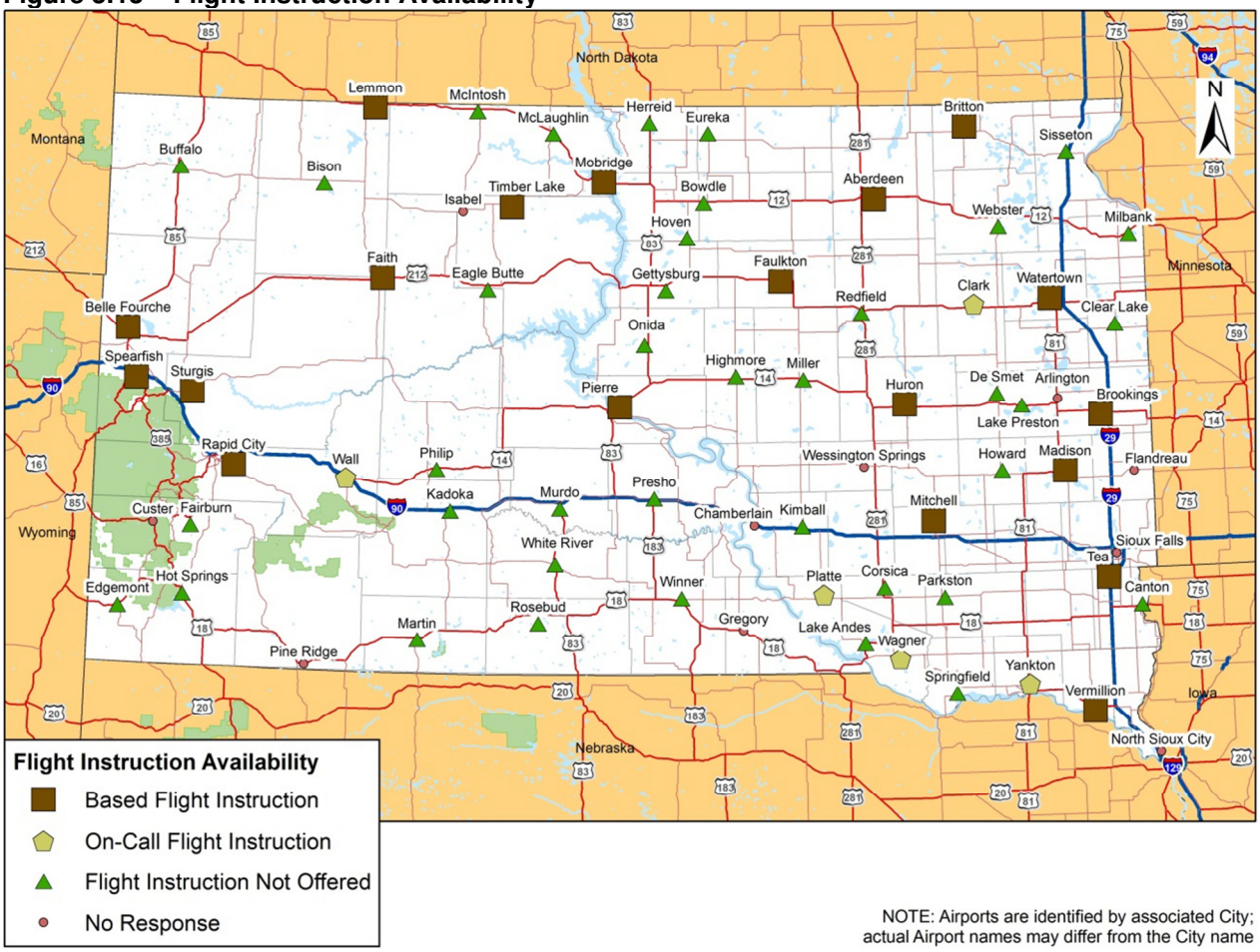
is typically based at an airport or available on an on-call basis. **Table 31** indicates that just over half of the airports in the system do not offer flight instruction, while **Figure 3.13** identifies airports which do provide flight instruction.

**Table 31 – Summary of Flight Instruction Availability**

| Flight Instruction Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Based Flight Instruction | 19 | 26.4% |
| On-Call Flight Instruction | 5 | 6.9% |
| Flight Instruction Not Offered | 38 | 52.8% |
| No Response | 10 | 13.9% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.13 – Flight Instruction Availability**




Source: Kirkham Michael

### 3.7.f. Aircraft Maintenance and Repair

The provision of aircraft maintenance and repair services is vital to the system in order to keep aircraft airworthy for operation. Whether it be a minor repair, or a major overhaul of aircraft engines, offering maintenance and repair services at airports supports the continued operation of aircraft. **Table 32**

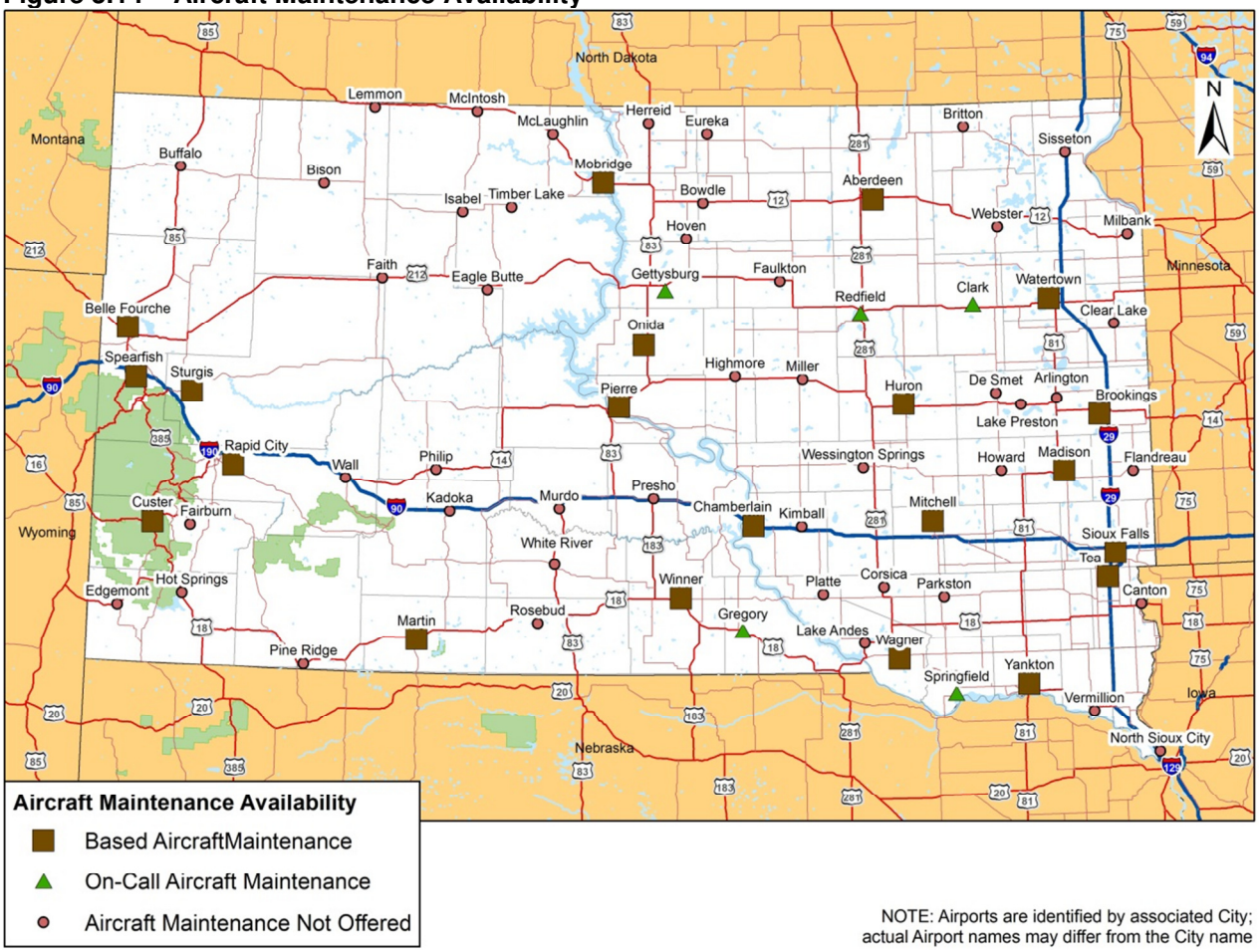
summarizes the availability and type of aircraft maintenance and repair services at airports within the system. Over half (63.9%) of the airports do not offer aircraft maintenance either based, or on-call as illustrated in **Figure 3.14**.

**Table 32 – Summary of Aircraft Maintenance Availability**

| Aircraft Maintenance Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Based Aircraft Maintenance | 21 | 29.2% |
| On-Call Aircraft Maintenance | 5 | 6.9% |
| Aircraft Maintenance Not Offered | 46 | 63.9% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.14 – Aircraft Maintenance Availability**




Source: Kirkham Michael

### 3.7.g. Charter Service

Charter service is often used by businesses and individuals who need an efficient method of air transportation without using commercial service. The availability of charter service provides on-demand

air service for passengers and cargo. **Table 33** provides a breakdown of charter service availability which indicates that the majority of system airports do not offer charter service.

**Table 33 – Summary of Charter Service Availability**

| Charter Service Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Based Charter Service | 10 | 13.9% |
| On-Call Charter Service | 3 | 4.2% |
| Charter Service Not Offered | 51 | 70.8% |
| No Response | 8 | 11.1% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.7.h. Weather Reporting

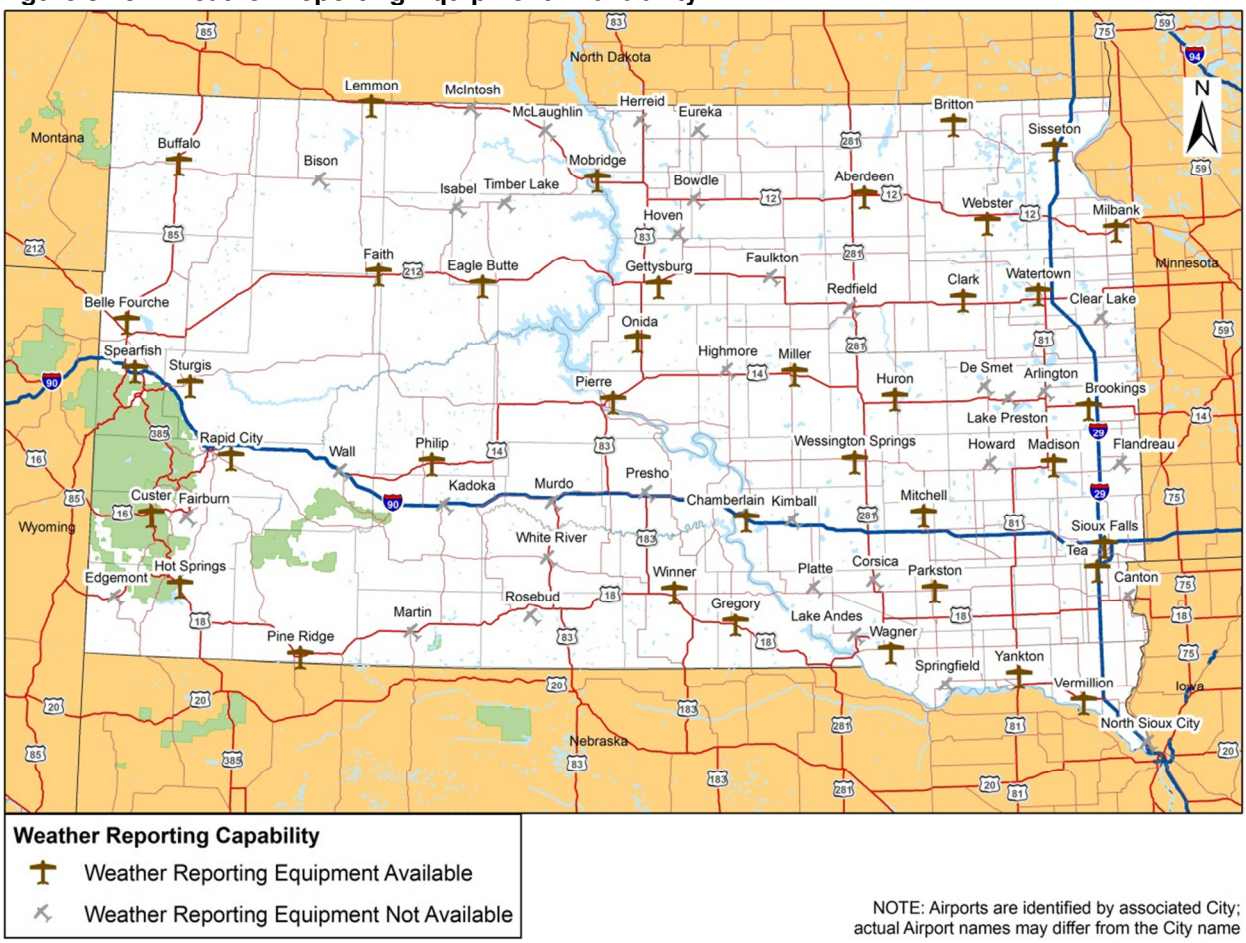
The provision of weather reporting equipment at system airports makes flight planning convenient and provides accurate up to the minute information to pilots while in the air and while planning routes before a flight. **Table 34** illustrates the availability of weather reporting equipment at public use airports in the State. Just over half (52.8%) of system airports are equipped with weather reporting capabilities, as illustrated in **Figure 3.15**.

**Table 34 – Summary of Weather Reporting Capability**

| Weather Reporting Capability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Weather Reporting Equipment | 38 | 52.8% |
| Weather Reporting Equipment Not Available | 34 | 47.2% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.15 – Weather Reporting Equipment Availability**




Source: Kirkham Michael

**Table 35 – Summary of Services 1**

| Associated City | Airport | Weekday Hours | Weekend Hours | Fuel Type | Fuel Availability | Snow Removal |
|---|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | 9 | None | Both | Yes | Yes |
| **Arlington** | Arlington Municipal | NR | NR | None | No | No |
| **Belle Fourche** | Belle Fourche Municipal | 12 | 12 | 100LL | No | Yes |
| **Bison** | Bison Municipal | NR | On-call | 100LL | No | Yes |
| **Bowdle** | Bowdle Municipal | NR | NR | None | No | No |
| **Britton** | Britton Municipal | 9 | 6 | 100LL | No | Yes |
| **Brookings** | Brookings Regional | On-call | On-call | Both | Yes | Yes |
| **Buffalo** | Harding County | 9 | Varies | 100LL | No | Yes |
| **Canton** | Canton Municipal | 8 | On-call | 100LL | No | Yes |
| **Chamberlain** | Chamberlain Municipal | Varies | Varies | Both | Yes | Yes |
| **Clark** | Clark County | None | None | 100LL | No | Yes |
| **Clear Lake** | Clear Lake Municipal | 8 | On-call | None | No | No |
| **Corsica** | Corsica Municipal | On-call | On-call | None | No | Yes |
| **Custer** | Custer County | On-call | On-call | Both | Yes | Yes |
| **De Smet** | Wilder Airport | 9 | On-call | None | No | Yes |

**Table 35 – Summary of Services 1**

| Associated City | Airport | Weekday Hours | Weekend Hours | Fuel Type | Fuel Availability | Snow Removal |
|---|---|---|---|---|---|---|
| **Eagle Butte** | Cheyenne Eagle Butte | On-call | On-call | None | No | Yes |
| **Edgemont** | Edgemont Municipal | None | None | None | No | Yes |
| **Eureka** | Eureka Municipal | None | None | None | No | NR |
| **Fairburn** | Custer State Park | None | None | None | No | Yes |
| **Faith** | Faith Municipal | NR | NR | 100LL | Yes | Yes |
| **Faulkton** | Faulkton Municipal | 1 | None | 100LL | No | Yes |
| **Flandreau** | Flandreau Municipal | NR | NR | None | No | Yes |
| **Gettysburg** | Gettysburg Municipal | NR | NR | Both | Yes | Yes |
| **Gregory** | Gregory Municipal Airport/Flynn Field | NR | NR | Both | No | Yes |
| **Herreid** | Herreid Municipal | None | None | None | No | Yes |
| **Highmore** | Highmore Municipal | None | None | Both | No | Yes |
| **Hot Springs** | Hot Springs Municipal | 8 | On-call | 100LL | Yes | Yes |
| **Hoven** | Hoven Municipal | NR | NR | 100LL | No | Yes |
| **Howard** | Howard Municipal | None | None | None | No | No |
| **Huron** | Huron Regional | None | None | Both | Yes | Yes |
| **Isabel** | Isabel Municipal | 9 | NR | None | No | No |
| **Kadoka** | Kadoka Municipal | On-call | On-call | None | No | Yes |
| **Kimball** | Kimball Municipal | 9 | 8 | None | No | No |
| **Lake Andes** | Lake Andes Municipal | Varies | Varies | None | No | Yes |
| **Lake Preston** | Lake Preston Municipal | None | None | 100LL | No | No |
| **Lemmon** | Lemmon Municipal | Varies | Varies | Both | Yes | Yes |
| **Madison** | Madison Municipal | 9 | NR | Both | No | Yes |
| **Martin** | Martin Municipal | NR | NR | None | No | Yes |
| **McIntosh** | McIntosh Municipal | 9 | NR | None | No | No |
| **McLaughlin** | McLaughlin Municipal | 10 | 10 | None | No | Yes |
| **Milbank** | Milbank Municipal | On-call | On-call | 100LL | Yes | Yes |
| **Miller** | Miller Municipal | NR | NR | Both | No | Yes |
| **Mitchell** | Mitchell Municipal | 8 | 8 | Both | Yes | Yes |
| **Mobridge** | Mobridge Municipal | None | None | Both | Yes | Yes |
| **Murdo** | Murdo Municipal | Varies | None | None | No | Yes |
| **N. Sioux City** | Graham Field | NR | NR | None | No | NR |
| **Onida** | Onida Municipal | 8+ | None | None | No | Yes |
| **Parkston** | Parkston Municipal | NR | NR | None | No | Yes |
| **Philip** | Philip | On-call | On-call | 100LL | Yes | Yes |
| **Pierre** | Pierre Regional | On-call | On-call | Both | Yes | Yes |
| **Pine Ridge** | Pine Ridge | 24-7 | 24-7 | None | No | Yes |
| **Platte** | Platte Municipal | NR | NR | None | No | Yes |
| **Presho** | Presho Municipal | 9 | None | None | No | Yes |
| **Rapid City** | Rapid City Regional | None | None | Both | Yes | Yes |
| **Redfield** | Redfield Municipal | 9 | On-call | 100LL | Yes | Yes |
| **Rosebud** | Rosebud Sioux Tribal Airport | NR | None | None | No | Yes |
| **Sioux Falls** | Joe Foss Field | None | None | Both | Yes | Yes |
| **Sisseton** | Sisseton Municipal | 9 | 9 | 100LL | Yes | Yes |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | NR | NR | Both | On-call | Yes |

**Table 35 – Summary of Services 1**

| Associated City | Airport | Weekday Hours | Weekend Hours | Fuel Type | Fuel Availability | Snow Removal |
|---|---|---|---|---|---|---|
| **Springfield** | Springfield Municipal | 9 | On-call | Both | No | Yes |
| **Sturgis** | Sturgis Municipal | 24-7 | 24-7 | Both | No | Yes |
| **Tea** | Marv-Skie Lincoln County Airport | On-call | On-call | Both | Yes | Yes |
| **Timber Lake** | Timber Lake Municipal | 10 | None | Both | No | No |
| **Vermillion** | Harold Davidson Field | 9 | None | 100LL | Yes | Yes |
| **Wagner** | Wagner Municipal | Varies | Varies | 100LL | Yes | Yes |
| **Wall** | Wall Municipal | 9 | 13 | 100LL | No | Yes |
| **Watertown** | Watertown Regional | None | None | Both | Yes | Yes |
| **Webster** | The Sigurd Andersen | 9 | 9 | None | No | Yes |
| **Wessington Springs** | Wessington Springs | NR | NR | None | No | Yes |
| **White River** | White River Municipal | None | None | None | No | Yes |
| **Winner** | Winner Regional | 9 | 9 | Both | Yes | Yes |
| **Yankton** | Chan Gurney Municipal | On-call | On-call | Both | Yes | Yes |

Source: 2009/10 Survey Data
NR = No Response

**Table 36 – Summary of Services 2**

| Associated City | Airport | Rental Aircraft | Flight Instruction | Aircraft Maintenance | Charter | Weather Reporting |
|---|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | Based | Based | Based | Based | Yes |
| **Arlington** | Arlington Municipal | NR | NR | Not offered | NR | No |
| **Belle Fourche** | Belle Fourche Municipal | Not offered | Based | Based | Not offered | Yes |
| **Bison** | Bison Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Bowdle** | Bowdle Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Britton** | Britton Municipal | Not offered | Based | Not offered | Not offered | Yes |
| **Brookings** | Brookings Regional | If in SDSU flight program | Based | Based | On-call | Yes |
| **Buffalo** | Harding County | Not offered | Not offered | Not offered | Not offered | Yes |
| **Canton** | Canton Municipal | Based | Not offered | Not offered | Not offered | No |
| **Chamberlain** | Chamberlain Municipal | NR | NR | Based | NR | Yes |
| **Clark** | Clark County | Not offered | On-call | On-call | Not offered | Yes |
| **Clear Lake** | Clear Lake Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Corsica** | Corsica Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Custer** | Custer County | NR | NR | Based | NR | Yes |
| **De Smet** | Wilder | Not offered | Not offered | Not offered | Not offered | No |
| **Eagle Butte** | Cheyenne Eagle Butte | Not offered | Not offered | Not offered | Not offered | Yes |
| **Edgemont** | Edgemont Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Eureka** | Eureka Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Fairburn** | Custer State Park | Not offered | Not offered | Not offered | Not offered | No |
| **Faith** | Faith Municipal | Not offered | Based | Not offered | Not offered | Yes |
| **Faulkton** | Faulkton Municipal | Not offered | Based | Not offered | Not offered | No |
| **Flandreau** | Flandreau Municipal | NR | NR | Not offered | NR | No |
| **Gettysburg** | Gettysburg Municipal | Not offered | Not offered | On-call | Not offered | Yes |

**Table 36 – Summary of Services 2**

| Associated City | Airport | Rental Aircraft | Flight Instruction | Aircraft Maintenance | Charter | Weather Reporting |
|---|---|---|---|---|---|---|
| **Gregory** | Gregory Municipal Airport/Flynn Field | NR | NR | On-call | NR | Yes |
| **Herreid** | Herreid Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Highmore** | Highmore Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Hot Springs** | Hot Springs Municipal | Not offered | Not offered | Not offered | Not offered | Yes |
| **Hoven** | Hoven Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Howard** | Howard Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Huron** | Huron Regional | Based | Based | Based | Based | Yes |
| **Isabel** | Isabel Municipal | NR | NR | Not offered | Not offered | No |
| **Kadoka** | Kadoka Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Kimball** | Kimball Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Lake Andes** | Lake Andes Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Lake Preston** | Lake Preston Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Lemmon** | Lemmon Municipal | On-call | Based | Not offered | NR | Yes |
| **Madison** | Madison Municipal | Based | Based | Based | On-call | Yes |
| **Martin** | Martin Municipal | NR | Not offered | Based | Not offered | No |
| **McIntosh** | McIntosh Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **McLaughlin** | McLaughlin Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Milbank** | Milbank Municipal | Not offered | Not offered | Not offered | Not offered | Yes |
| **Miller** | Miller Municipal | Not offered | Not offered | Not offered | Not offered | Yes |
| **Mitchell** | Mitchell Municipal | Based | Based | Based | Based | Yes |
| **Mobridge** | Mobridge Municipal | NR | Based | Based | NR | Yes |
| **Murdo** | Murdo Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **N. Sioux City** | Graham Field | NR | NR | Not offered | NR | No |
| **Onida** | Onida Municipal | Not offered | Not offered | Based | Not offered | Yes |
| **Parkston** | Parkston Municipal | Not offered | Not offered | Not offered | Not offered | Yes |
| **Philip** | Philip | Not offered | Not offered | Not offered | Not offered | Yes |
| **Pierre** | Pierre Regional | Based | Based | Based | Based | Yes |
| **Pine Ridge** | Pine Ridge | NR | NR | Not offered | Not offered | Yes |
| **Platte** | Platte Municipal | Not offered | On-call | Not offered | Not offered | No |
| **Presho** | Presho Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Rapid City** | Rapid City Regional | Not offered | Based | Based | Based | Yes |
| **Redfield** | Redfield Municipal | Not offered | Not offered | On-call | Not offered | No (On hold) |
| **Rosebud** | Rosebud Sioux Tribal Airport | Not offered | Not offered | Not offered | Not offered | No |
| **Sioux Falls** | Joe Foss Field | Based | NR | Based | Based | Yes |
| **Sisseton** | Sisseton Municipal | Not offered | Not offered | Not offered | Not offered | Yes |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | Based | Based | Based | Based | Yes |
| **Springfield** | Springfield Municipal | Not offered | Not offered | On-call | Not offered | No |
| **Sturgis** | Sturgis Municipal | Not offered | Based | Based | Not offered | Yes |
| **Tea** | Marv-Skie Lincoln County Airport | Based | Based | Based | Based | Yes |
| **Timber Lake** | Timber Lake Municipal | NR | Based | Not offered | Not offered | No |
| **Vermillion** | Harold Davidson Field | Not offered | Based | Not offered | Not offered | Yes |

**Table 36 – Summary of Services 2**

| Associated City | Airport | Rental Aircraft | Flight Instruction | Aircraft Maintenance | Charter | Weather Reporting |
|---|---|---|---|---|---|---|
| **Wagner** | Wagner Municipal | Not offered | On-call | Based | On-call | Yes |
| **Wall** | Wall Municipal | Not offered | On-call | Not offered | Not offered | No |
| **Watertown** | Watertown Regional | Based | Based | Based | Based | Yes |
| **Webster** | The Sigurd Andersen | Not offered | Not offered | Not offered | Not offered | Yes |
| **Wessington Springs** | Wessington Springs | NR | NR | Not offered | Not offered | Yes |
| **White River** | White River Municipal | Not offered | Not offered | Not offered | Not offered | No |
| **Winner** | Winner Regional | Not offered | Not offered | Based | Not offered | Yes |
| **Yankton** | Chan Gurney Municipal | On-call | On-call | Based | Based | Yes |

Source: 2009/10 Survey Data
NR = No Response

## 3.8 Runway Approaches

South Dakota's aviation system is supported through the use of equipment and procedures that provide assistance to pilots when landing. Vertical and horizontal guidance is provided to pilots through the use of approaches so that landings can be conducted at night and during other times of reduced visibility, or in adverse weather conditions. There are different types of runway approaches which typically increase the safety and level of accuracy when landing. The following sections discuss approach types and approach obstructions found at system airports. Airport specific data regarding primary runway approaches and obstructions can be found in **Table 39**.

### 3.8.a. Approach Type

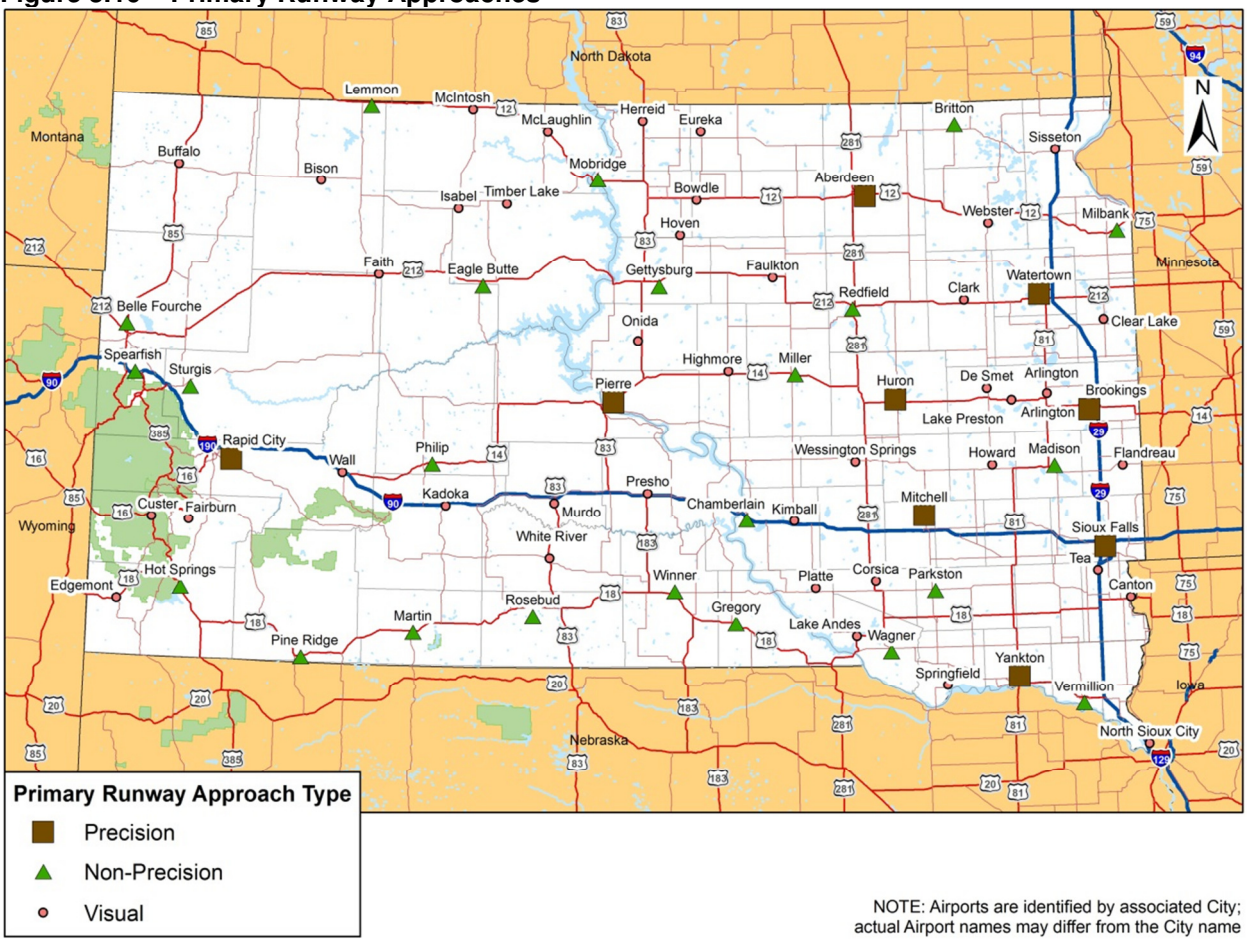
There are three types of runway approaches found at airports in the State, including precision (Instrument Landing System [ILS]), non-precision (Global Positioning System [GPS]), and visual approaches (no instrument landing). Precision and non-precision approaches use landing instrumentation which provides additional guidance for pilots operating in reduced visibility, while visual approaches use no instrumentation and do not provide any additional guidance to pilots. **Table 37** identifies just under half of the airports have at least a non-precision approach, while **Figure 3.16** illustrates the type of approach available at each airport across the State.

**Table 37 – Summary of Primary Runway Approaches**

| Primary Runway Approach | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Precision | 9 | 12.5% |
| Non-Precision | 23 | 31.9% |
| Visual | 40 | 55.5% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.16 – Primary Runway Approaches**




Source: Kirkham Michael

### 3.8.b. Approach Information

Of the 110 runways in the system (220 runway ends), only 14 runway ends have obstructions to their existing approaches, as identified in **Table 38**. The FAA funds several approach surveys each year. The Office of Aeronautics works with the Bismarck Airports District Office (ADO) to select airports to be surveyed. When obstructions are identified, the airport sponsor is notified so the approach may be developed.

**Table 39** includes runway approach information for every runway included in the system. The approach type, published approaches, existing approach slope, obstruction glide slope, controlling obstruction, LPV approach status, and the type of land use found in each approach is included in the table.

**Table 38 – Summary of Approach Obstructions**

| Obstructions | Number of Runway Ends | Percentage of System Airports |
|---|---|---|
| Runway ends with an Obstruction | 14 | 6.4% |
| Runway ends without Obstructions | 206 | 93.6% |
| **Total Runway Ends** | **220** | **100%** |

Source: 2009/10 Survey Data

**Table 39 – Summary of Runway Approaches**

| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| **COMMERCIAL SERVICE AIRPORTS** | | | | | | | | |
| Aberdeen Regional | 13 | Non-Precision | RNAV (GPS) RWY 13<br>LOC/DME BC RWY 13<br>VOR/DME RWY 13 | 34:1 | 34:1 | None | | Comm/Road/WRW |
| | 31 | Precision | ILS RWY 31<br>RNAV (GPS) RWY 31<br>VOR RWY 31<br>NDB RWY 31 | 50:1 | 50:1 | None | Existing | Res/Road/Ag |
| | 17 | Visual | None | 34:1 | 20:1 | None | | Comm/Road/Ag |
| | 35 | Non-Precision | RNAV (GPS) RWY 35 | 34:1 | 34:1 | None | Existing | Road/Ag/WRW |
| Huron Regional | 12 | Precision | ILS OR LOC RWY 12<br>RNAV (GPS) RWY 12<br>VOR RWY 12 | 50:1 | 50:1 | None | | Res/Road/Open/Ag/WRW |
| | 30 | Non-Precision | RNAV (GPS) RWY 30<br>LOC/DME BC RWY 30 | 34:1 | 28:1 | Antenna | Existing | Res/Road/RR/Ag/WRW |
| | 17 | Visual | None | 20:1 | None | None | | Res/Road/Ag/WRW/Golf Course |
| | 35 | Visual | None | 20:1 | None | None | | Res/Comm/Ind/Road/RR/Ag/WRW |
| Pierre Regional | 7 | Non-Precision | RNAV (GPS) RWY 07<br>VOR/DME OR TACAN RWY 07 | 34:1 | 34:1 | Tank | Existing | Res/Comm/Ind/Road/Open |
| | 25 | Non-Precision | RNAV (GPS) RWY 25<br>VOR OR TACAN RWY 25 | 34:1 | 50:1 | None | Existing | Res/Road/Ag |
| | 13 | Non-Precision | RNAV (GPS) RWY 13 | 34:1 | 50:1 | None | Existing | Res/Road/Ag |
| | 31 | Precision | ILS OR LOC RWY 31<br>RNAV (GPS) RWY 31 | 50:1 | 50:1 | None | Existing | Res/Road/Open/WRW |
| Rapid City Regional | 5 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/Open/WRW |
| | 23 | Visual | None | 20:1 | 30:1 | Road | | Road/Open/WRW |
| | 14 | Non-Precision | RNAV (GPS) RWY 14<br>VOR OR TACAN RWY 14 | 34:1 | 50:1 | None | Existing | Res/Road/Ag/Open |
| | 32 | Precision | ILS OR LOC RWY 32<br>RNAV (GPS) RWY 32<br>VOR OR TACAN RWY 32 | 50:1 | 50:1 | None | Existing | Res/Road/Ag/Open/WRW |

**Table 39 – Summary of Runway Approaches**

| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| Joe Foss Field | 3 | Precision | ILS OR LOC RWY 03<br>HI-ILS OR LOC RWY 03<br>RNAV (GPS) RWY 03 | 50:1 | 34:1 | Tree | Existing | Res/Comm/Ind/Road/WRW/Golf Course |
| | 21 | Precision | ILS OR LOC RWY 21<br>HI-ILS RWY 21<br>RNAV (GPS) RWY 21 | 50:1 | 44:1 | Railroad | Existing | Res/Comm/Ind/Road/RR/Ag/WRW |
| | 9 | Non-Precision | RNAV (GPS) RWY 09 | 20:1 | 50:1 | None | | Res/Comm/Ind/Road/Ag |
| | 27 | Non-Precision | RNAV (GPS) RWY 27 | 20:1 | 24:1 | Pole | | Res/Comm/Ind/Road/WRW |
| | 15 | Non-Precision | RNAV (GPS) RWY 15<br>HI-TACAN RWY 15<br>VOR OR TACAN RWY 15 | 34:1 | 27:1 | Fence | Existing | Res/Road/Ag/WRW |
| | 33 | Non-Precision | RNAV (GPS) RWY 33<br>VOR/DME OR TACAN RWY 33 | 34:1 | 32:1 | Tree | Existing | Res/Comm/Ind/Road/RR/WRW |
| Watertown Regional | 12 | Non-Precision | RNAV (GPS) RWY 12 | 34:1 | 27:1 | Tree | Existing | Res/Road/Ag/WRW |
| | 30 | Non-Precision | RNAV (GPS) RWY 30 | 34:1 | 35:1 | Tree | Existing | Res/Comm/Ind/Road/RR/WRW |
| | 17 | Non-Precision | RNAV (GPS) RWY 17<br>LOC/DME BC RWY 17<br>VOR OR TACAN RWY 17 | 34:1 | 50:1 | None | Existing | Res/Road/Ag/WRW |
| | 35 | Precision | ILS OR LOC RWY 35<br>RNAV (GPS) RWY 35<br>VOR/DME OR TACAN RWY 35<br>NDB RWY 35 | 50:1 | 43:1 | Building | Existing | Res/Ind/Road/Ag/WRW |
| **LARGE GENERAL AVIATION AIRPORTS** | | | | | | | | |
| Brookings Regional | 12 | Non-Precision | RNAV (GPS) RWY 12<br>VOR RWY 12 | 34:1 | 18:1 | Railroad | Existing | Res/Road/RR/Ag/WRW |
| | 30 | Precision | ILS OR LOC RWY 30<br>RNAV (GPS) RWY 30<br>VOR RWY 30 | 50:1 | 34:1 | Tree | Existing | Res/Comm/Road |
| | 17 | Visual | None | 20:1 | 37:1 | Railroad | | Res/Road/RR/Ag/WRW |
| | 35 | Visual | None | 20:1 | 23:1 | Road | | Res/Road/Ag/WRW |

**Table 39 – Summary of Runway Approaches**

| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| Madison Municipal | 3 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/RR/Ag |
| | 21 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/Ag/WRW |
| | 15 | Non-Precision | NDB OR GPS RWY 15 | 34:1 | 44:1 | Silo | WAAS 2008 | Res/Road/Ag/WRW |
| | 33 | Non-Precision | GPS RWY 33 | 34:1 | 32:1 | Tree | WAAS 2008 | Res/Road/RR/Ag/WRW |
| Mitchell Municipal | 12 | Non-Precision | RNAV (GPS) RWY 12<br>VOR RWY 12 | 50:1 | 50:1 | None | Existing | Road/Ag/WRW |
| | 30 | Precision | ILS OR LOC RWY 30<br>RNAV (GPS) RWY 30<br>VOR RWY 30 | 50:1 | 50:1 | None | Existing | Res/Road/Ag/WRW |
| | 17 | Visual | None | 34:1 | 50:1 | None | WAAS 2009 | Road/Ag/WRW |
| | 35 | Visual | None | 34:1 | 50:1 | None | WAAS 2009 | Res/Road/Ag/WRW |
| Black Hills | 13 | Non-Precision | GPS Rwy 13<br>NDB or GPS-A | 34:1 | 20:1 | Hill | | Road/Open/WRW |
| | 31 | Non-Precision | NDB or GPS-A | 20:1 | 27:1 | Road | | Res/Road/Ag/Open/WRW |
| | 4 | Non-Precision | NDB or GPS-A | 20:1 | 36:1 | Highway | | Res/Ind/Road/Open |
| | 22 | Non-Precision | NDB or GPS-A | 20:1 | 50:1 | Fence | | Res/Road/Open |
| | 8 | Non-Precision | NDB or GPS-A | 20:1 | 50:1 | None | | Res/Comm/Road/Open/WRW |
| | 26 | Non-Precision | NDB or GPS-A | 20:1 | 50:1 | None | | Res/Road/Open |
| Marv Skie | 16 | Visual | None | 20:1 | 27:1 | Road | | Res/Ind/Road/Ag/WRW |
| | 34 | Visual | None | 20:1 | 50:1 | None | | Comm/Road/Ag |
| Chan Gurney Municipal | 1 | Visual | None | 20:1 | 26:1 | Power Line | | Res/Comm/Ind/Road/RR/Cemetery |
| | 19 | Visual | None | 20:1 | 30:1 | Fence | | Res/Road/Ag |
| | 13 | Non-Precision | RNAV (GPS) RWY 13<br>VOR RWY 13 | 34:1 | 26:1 | Tree | Existing | Res/Road/Ag/Mining |
| | 31 | Precision | ILS RWY 31<br>VOR RWY 31<br>NDB OR GPS RWY 31 | 50:1 | 50:1 | None | | Res/Ind/Road/RR/Ag |
| **MEDIUM GENERAL AVIATION AIRPORTS** | | | | | | | | |

**Table 39 – Summary of Runway Approaches**

| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| Belle Fourche Municipal | 14 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Open/WRW |
| | 32 | Non-Precision | RNAV (GPS) RWY 32 | 20:1 | 50:1 | None | WAAS 2008 | Road/Open/WRW |
| | 18 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Road/Open/WRW |
| | 36 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Open/WRW |
| Britton Municipal | 1 | Visual | None | 20:1 | 20:1 | Fence | WAAS 2008 | Res/Road/RR/Ag/WRW |
| | 19 | Visual | None | 20:1 | 21:1 | Road | WAAS 2008 | Road/Ag |
| | 13 | Non-Precision | RNAV (GPS) RWY 13 | 20:1 | 40:1 | Road | WAAS 2008 | Res/Road/RR/Ag |
| | 31 | Non-Precision | RNAV (GPS) RWY 31 | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/Ag/Golf Course |
| Chamberlain Municipal | 13 | Non-Precision | RNAV (GPS) RWY 13 | 20:1 | 20:1 | Tree | WAAS 2009 | Res/Road/Ag/WRW |
| | 31 | Non-Precision | RNAV (GPS) RWY 31 | 20:1 | 50:1 | None | WAAS 2009 | Res/Road/Ag |
| | 18 | Visual | None | 20:1 | 21:1 | Pole | | Road/Ag |
| | 36 | Visual | None | 20:1 | 50:1 | None | | Road/Ag |
| Custer County | 8 | Visual | None | 20:1 | 50:1 | None | | Res/Park-Forest |
| | 26 | Visual | None | 20:1 | 21:1 | Tree | | Park-Forest |
| Gettysburg Municipal | 4 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Road/Ag/WRW |
| | 22 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Cem/Road/Ag |
| | 13 | Non-Precision | RNAV (GPS) RWY 13 | 20:1 | 35:1 | Pole | WAAS 2008 | Res/Ind/Road/RR/Ag/WRW |
| | 31 | Non-Precision | RNAV (GPS) RWY 31 | 20:1 | 50:1 | None | WAAS 2008 | Road/Ag/WRW |
| Gregory Municipal | 13 | Non-Precision | GPS RWY 31 | 20:1 | 29:1 | Tree | WAAS 2009 | Res/Road/Golf Course |
| | 31 | Visual | None | 20:1 | 50:1 | None | WAAS 2009 | Res/Road/Ag/WRW |
| Hot Springs Municipal | 1 | Visual | None | 20:1 | 28:1 | Tree | WAAS 2008 | Res/Road/Ag/Open |

**Table 39 – Summary of Runway Approaches**

| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| | 19 | Non-Precision | GPS RWY 19 | 20:1 | 35:1 | Fence | WAAS 2008 | Road/Open/WRW |
| | 6 | Visual | None | 20:1 | 40:1 | None | WAAS 2008 | Road/Ag/Open/WRW/Mining |
| | 24 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Open/WRW |
| Lemmon Municipal | 7 | Visual | None | 20:1 | None | None | | Road/Ag/Open |
| | 25 | Visual | None | 20:1 | None | None | | Res/Road/Ag |
| | 11 | Visual | None | 20:1 | 30:1 | Road | WAAS 2009 | Res/Road/Ag |
| | 29 | Non-Precision | GPS RWY 29 | 20:1 | 50:1 | None | WAAS 2009 | Road/Ag/Open/WRW |
| Milbank Municipal | 7 | Visual | None | 20:1 | 40:1 | Fence | WAAS 2008 | Res/Road/Ag |
| | 25 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/Ag/WRW |
| | 13 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/RR/Ag/WRW |
| | 31 | Non-Precision | RNAV (GPS) RWY 31 | 20:1 | 20:1 | Road | WAAS 2008 | Res/Road/Ag/Mining |
| Miller Municipal | 15 | Non-Precision | GPS RWY 15 | 20:1 | 50:1 | None | WAAS 2009 | Res/Road/Ag/WRW |
| | 33 | Non-Precision | GPS RWY 33 | 20:1 | 33:1 | Pole | WAAS 2009 | Res/Road/RR/Ag/WRW |
| Mobridge Municipal | 12 | Non-Precision | RNAV (GPS) RWY 12<br>NDB RWY 12 | 20:1 | 45:1 | Ground | WAAS 2008 | Res/Road/Ag/Open/WRW |
| | 30 | Non-Precision | RNAV (GPS) RWY 30 | 20:1 | 30:1 | Power Line | WAAS 2008 | Res/Road/Open |
| | 17 | Visual | None | 20:1 | 20:1 | Road | WAAS 2008 | Res/Road/Open |
| | 35 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/RR/Ag/Open/WRW/Rec |
| Philip | 5 | Non-Precision | VOR OR GPS-A | 20:1 | 50:1 | None | | Road/RR/Open/WRW |
| | 23 | Non-Precision | VOR OR GPS-A | 20:1 | 22:1 | Tree | | Road/Open/WRW |
| | 12 | Non-Precision | VOR OR GPS-A | 20:1 | 23:1 | Pole | WAAS 2009 | Road/Open/WRW |
| | 30 | Non-Precision | VOR OR GPS-A | 20:1 | 50:1 | None | WAAS 2009 | Road/RR/Open/WRW |

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| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| Redfield Municipal | 1 | Visual | None | 20:1 | 50:1 | None | | Ag/WRW |
| | 19 | Visual | None | 20:1 | 17:1 | Tree | | Res/Comm/Ind/Road/RR/Ag/WRW |
| | 13 | Visual | None | 20:1 | 22:1 | Tree | | Res/Road/Ag/WRW |
| | 31 | Visual | None | 20:1 | 41:1 | Tree | | Res/Road/Ag/Open/WRW |
| Sturgis Municipal | 11 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Road/Ag/Open/WRW |
| | 29 | Non-Precision | GPS RWY 29 | 20:1 | 50:1 | None | WAAS 2008 | Road/Ag/Open |
| Harold Davidson Field | 12 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Road/Ag/WRW |
| | 30 | Non-Precision | RNAV (GPS) RWY 30 | 20:1 | 25:1 | Tree | Existing | Res/Road/Ag/WRW |
| Wagner Municipal | 8 | Visual | None | 20:1 | 35:1 | Power Line | WAAS 2009 | Res/Road/Ag |
| | 26 | Visual | None | 20:1 | 28:1 | Road | WAAS 2009 | Res/Road/Ag/WRW/Cemetery |
| | 14 | Visual | None | 20:1 | 24:1 | Road | | Res/Comm/Ind/Road/RR/Ag |
| | 32 | Visual | None | 20:1 | 24:1 | Power Line | | Res/Road/Ag |
| Winner Regional | 3 | Non-Precision | VOR-A | 20:1 | 50:1 | None | WAAS 2008 | Res/Comm/Ind/Road/Ag |
| | 21 | Non-Precision | VOR-A | 20:1 | 20:1 | Fence | WAAS 2008 | Res/Road/Ag/WRW |
| | 13 | Non-Precision | RNAV (GPS) RWY 13 VOR-A | 20:1 | 50:1 | None | Existing | Res/Road/Ag |
| | 31 | Non-Precision | RNAV (GPS) RWY 31 VOR-A | 20:1 | 50:1 | None | Existing | Res/RoadAg |
| **SMALL GENERAL AVIATION AIRPORTS** | | | | | | | | |
| Bison Municipal | 11 | Visual | None | 20:1 | 50:1 | None | | Road/Ag |
| | 29 | Visual | None | 20:1 | 20:1 | Tree | | Res/Road/Ag |
| Harding County | 8 | Visual | None | 20:1 | 20:1 | Road | | Res/Road/Open/WRW |
| | 26 | Visual | None | 20:1 | 20:1 | Fence | | Open/WRW |
| | 12 | Visual | None | 20:1 | 41:1 | Fence | | Res/Road/Open/WRW |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Open/WRW |
| Canton Municipal | 18 | Visual | None | 20:1 | 26:1 | Road | | Res/Road/Ag/WRW |
| | 36 | Visual | None | 20:1 | 21:1 | Tree | | Ind/Road/RR/Ag/WRW |

**Table 39 – Summary of Runway Approaches**

| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| Clark County | 3 | Visual | None | 20:1 | 23:1 | Road | | Res/Road/Ag |
| | 21 | Visual | None | 20:1 | 30:1 | Tree | | Road/Ag/WRW |
| | 13 | Visual | None | 20:1 | 36:1 | Road | WAAS 2009 | Road/Ag |
| | 31 | Visual | None | 20:1 | 50:1 | None | WAAS 2009 | Res/Road/Ag/WRW |
| Wilder | 15 | Visual | None | 20:1 | 23:1 | Tree | WAAS 2009 | Road/Ag/Open |
| | 33 | Visual | None | 20:1 | 46:1 | Tree | WAAS 2009 | Res/Road/Ag/Open/WRW |
| Cheyenne Eagle Butte | 13 | Visual | None | 20:1 | 38:1 | Road | WAAS 2008 | Res/Road/Open/WRW |
| | 31 | Non-Precision | RNAV (GPS) RWY 31 | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/Open/WRW |
| Edgemont Municipal | 12 | Visual | None | 20:1 | 50:1 | None | | Road/Open |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Road/RR/Open/WRW |
| | 16 | Visual | None | 20:1 | 21:1 | Building | | Res/Road/Open/WRW |
| | 34 | Visual | None | 20:1 | 20:1 | Fence | | Road/RR/Open/WRW |
| Eureka Municipal | 7 | Visual | None | 20:1 | 20:1 | Fence | | Road/Ag |
| | 25 | Visual | None | 20:1 | 50:1 | None | | Road/Ag/WRW |
| | 12 | Visual | None | 20:1 | 50:1 | None | | Road/Ag |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Road/Ag/WRW |
| Faith Municipal | 13 | Visual | None | 20:1 | 50:1 | None | | Res/Open/WRW |
| | 31 | Visual | None | 20:1 | 23:1 | Road | | Cem/Road/Open/Ag/WRW |
| Faulkton Municipal | 13 | Visual | None | 20:1 | 22:1 | Road | | Ind/Road/Ag/WRW |
| | 31 | Visual | None | 20:1 | 30:1 | Fence | | Road/Ag |
| Flandreau Municipal | 10 | Visual | None | 20:1 | 17:1 | Tree | | Res/Road/Ag/WRW |
| | 28 | Visual | None | 20:1 | 21:1 | Road | | Res/Road/Ag/WRW |
| Highmore Municipal | 12 | Visual | None | 20:1 | 30:1 | Fence | WAAS 2009 | Res/Road/Open/Ag |
| | 30 | Visual | None | 20:1 | 25:1 | Road | WAAS 2009 | Res/Road/RR/Open/Ag |
| Hoven Municipal | 13 | Visual | None | 20:1 | 50:1 | None | WAAS 2009 | Road/Ag/WRW |

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| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| | 31 | Visual | None | 20:1 | 22:1 | Highway | WAAS 2009 | Road/Res/Ag |
| Martin Municipal | 14 | Visual | None | 20:1 | 36:1 | Road | | Res/Ind/Road/Ag/Open/WRW/Golf Course |
| | 32 | Non-Precision | GPS RWY 32 | 20:1 | 50:1 | None | | Road/Ag/Open/WRW |
| Mc Laughlin Municipal | 13 | Visual | None | 20:1 | 20:1 | Fence | | Res/Ind/Road/RR/Ag/Open/WRW |
| | 31 | Visual | None | 20:1 | 50:1 | None | | Road/Ag/Open/WRW |
| Mission Sioux | 11 | Visual | None | 20:1 | 33:1 | Fence | | Res/Road/Open/WRW |
| | 29 | Visual | None | 20:1 | 21:1 | Road | | Res/Road/Open/WRW |
| Murdo Municipal | 14 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/Open/WRW |
| | 32 | Visual | None | 20:1 | 23:1 | Fence | | Road/Open/WRW |
| Onida Municipal | 8 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| | 26 | Visual | None | 20:1 | 50:1 | None | | Res/Road/RR/Ag/WRW |
| | 13 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| | 31 | Visual | None | 20:1 | 33:1 | Power Line | | Res/Road/RR/Ag/WRW |
| Parkston Municipal | 15 | Visual | None | 20:1 | 21:1 | Pole | WAAS 2009 | Res/Comm/Ind/Road/Ag |
| | 33 | Visual | None | 20:1 | 50:1 | None | WAAS 2009 | Road/RR/Ag/WRW |
| Pine Ridge | 6 | Visual | None | 20:1 | 50:1 | None | WAAS 2008 | Res/Road/Ag/Open/WRW |
| | 24 | Visual | None | 20:1 | 21:1 | Fence | WAAS 2008 | Res/Road/Open/WRW |
| | 12 | Visual | None | 20:1 | 22:1 | Power Line | WAAS 2008 | Res/Road/Open/WRW |
| | 30 | Non-Precision | RNAV (GPS) RWY 30 | 20:1 | 33:1 | Fence | WAAS 2008 | Open/WRW |
| Platte Municipal | 14 | Visual | None | 20:1 | 21:1 | Tree | | Res/Road/Ag/WRW |
| | 32 | Visual | None | 20:1 | 22:1 | Tree | | Res/Road/Ag |
| Sisseton Municipal | 4 | Visual | None | 20:1 | 25:1 | Pole | | Res/Road/Ag/WRW |
| | 22 | Visual | None | 20:1 | 28:1 | Tree | | Res/Road/Ag/WRW |
| | 16 | Visual | None | 20:1 | 25:1 | Road | WAAS 2009 | Road/Ag/WRW |
| | 34 | Visual | None | 20:1 | 21:1 | Fence | WAAS 2009 | Road/Ag/WRW |

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| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| Springfield Municipal | 1 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| | 19 | Visual | None | 20:1 | 37:1 | Fence | | Res/Road/Ag |
| | 15 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| | 33 | Visual | None | 20:1 | 32:1 | Road | | Res/Road/Ag/WRW |
| Wall Municipal | 12 | Visual | None | 20:1 | 50:1 | None | | Road/Ag |
| | 30 | Visual | None | 20:1 | 22:1 | Antenna | | Res/Comm/Ind/Road/RR/Open |
| Sigurd Anderson | 1 | Visual | None | 20:1 | 20:1 | Fence | | Res/Road/Ag/WRW |
| | 19 | Visual | None | 20:1 | 20:1 | Tree | | Res/Road/Ag/WRW |
| | 12 | Visual | None | 20:1 | 21:1 | Road | | Res/Road/Ag/WRW |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| Wessington Springs | 12 | Visual | None | 20:1 | 25:1 | Power Line | | Res/Comm/Ind/Road/Ag/WRW |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| **BASIC SERVICE AIRPORTS** | | | | | | | | |
| Arlington Municipal | 14 | Visual | None | 20:1 | 25:1 | Tree | | Road/Ag |
| | 32 | Visual | None | 20:1 | 33:1 | Tree | | Road/Ag |
| | 4 | Visual | None | 20:1 | 33:1 | Tree | | Road/Ag/WRW |
| | 22 | Visual | None | 20:1 | 22:1 | Tree | | Road/Ag |
| Bowdle Municipal | 13 | Visual | None | 20:1 | 50:1 | None | | Road/Ag |
| | 31 | Visual | None | 20:1 | 37:1 | Road | | Road/Ag/WRW |
| Clear Lake Municipal | 13 | Visual | None | 20:1 | 20:1 | Road | | Res/Road/Ag/WRW |
| | 31 | Visual | None | 20:1 | 20:1 | Power Line | | Res/Road/Ag/WRW |
| | 2 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/WRW |
| | 20 | Visual | None | 20:1 | 22:1 | Road | | Res/Road/Ag/WRW |
| Corsica Municipal | 17 | Visual | None | 20:1 | 20:1 | Fence | | Road/Ag |
| | 35 | Visual | None | 20:1 | 22:1 | Road | | Res/Road/Ag/WRW |
| Custer State Park | 15 | Visual | None | 20:1 | 21:1 | Tree | | Road/Park-Forest |
| | 33 | Visual | None | 20:1 | 50:1 | None | | Road/Park-Forest |
| Herreid Municipal | 12 | Visual | None | 20:1 | 50:1 | None | | Road/Open/Ag/WRW |
| | 30 | Visual | None | 20:1 | 16:1 | Road | | Res/Road/Open/Ag/WRW |
| Howard Municipal | 13 | Visual | None | 20:1 | 21:1 | Road | | Res/Road/Ag/WRW |
| | 31 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/Open/WRW |

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| Airport | Runway End | Approach Type | Published Approaches | Existing Approach Slope | Obstruction Glide Slope | Controlling Obstruction | LPV Approach Status | Land Use in Approach |
|---|---|---|---|---|---|---|---|---|
| | 18 | Visual | None | 20:1 | 26:1 | Power Line | | Res/Road/Ag/WRW |
| | 36 | Visual | None | 20:1 | 20:1 | Fence | | Res/Road/Ag |
| Isabel Municipal | 13 | Visual | None | 20:1 | 32:1 | Tree | | Res/Open/WRW/Cemetery |
| | 31 | Visual | None | 20:1 | 20:1 | Tree | | Res/Open/WRW/Cemetery |
| Kadoka Municipal | 4 | Visual | None | 20:1 | 50:1 | None | | Res/Comm/Road/RR/Ag/Open/WRW |
| | 22 | Visual | None | 20:1 | 50:1 | None | | Road/Open/WRW |
| | 12 | Visual | None | 20:1 | 21:1 | Antenna | | Res/Comm/Road/RR/Open/WRW |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Road/Open/WRW |
| Kimball Municipal | 13 | Visual | None | 20:1 | 20:1 | Road | | Road/RR/Ag |
| | 31 | Visual | None | 20:1 | 20:1 | Road | | Res/Comm/Road/RR/Ag |
| Lake Andes Municipal | 12 | Visual | None | 20:1 | 24:1 | Road | | Res/Road/Ag/Open/WRW |
| | 30 | Visual | None | 20:1 | 34:1 | Power Line | | Road/Ag/Open/WRW |
| Lake Preston Municipal | 12 | Visual | None | 20:1 | 32:1 | Fence | | Res/Road/RR/Ag/WRW |
| | 30 | Visual | None | 20:1 | 23:1 | Road | | Res/Road/Ag/WRW |
| Mc Intosh Municipal | 14 | Visual | None | 20:1 | 20:1 | Tree | | Res/Road/RR/Ag |
| | 32 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/Open/WRW |
| Graham Field | 15 | Visual | None | 20:1 | 50:1 | None | | Road/Ag/WRW |
| | 33 | Visual | None | 20:1 | 50:1 | None | | Res/Road/WRW |
| Presho Municipal | 10 | Visual | None | 20:1 | 20:1 | Road | | Res/Comm/Ind/Road/RR/Ag/WRW |
| | 28 | Visual | None | 20:1 | 27:1 | Fence | | Res/Road/Ag/WRW |
| Timber Lake Municipal | 17 | Visual | None | 20:1 | 30:1 | Fence | | Res/Road/Ag/Open/WRW |
| | 35 | Visual | None | 20:1 | 20:1 | Fence | | Res/Ag/Road |
| | 12 | Visual | None | 20:1 | 50:1 | None | | Res/Road/Ag/Open |
| | 30 | Visual | None | 20:1 | 21:1 | Road | | Road/Ag/WRW |
| White River Municipal | 12 | Visual | None | 20:1 | 30:1 | Pole | | Res/Comm/Road/Open/WRW |
| | 30 | Visual | None | 20:1 | 50:1 | None | | Open/WRW |

Source: 2009/10 Survey Data

## 3.9 Planning

Airports which are actively engaged in planning activities support the overall aviation system through strengthened emergency response plans, security plans, and the protection of existing and future infrastructure. Prior planning efforts can prepare and protect airports in the event of an emergency and guard them from incompatible land uses. Several planning efforts are discussed in the following sections. A listing of airport specific planning activities can be found in **Table 44**.

### 3.9.a. Emergency Response Plan

Emergency response plans often include two elements: procedures to respond to various emergency situations, and mutual aid agreements with surrounding community entities. These documents provide the necessary steps to handle situations such as aircraft accidents, fuel spills, fires, and natural disasters. An emergency response plan is greatly strengthened by establishing agreements with local police, fire, and medical services. **Table 40** indicates just over 30 percent (31.9%) of system airports have an emergency response plan available.

**Table 40 – Summary of Emergency Response Plan Availability**

| Emergency Response Plan Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Emergency Response Plan Available | 23 | 31.9% |
| Emergency Response Plan Not Available | 31 | 43.1% |
| No Response | 18 | 25.0% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.9.b. Security Plan

Airport security plans can vary greatly from airport to airport based upon airport size and typical users. While they are each unique, security plans in general establish procedures and protocol for securing an airport, address passenger and cargo screening requirements, and outline response procedures for bomb threats, crowd control, crime, seizure of aircraft, and escorting of high profile individuals. **Table 41** shows only 12 of 72 airports have a security plan available.

**Table 41 – Summary of Security Plan Availability**

| Security Plan Availability | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Security Plan Available | 12 | 16.7% |
| Security Plan Not Available | 39 | 54.2% |
| No Response | 21 | 29.2% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

### 3.9.c. Height Zoning

Coordination with local communities to develop and enact height zoning often helps to prevent obstructions from penetrating runway approaches and discourages the development of height-sensitive structures in the vicinity of an airport. **Table 42** indicates that over 50 percent (54.2%) of system airports

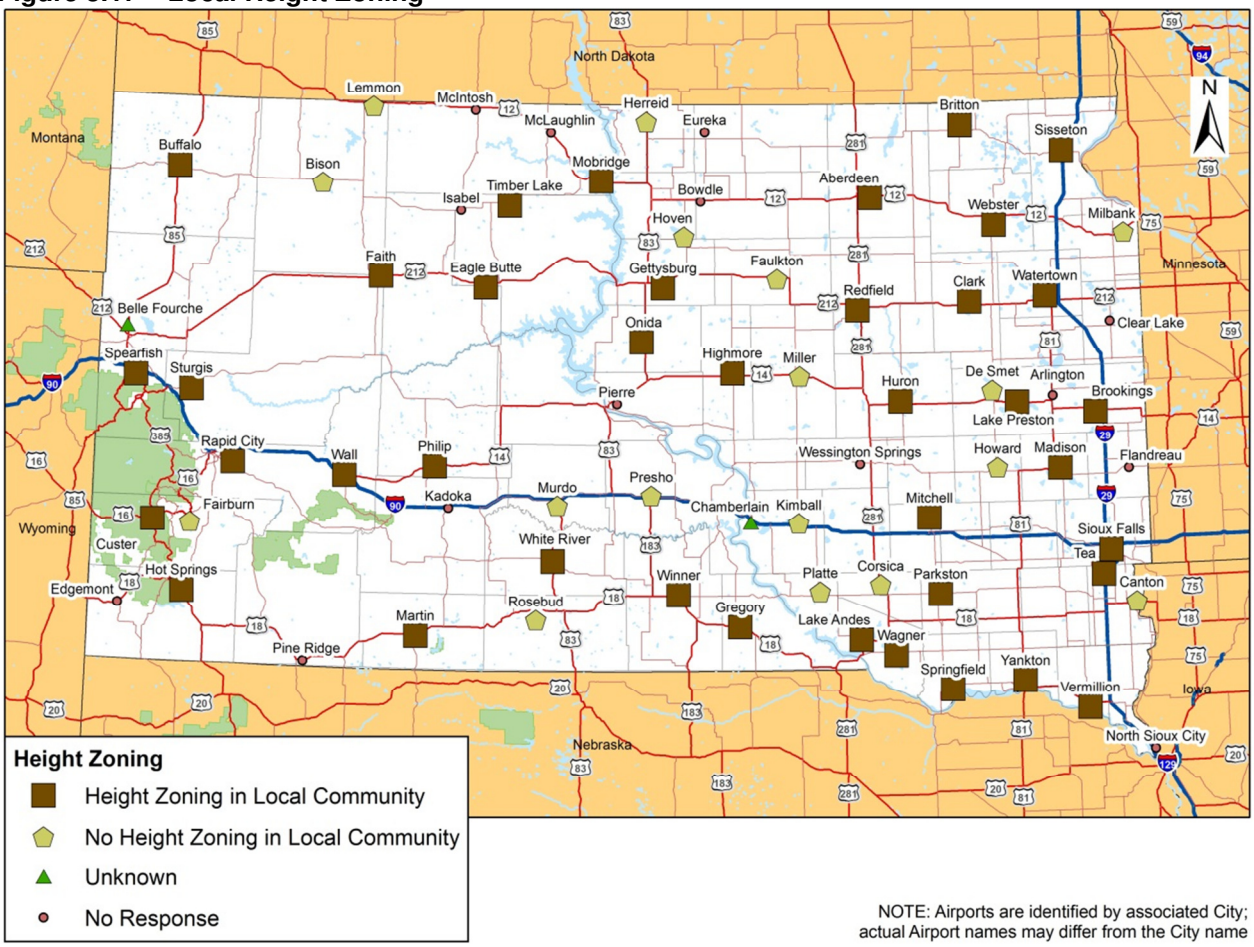
are located in communities that have enacted local height zoning. **Figure 3.17** identifies the existence of height zoning at each system airport.

**Table 42 – Summary of Local Height Zoning**

| Height Zoning | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Height Zoning in Local Community | 39 | 54.2% |
| No Height Zoning in Local Community | 17 | 23.6% |
| Unknown | 2 | 2.8% |
| No Response | 14 | 19.4% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Figure 3.17 – Local Height Zoning**




Source: Kirkham Michael

### 3.9.d. Inclusion in Local Comprehensive/Land Use Plan

Airport coordination with the local community to address land use concerns in the vicinity of an airport (which may include height, population density, visual obstructions, wildlife attractants, and noise) helps promote the safety of persons in the air and on the ground by encouraging compatible land use. Planning ahead for future compatible development helps protect the existing and future airport infrastructure as

well. **Table 43** shows only one-third of system airports are included in local comprehensive or land use planning efforts.

**Table 43 – Summary of Airport Inclusion in Local Comprehensive/Land Use Plan**

| Comp Plan/Land Use Plan Inclusion | Number of System Airports | Percentage of System Airports |
|---|---|---|
| Airport Included in Local Comp/Land Use Plan | 24 | 33.3% |
| Airport Not Included in Local Comp/Land Use Plan | 35 | 48.6% |
| No Response | 13 | 18.1% |
| **Total System Airports** | **72** | **100%** |

Source: 2009/10 Survey Data

**Table 44 – Summary of Planning Tools**

| Associated City | Airport | Emergency Response Plan | Security Plan | Height Zoning | Land Use in Comp Plan |
|---|---|---|---|---|---|
| **Aberdeen** | Aberdeen Regional | Yes | Yes | Yes | Yes |
| **Arlington** | Arlington Municipal | NR | NR | NR | NR |
| **Belle Fourche** | Belle Fourche Municipal | No | No | No | No |
| **Bison** | Bison Municipal | NR | Yes | No | No |
| **Bowdle** | Bowdle Municipal | NR | NR | NR | NR |
| **Britton** | Britton Municipal | No | No | Yes | No |
| **Brookings** | Brookings Regional | Yes | Yes | Yes | Yes |
| **Buffalo** | Harding County | NR | No | Yes | NR |
| **Canton** | Canton Municipal | No | No | No | No |
| **Chamberlain** | Chamberlain Municipal | Yes | NR | No | Yes |
| **Clark** | Clark County | No | No | Yes | Yes |
| **Clear Lake** | Clear Lake Municipal | NR | NR | NR | Yes |
| **Corsica** | Corsica Municipal | No | No | No | No |
| **Custer** | Custer County | NR | No | Yes | Yes |
| **De Smet** | Wilder | Yes | No | No | No |
| **Eagle Butte** | Cheyenne Eagle Butte | No | No | In Process | No |
| **Edgemont** | Edgemont Municipal | No | No | NR | NR |
| **Eureka** | Eureka Municipal | NR | NR | NR | NR |
| **Fairburn** | Custer State Park | No | No | No | No |
| **Faith** | Faith Municipal | NR | NR | Yes | No |
| **Faulkton** | Faulkton Municipal | No | No | No | No |
| **Flandreau** | Flandreau Municipal | NR | NR | NR | NR |
| **Gettysburg** | Gettysburg Municipal | Yes | NR | Yes | No |
| **Gregory** | Gregory Municipal Airport/Flynn Field | Yes | No | Yes | Yes |
| **Herreid** | Herreid Municipal | No | No | No | No |
| **Highmore** | Highmore Municipal | NR | No | Yes | No |
| **Hot Springs** | Hot Springs Municipal | NR | NR | Yes | In Process |
| **Hoven** | Hoven Municipal | No | No | No | No |
| **Howard** | Howard Municipal | No | No | No | No |
| **Huron** | Huron Regional | Yes | Yes | Yes | No |

**Table 44 – Summary of Planning Tools**

| Associated City | Airport | Emergency Response Plan | Security Plan | Height Zoning | Land Use in Comp Plan |
|---|---|---|---|---|---|
| **Isabel** | Isabel Municipal | NR | NR | NR | NR |
| **Kadoka** | Kadoka Municipal | Yes | NR | NR | NR |
| **Kimball** | Kimball Municipal | Yes | NR | No | No |
| **Lake Andes** | Lake Andes Municipal | Yes | NR | Yes | No |
| **Lake Preston** | Lake Preston Municipal | No | No | Yes | Yes |
| **Lemmon** | Lemmon Municipal | NR | No | No | No |
| **Madison** | Madison Municipal | No | No | Yes | Yes |
| **Martin** | Martin Municipal | No | Yes | Yes | No |
| **McIntosh** | McIntosh Municipal | No | No | NR | No |
| **McLaughlin** | McLaughlin Municipal | No | No | NR | NR |
| **Milbank** | Milbank Municipal | Yes | No | No | Yes |
| **Miller** | Miller Municipal | No | No | No | No |
| **Mitchell** | Mitchell Municipal | Yes | No | Yes | Yes |
| **Mobridge** | Mobridge Municipal | No | NR | Yes | No |
| **Murdo** | Murdo Municipal | Yes | No | No | No |
| **North Sioux City** | Graham Field | NR | NR | NR | NR |
| **Onida** | Onida Municipal | Yes | No | Yes | No |
| **Parkston** | Parkston Municipal | No | No | Yes | No |
| **Philip** | Philip | No | No | Yes | No |
| **Pierre** | Pierre Regional | Yes | Yes | NR | NR |
| **Pine Ridge** | Pine Ridge | NR | NR | NR | NR |
| **Platte** | Platte Municipal | No | NR | No | No |
| **Presho** | Presho Municipal | No | No | No | No |
| **Rapid City** | Rapid City Regional | Yes | Yes | Yes | Yes |
| **Redfield** | Redfield Municipal | No | No | Yes | Yes |
| **Rosebud** | Rosebud Sioux Tribal Airport | No | No | No | No |
| **Sioux Falls** | Joe Foss Field | Yes | Yes | Yes | Yes |
| **Sisseton** | Sisseton Municipal | No | No | Yes | No |
| **Spearfish** | Black Hills Airport/Clyde Ice Field | No | No | Yes | Yes |
| **Springfield** | Springfield Municipal | NR | NR | Yes | No |
| **Sturgis** | Sturgis Municipal | No | No | Yes | No |
| **Tea** | Marv-Skie Lincoln County | No | No | Yes | No |
| **Timber Lake** | Timber Lake Municipal | Yes | No | Yes | NR |
| **Vermillion** | Harold Davidson Field | Yes | Yes | Yes | Yes |
| **Wagner** | Wagner Municipal | Yes | Yes | Yes | Yes |
| **Wall** | Wall Municipal | Yes | NR | Yes | No |
| **Watertown** | Watertown Regional | Yes | Yes | Yes | Yes |
| **Webster** | The Sigurd Andersen | No | No | Yes | Yes |
| **Wessington Springs** | Wessington Springs | NR | NR | NR | Yes |
| **White River** | White River Municipal | NR | NR | Yes | Yes |
| **Winner** | Winner Regional | No | No | Yes | Yes |
| **Yankton** | Chan Gurney Municipal | Yes | Yes | Yes | Yes |

Source: 2009/10 Survey Data NR = No Response

## 3.10 Summary

The inventory element of the system planning process is an important step in developing a blueprint for the future development of South Dakota's aviation system. By cataloging numerous airport facilities and services at each of the 72 public use airports, a base line is established which is used throughout the SDSASP, including the system analysis which can be found in Chapter 5 and system recommendations which can be found in Chapter 8. This comprehensive collection of data has been developed to assist airport officials, airport sponsors, and the South Dakota DOT Office of Aeronautics identify areas for improvement and determine the future allocation of resources, as they become available, to meet the goals and objectives of the system.

# Chapter 4 - Forecasts

## Introduction

This Chapter of the *South Dakota State Aviation System Plan* (SDSASP) provides projections of future aviation demand at the 72 public use airports in the system. Projections of short, intermediate, and long-term activity at the airports are based on five, 10, and 20 year milestones, using 2008 as the base year of analysis since it was the most recent year for which a full year of activity data was available at the time of plan development.

Projection of aviation demand is a crucial element of the aviation system planning process as it provides the basis for several key analyses, including:

- Determining the roles of the airports within the State's aviation system
- Evaluating the capacity of existing airport facilities and their ability to accommodate projected aviation demand
- Estimating the extent of airside and landside improvements required in future years to accommodate projected demand

This analysis uses the most recent aircraft activity available to project future levels of aviation demand through the year 2030. The forecast analysis contained in this Chapter includes methodologies based on historical aviation trends at the airports, as well as other socioeconomic trends occurring within the State. National projections of aviation activity developed by the Federal Aviation Administration (FAA) were also reviewed within the context of this forecast analysis.

This Chapter provides discussions of the methodologies and findings on the projections of passenger enplanements, aircraft operations, and based aircraft in the system. It should be noted that the FAA has

reviewed and accepted the forecasts for those airports included in the National Plan of Integrated Airport Systems (NPIAS).

## 4.1 Statewide Socioeconomic and Demographic Trends

Socioeconomic and demographic trends ultimately affect the demand for aviation facilities and services within South Dakota. A review of these conditions is important and will help shape the future of South Dakota's system of airports. The data presented in the following section was provided by the United States Census Bureau.

### 4.1.a Population

While the U.S. Census Bureau conducted a Census update in 2010, data from this effort was not yet available at the time of the SDSASP development. Therefore, data from the 2000 Census and associated Census projections are used. The 2000 U.S. Census reported the South Dakota population at 755,844 residents. By 2009, the population estimates indicate a 14.4 percent (14.4%) growth, or 56,539 people, ranking South Dakota's population 46$^{th}$ largest in the United States at 812,838. South Dakota has experienced a mild population growth rate since 2000, with a compound annual average growth rate (CAGR) of 0.82 percent (0.82%).

Between 2000 and 2009, 20 of South Dakota's 66 counties experienced an overall increase in population. Of the 20 counties that experienced growth, nine counties grew at a rate greater than the 0.82 percent (0.82%) State average. Lincoln County, located in the south eastern portion of South Dakota, experienced the greatest population increase, growing by 41.46 percent (41.46%) or 17,087 people. Of the 46 counties experiencing a decline in growth, Campbell County experienced the greatest decline of 4.07 percent (4.07%) or a decrease of 1,316 people. **Table 1** contains South Dakota's population change by county from 2000 through 2009, as projected by the U.S. Census Bureau.

### 4.1.b Socioeconomic Factors

Socioeconomic trends have an impact on the demand for aviation services and were reviewed as part of the aviation demand forecasting efforts. Historical and projected levels of socioeconomic factors including population, total employment, per capita income, and retail sales were obtained from Woods & Poole Economics, Inc., an independent firm which specializes in long-term economic and demographic projections.

**Table 2** summarizes the socioeconomic trends occurring within the State. All four socioeconomic factors are projected to increase through the year 2030 between 0.42 percent (0.42%) and 1.14 percent (1.14%) CAGR and therefore point to a marginal increase in aviation demand.

**Table 1 – South Dakota Population Change by County 2000-2009**

| | | July 2009 | July 2006 | July 2003 | 2000 Census Count | Percent Change 2000-2009 |
|---|---|---|---|---|---|---|
| **State of South Dakota** | | **812,383** | **788,519** | **766,975** | **755,844** | **0.82%** |
| | **Rank** | | | | | |
| **Minnehaha County** | 1 | 183,048 | 172,333 | 159,575 | 148,281 | **2.73%** |
| **Pennington County** | 2 | 100,850 | 94,817 | 91,467 | 88,565 | **1.45%** |
| **Lincoln County** | 3 | 41,218 | 35,707 | 29,226 | 24,131 | **6.13%** |
| **Brown County** | 4 | 35,204 | 34,907 | 34,842 | 35,460 | **-0.08%** |
| **Brookings County** | 5 | 30,056 | 29,198 | 28,605 | 28,220 | **0.70%** |
| **Codington County** | 6 | 26,168 | 26,109 | 25,852 | 25,897 | **0.12%** |
| **Meade County** | 7 | 23,916 | 24,295 | 24,382 | 24,253 | **-0.16%** |
| **Lawrence County** | 8 | 23,498 | 22,945 | 22,016 | 21,802 | **0.84%** |
| **Yankton County** | 9 | 21,986 | 21,658 | 21,529 | 21,652 | **0.17%** |
| **Davison County** | 10 | 18,929 | 19,041 | 18,712 | 18,741 | **0.11%** |
| **Hughes County** | 11 | 16,969 | 16,798 | 16,566 | 16,481 | **0.32%** |
| **Beadle County** | 12 | 16,266 | 15,501 | 16,154 | 17,023 | **-0.50%** |
| **Union County** | 13 | 14,589 | 13,643 | 13,001 | 12,584 | **1.66%** |
| **Shannon County** | 14 | 13,727 | 13,637 | 13,132 | 12,466 | **1.08%** |
| **Clay County** | 15 | 13,490 | 13,332 | 13,396 | 13,537 | **-0.04%** |
| **Lake County** | 16 | 11,994 | 11,145 | 11,019 | 11,276 | **0.69%** |
| **Todd County** | 17 | 10,095 | 9,887 | 9,448 | 9,050 | **1.22%** |
| **Roberts County** | 18 | 9,933 | 9,933 | 9,964 | 10,016 | **-0.09%** |
| **Butte County** | 19 | 9,577 | 9,237 | 9,070 | 9,094 | **0.58%** |
| **Charles Mix County** | 20 | 8,984 | 9,046 | 9,041 | 9,350 | **-0.44%** |
| **Turner County** | 21 | 8,237 | 8,340 | 8,560 | 8,849 | **-0.79%** |
| **Custer County** | 22 | 7,924 | 7,888 | 7,565 | 7,275 | **0.95%** |
| **Fall River County** | 23 | 7,241 | 7,267 | 7,265 | 7,453 | **-0.32%** |
| **Hutchinson County** | 24 | 7,124 | 7,343 | 7,714 | 8,075 | **-1.38%** |
| **Grant County** | 25 | 7,068 | 7,203 | 7,614 | 7,847 | **-1.15%** |
| **Bon Homme County** | 26 | 6,995 | 7,140 | 7,073 | 7,260 | **-0.41%** |
| **Spink County** | 27 | 6,554 | 6,785 | 6,959 | 7,454 | **-1.42%** |
| **Moody County** | 28 | 6,375 | 6,482 | 6,447 | 6,595 | **-0.38%** |
| **Dewey County** | 29 | 5,969 | 6,053 | 6,126 | 5,972 | **-0.01%** |
| **Hamlin County** | 30 | 5,754 | 5,518 | 5,520 | 5,540 | **0.42%** |
| **McCook County** | 31 | 5,619 | 5,692 | 5,790 | 5,832 | **-0.41%** |
| **Tripp County** | 32 | 5,541 | 5,910 | 6,154 | 6,430 | **-1.64%** |
| **Day County** | 33 | 5,509 | 5,710 | 5,890 | 6,267 | **-1.42%** |
| **Kingsbury County** | 34 | 5,308 | 5,355 | 5,508 | 5,815 | **-1.01%** |
| **Brule County** | 35 | 5,275 | 5,090 | 5,148 | 5,364 | **-0.19%** |
| **Walworth County** | 36 | 5,228 | 5,376 | 5,497 | 5,974 | **-1.47%** |
| **Deuel County** | 37 | 4,203 | 4,269 | 4,337 | 4,498 | **-0.75%** |
| **Marshall County** | 38 | 4,160 | 4,318 | 4,266 | 4,576 | **-1.05%** |

**Table 1 – South Dakota Population Change by County 2000-2009**

| | | July 2009 | July 2006 | July 2003 | 2000 Census Count | Percent Change 2000-2009 |
|---|---|---|---|---|---|---|
| **Corson County** | 39 | 4,093 | 4,088 | 4,261 | 4,181 | **-0.24%** |
| **Flynn Field County** | 40 | 4,003 | 4,123 | 4,393 | 4,792 | **-1.98%** |
| **Edmunds County** | 41 | 3,935 | 3,979 | 4,163 | 4,367 | **-1.15%** |
| **Lyman County** | 42 | 3,891 | 3,854 | 3,911 | 3,895 | **-0.01%** |
| **Hanson County** | 43 | 3,553 | 3,560 | 3,407 | 3,139 | **1.39%** |
| **Clark County** | 44 | 3,431 | 3,532 | 3,863 | 4,143 | **-2.07%** |
| **Bennett County** | 45 | 3,348 | 3,421 | 3,484 | 3,574 | **-0.72%** |
| **Hand County** | 46 | 3,238 | 3,279 | 3,486 | 3,741 | **-1.59%** |
| **Douglas County** | 47 | 2,933 | 3,093 | 3,277 | 3,458 | **-1.81%** |
| **Perkins County** | 48 | 2,869 | 2,954 | 3,131 | 3,363 | **-1.75%** |
| **Aurora County** | 49 | 2,868 | 2,887 | 2,928 | 3,058 | **-0.71%** |
| **Stanley County** | 50 | 2,792 | 2,768 | 2,724 | 2,772 | **0.08%** |
| **Jackson County** | 51 | 2,658 | 2,749 | 2,810 | 2,930 | **-1.08%** |
| **Ziebach County** | 52 | 2,552 | 2,636 | 2,522 | 2,519 | **0.14%** |
| **McPherson County** | 53 | 2,439 | 2,551 | 2,724 | 2,904 | **-1.92%** |
| **Sanborn County** | 54 | 2,432 | 2,460 | 2,605 | 2,675 | **-1.05%** |
| **Miner County** | 55 | 2,420 | 2,494 | 2,623 | 2,884 | **-1.93%** |
| **Faulk County** | 56 | 2,210 | 2,290 | 2,450 | 2,640 | **-1.96%** |
| **Buffalo County** | 57 | 2,067 | 2,105 | 2,052 | 2,032 | **0.19%** |
| **Potter County** | 58 | 2,053 | 2,265 | 2,470 | 2,693 | **-2.97%** |
| **Mellette County** | 59 | 2,042 | 2,033 | 2,068 | 2,083 | **-0.22%** |
| **Jerauld County** | 60 | 1,953 | 2,020 | 2,147 | 2,295 | **-1.78%** |
| **Haakon County** | 61 | 1,777 | 1,854 | 2,032 | 2,196 | **-2.32%** |
| **Hyde County** | 62 | 1,393 | 1,502 | 1,578 | 1,671 | **-2.00%** |
| **Sully County** | 63 | 1,348 | 1,403 | 1,427 | 1,556 | **-1.58%** |
| **Campbell County** | 64 | 1,344 | 1,452 | 1,642 | 1,782 | **-3.09%** |
| **Harding County** | 65 | 1,123 | 1,187 | 1,281 | 1,353 | **-2.05%** |
| **Jones County** | 66 | 1,037 | 1,072 | 1,086 | 1,193 | **-1.55%** |

Source: United States Census Bureau

Population projections indicate that by the year 2030 South Dakota's population will have grown by 14.77 percent (14.77%) or 139,345 individuals resulting in a grand total of 943,000 residents.

**Table 2 – South Dakota Socioeconomic Trends**

| Year | Total Population (Thousands) | Total Employment (Thousands) | Income per Capita (2004$) | Total Retail Sales (mil 2004$) |
|---|---|---|---|---|
| 1975 | 681.25 | 326.33 | $16,836 | $2,328 |
| 1980 | 690.73 | 353.59 | $14,567 | $2,428 |
| 1985 | 698.41 | 366.59 | $17,924 | $2,306 |
| 1990 | 697.10 | 412.00 | $20,388 | $2,406 |
| 1995 | 737.92 | 475.03 | $20,632 | $3,700 |
| 2000 | 755.65 | 519.20 | $25,619 | $3,339 |
| 2005 | 779.31 | 539.99 | $29,152 | $2,222 |
| 2006 | 787.38 | 551.01 | $26,005 | $2,236 |
| 2007 | 795.68 | 564.48 | $31,014 | $2,217 |
| 2008 | 804.19 | 566.97 | $31,630 | $2,104 |
| *Projected* | | | | |
| 2015 | 846.23 | 604.05 | $32,322 | $2,034 |
| 2020 | 878.02 | 635.75 | $34,716 | $2,107 |
| 2030 | 943.53 | 702.83 | $40,590 | $2,306 |
| *CAGR* | *0.73%* | *0.98%* | *1.14%* | *0.42%* |

Source: Woods & Poole Economics, Inc.

## 4.2 Overview of the U.S. Aviation Industry and Industry Trends

Notable changes have occurred in the aviation industry over the past 10 years. To varying degrees, these industry trends have influenced aviation demand at the individual airports. To produce viable demand projections for airports within the system, it is important to have an understanding of these trends and how national trends are most likely to influence aviation demand at the airports over the planning period. The following sections present a summary of some of these trends as detailed in the FAA's Aerospace Forecasts Fiscal Year 2010-2030.

### 4.2.a Commercial Aviation

The U.S. commercial aviation industry recently experienced a decline in late 2008 through 2009 as the recession slowed demand for air travel. An industry that has seen a reduction in airline capacity, and multiple air carriers enter bankruptcy or cease operations over a five-year period, is now slowly returning to profitability. The FAA's forecasts indicate that domestic and international aviation growth will continue during the 20-year forecast.

The U.S. commercial aviation industry consists of 18 mainline air carriers that use large passenger jets (over 90 seats) and 66 regional carriers that use smaller piston, turboprop, and regional jet aircraft (up to 90 seats) to connect passengers to the larger carriers. In just five years, these numbers have decreased from 33 mainline carriers and 81 regional carries as a result of airline mergers and air carriers ceasing operations.

Mainline and regional carriers provide both domestic and international passenger service between the U.S. and foreign destinations, although regional carrier international service is confined to border markets in Canada, Mexico, and the Caribbean. Three distinct trends have occurred over the past five years that have helped shape today's U.S. commercial air carrier industry:

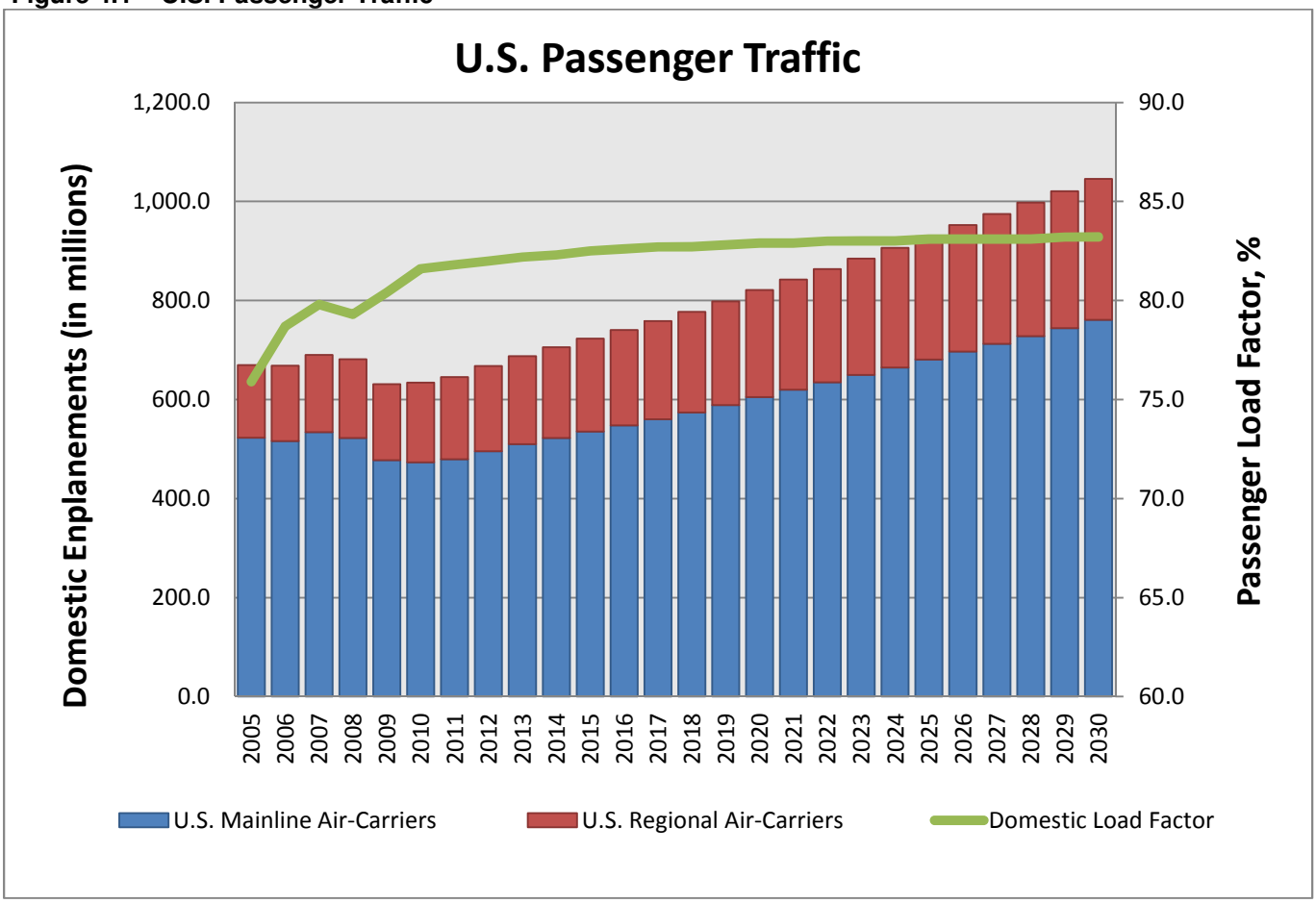
(1) Convergence of the network and low cost carrier business models
(2) Consolidation of activity at a small percentage of the nation's airports
(3) Delineation of markets between mainline and regional carriers

System capacity is forecasted to shrink by 1.6 percent (1.6%) in FY 2010 following the dramatic decreases during FY 2009. Mainline carriers capacity is forecasted to shrink for a third consecutive year down by 1.6 percent (1.6%), while regional carriers will increase capacity by 1.9 percent (1.9%). By 2010 and 2011 there are small gains in capacity projected for both mainline and regional carriers at 2.2 percent (2.2%) and 4.2 percent (4.2%) respectively. For the forecast period (2010-2030), domestic capacity is projected to increase at an average annual rate of 2.9 percent (2.9%), with mainline carriers at a slower rate than their regional counterparts at 2.7 percent (2.7%) and 4.0 percent (4.0%) respectively.

Passenger enplanements are forecast to grow 0.4 percent (0.4%) in 2010, following a 7.3 percent (7.3%) decline in 2009. Passenger volume is projected to increase in 2011 as the economy begins to recover, and is expected to grow at an average rate of 2.6 percent (2.6%) through the remainder of the forecast period. Throughout the forecast period, domestic enplanements are projected to grow at an average annual rate of 2.4 percent (2.4%) with mainline carriers growing at a slower rate than their regional carrier counterparts at 2.2 percent (2.2%) and 3.0 percent (3.0%) respectively. Total domestic enplanements are projected to increase from 522.3 million in 2008 to 760.9 million in 2030, as seen in **Figure 4.1**.

Passenger load factor is the ratio of the number of arriving-and-departing passengers to the number of arriving-and-departing seats. Commercial air carrier domestic load factor increased 1.1 points during FY 2009 to an all-time high of 80.4 percent (80.4%). Contributing to this increase are both mainline and regional carriers at 81.3 percent (81.3%) and 74.3 percent (74.3%) respectively. The load factor is forecast to increase in 2010 by 1.2 percent (1.2%) to 81.6 percent (81.6%), as the mainline carriers load factor increases by 1.2 percent (1.2%) and the regional carriers load factor falls by 1.5 percent (1.5%). Throughout the remainder of the forecast period, load factors will rise slowly peaking at 83.2 percent (83.2%) by 2030.

**Figure 4.1 – U.S. Passenger Traffic**




Source: FAA's Aerospace Forecasts Fiscal Year 2010-2030

Both mainline and regional carriers have been increasing the size of aircraft flown domestically, but for different reasons. Mainline carriers continue to retire older, less efficient aircraft for newer, more fuel efficient and slightly larger aircraft. Meanwhile, regional carriers are continuing their shift towards retiring the smaller 50 seat regional jets and replacing them with larger 70 and 90 seat regional jets. This trend in the regional market has taken hold as the regional carriers are better able to support operations of their mainline partners. The changing aircraft fleet mix is narrowing the gap between the size and aircraft types operated by the mainline and regional carriers.

Passenger trip length fell by 3.4 miles to 870.5 miles during 2009 after increasing 3.7 miles in 2008. In 2011, domestic passenger trip lengths are forecast to increase steadily for the balance of the forecast period, reaching 997.2 miles by 2030. These increases were reflected in both the mainline and regional markets as the mainline carrier's relinquish shorter length routes to regional partner carriers and focusing on longer domestic routes. Regional carrier trip lengths have also increased due to the continual transition towards larger 70 and 90 seat regional jets, allowing these carriers to service longer haul markets.

Another key factor in predicting aviation activity relative to passenger demand is the level of connecting versus non-stop traffic. However, as the current cycle of U.S. airline industry restructuring unfolds and hub structures change, the impact on local communities and airport activity levels can vary significantly.

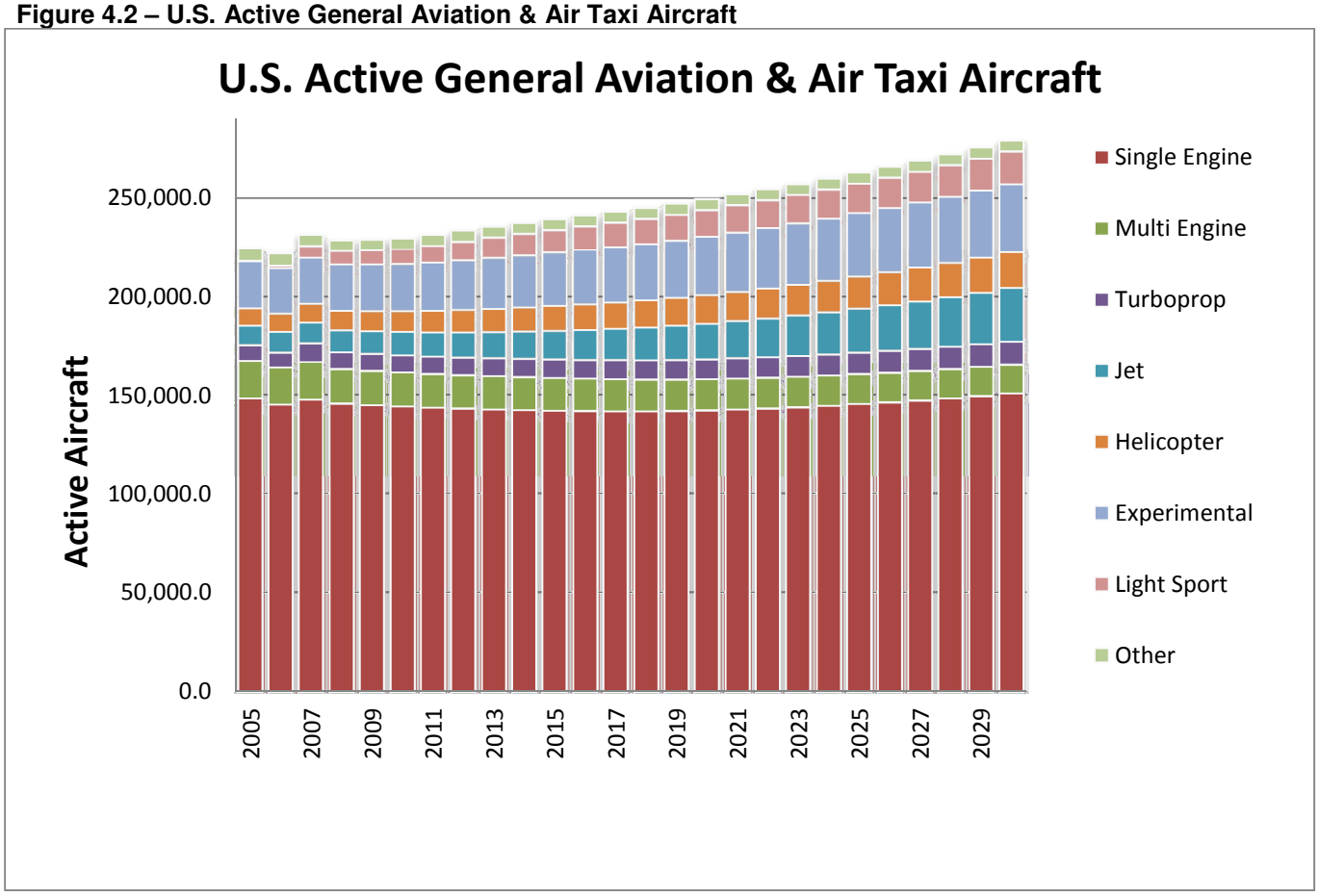
**4.2.b General Aviation**

As the demand for business jets has grown over the past several years, the FAA projects that business use of general aviation (GA) aircraft will expand at a more rapid pace than that for personal or sport use. The business side of general aviation should continue to benefit from an emerging market for new Very Light Jets (VLJs). VLJ's were forecast to boost the GA turbine aircraft market as the initial cost, operation, and maintenance for these aircraft are were believed to allow ownership to segments of the market that were previously priced out by the larger more expensive aircraft. In addition, corporate safety/security concerns for corporate staff, combined with increased processing times at many U.S. airports have made fractional, corporate, and on-demand charter flights practical alternatives to travel on commercial flights.

Since 2005, a new category of aircraft has been introduced to general aviation, the Light Sport Aircraft (LSA). It was believed that this new entry-level aircraft would boost single engine aircraft manufacturing numbers and translate into ownership opportunities for many pilots that were seeking the Light Sport Pilot Certificate. By the end of 2008 a total of 6,811 active aircraft were estimated to be in this category. The forecast assumes the fleet will increase approximately 825 aircraft per year until 2013, thereafter the rate will taper to about 335 aircraft per year. By 2030 a total of 16,311 light sport aircraft are projected to be in the fleet.

The active general aviation fleet is projected to increase at an average annual rate of 0.9 percent (0.9%), increasing from an estimated 229,149 in 2009 to 278,732 aircraft in 2030 as illustrated in **Figure 4.2**. The more expensive and sophisticated turbine-powered fleet (including rotorcraft) is projected to grow at an average of three percent (3.0%) a year over the 20-year forecast period with the turbine jet fleet increasing at 4.2 percent (4.2%) per year.

**Figure 4.2 – U.S. Active General Aviation & Air Taxi Aircraft**




Source: FAA's Aerospace Forecasts Fiscal Year 2010-2030

The number of piston-powered aircraft (including rotorcraft) is projected to decrease by 0.8 percent (-0.8%) from 2008 through 2017, with declines in both the single and multi-engine fixed wing aircraft, but showing growth in the smaller category of piston-powered rotorcraft. Beyond 2017 active piston powered aircraft are forecast to increase through 2030. During the forecast period piston-powered rotorcraft are projected to increase rapidly at 3.4 percent (3.4%) while the average increase for piston-powered aircraft as a whole is projected to be 0.2 percent (0.2%). In addition, it is assumed that new light sport aircraft and less expensive VLJs could erode the replacement market for traditional piston aircraft at the low and high ends of the market respectively.

## 4.3 Forecasting Approach

There are a number of different forecasting techniques available for projecting aviation activity, ranging from subjective judgment to sophisticated mathematical modeling. Due to the fact that a large number of variables affect a facility plan, it is important that each be considered. For variables that significantly affect the nature and extent of facilities, redundancy has been achieved through the utilization of several forecasting techniques to minimize the uncertainty associated with the range of the forecast variable.

This analysis includes the assessment of historical trends on aviation activity data at the local, regional, and national level. Aviation activity statistics on such items as passenger enplanements, aircraft operations, and based aircraft are collected, reviewed, and analyzed as well. Similarly, socioeconomic factors such as population and income are analyzed for the effect they may have on aviation growth. The comparison of relationships among these various indicators provides the initial step in the development of realistic forecasts of aviation demand. The following general methodologies were used in projecting various components of aviation demand at airports within the system.

Time Series Methodology. Historical trend lines and linear extrapolation are some of the most widely used methods of forecasting. These techniques utilize time-series types of data and are most useful for a pattern of demand that demonstrates a historical relationship with time. In utilizing this technique, an assumption is made that the same factors that have influenced demand will continue to affect future demand. While this is a rather broad assumption, it often provides a reliable benchmark for comparing the results of other analyses. Linear extrapolation establishes a linear trend by fitting a straight line using the least squares method to known historical data. Historic trend lines, as utilized in these analyses, examine historic compounded annual growth rates and extrapolate future data values by assuming a similar CAGR in the future.

Market Share Methodology. Market share, ratio, or top-down models, are utilized to scale larger aviation activity down to a local level. Inherent to the use of such a method is the demonstration that the proportion of the large-scale activity that can be assigned to the local level is a regular and predictable quantity. This method has been used extensively in the aviation industry for aviation demand forecasting at the local level. Its most common use is in the determination of the share of total national traffic activity that will be captured by a particular region or airport. Historical data is examined to determine the ratio of local airport traffic to total national traffic. Outside data sources are used, in this case the FAA, and projected levels of national activity are determined and proportioned to the airport based upon the observed and projected trends.

Socioeconomic Methodology. Socioeconomic or correlation analysis examines the direct relationship between two or more sets of historical data. In this case, socioeconomic analyses have been performed, relating historical aviation activity to historical population levels within the airport region. Based upon the observed and projected correlation between historical aviation activity and the socioeconomic data sets, future aviation activity projections are developed. In this case, historical and projected levels of socioeconomic factors such as population and per capita income were obtained from Woods & Poole Economics, Inc. This forecasting methodology is subject to how accurately an airport's activity reflects local demographic makeup.

## 4.4 Aviation Demand Projections

Aviation demand projections of enplanements, based aircraft, and aircraft operations were prepared for each of the 72 airports in the system. **Appendix A** contains the results of this effort for each airport. Projections for the air carrier airports, general aviation airports included in the National Plan of Integrated Airport Systems (NPIAS), and non-NPIAS general aviation airports were each developed differently as described below. The following sections summarize the findings for enplanements, based aircraft, and aircraft operations.

### 4.4.a Enplanements

Commercial service within South Dakota is currently provided at six airports. The air carrier airports within the State include:

- Aberdeen Regional Airport (ABR)
- Huron Regional Airport (HON)
- Pierre Regional Airport (PIR)
- Rapid City Regional Airport (RAP)
- Joe Foss Field Airport (FSD)
- Watertown Regional Airport (ATY)

For the purposes of this study, it is assumed that commercial airline service in South Dakota will continue to be provided by these six airports. South Dakota has two airports that are currently receiving support through the U.S. Department of Transportation Essential Air Service (EAS) program, including Huron Regional Airport in Huron and Watertown Regional Airport in Watertown. For the purposes of this assessment, it has been assumed that air carrier service will continue at these airports through the planning period.

In general, projections of enplanements at the commercial service airports were interpolated and summarized from recent airport master plan forecasts where available. Where recent master plan forecasts were not available or where the airport master plan forecasts were not tracking well with recent historical data, projections were obtained from the FAA's Terminal Area Forecast (TAF) system.

**Table 3** summarizes the results of the enplanement projections for the State's commercial service airports.

**Table 3 - Enplanement Projections**

| Airport | FAA Identifier | 2008 | 2015 | 2020 | 2030 |
|---|---|---|---|---|---|
| Aberdeen | ABR | 23,588 | 24,594 | 26,931 | 32,299 |
| Huron | HON | 2,570 | 2,615 | 2,648 | 2,715 |
| Pierre | PIR | 15,586 | 16,569 | 16,991 | 17,873 |
| Rapid City | RAP | 282,536 | 320,594 | 359,384 | 436,964 |
| Sioux Falls | FSD | 384,618 | 365,511 | 390,933 | 453,624 |
| Watertown | ATY | 4,860 | 5,058 | 5,058 | 5,058 |
| | *Total* | 713,758 | 734,941 | 801,945 | 948,533 |

Source: Airport Master Forecasts, FAA Terminal Area Forecast System, Mead & Hunt, Inc.

Commercial enplanements for the State are projected to increase from 713,000 in 2008 to nearly 950,000 by the year 2030, representing a CAGR of 1.3 percent (1.3%). Enplanements within the State are anticipated to remain dominated by those at the Rapid City Regional Airport in Rapid City and Joe Foss Field in Sioux Falls.

### 4.4.b Based Aircraft Projections

Nationally, the increases in new aircraft shipments that were recorded during the late 1990's and early 2000's have been replaced by sharp declines in the overall GA market. The active general aviation fleet witnessed a nationwide decrease in operations recorded by the FAA and federally contracted towered locations. The GA market has also experienced some mixed results within the past couple of years and is projected to increase at an average annual rate of 0.9 percent (0.9%), growing from an estimated 229,149 in 2009 to 278,723 aircraft in 2030. The more expensive and sophisticated turbine-powered fleet (including rotorcraft) is projected to grow at an average of three percent (3.0%) a year over the 20-year forecast period with the turbine jet fleet increasing at 4.2 percent (4.2%) per year. The increased sale of jet aircraft reflects largely the growing fractional ownership programs and the importance of business aviation to many of the nation's companies.

The number of based aircraft at each airport was obtained from various sources including FAA 5010 forms, the FAA Terminal Area Forecast (TAF) system, airport manager surveys, and site visit estimations for the 2008 base year. In general, FAA TAF data served as the basis for the air-carrier and NPIAS general aviation airports. FAA 5010 forms, airport manager interviews, and site visits served as the basis for those airports not found in the FAA TAF.

The FAA projects that the number of active aircraft in the U.S. will increase at 0.9 percent (0.9%) and the number of based aircraft in the State is projected to be slightly higher at one percent (1.0%). Based aircraft in the State are projected to increase from 1,291 to 1,607 by the year 2030 as shown in **Table 4**.

**Table 4 - Based Aircraft Projections**

| | 2008 | 2015 | 2020 | 2030 |
|---|---|---|---|---|
| ***Air Carrier Airports*** | | | | |
| Based Aircraft | 451 | 484 | 508 | 561 |
| Airports | 6 | 6 | 6 | 6 |
| Avg. Based Aircraft/Airport | 75 | 81 | 85 | 94 |
| ***NPIAS GA Airports*** | | | | |
| Based Aircraft | 809 | 867 | 912 | 1,007 |
| Airports | 51 | 51 | 51 | 51 |
| Avg. Based Aircraft/Airport | 17 | 18 | 19 | 21 |
| ***Non-NPIAS GA Airports*** | | | | |
| Based Aircraft | 31 | 33 | 35 | 39 |
| Airports | 15 | 15 | 15 | 15 |
| Avg. Based Aircraft/Airport | 2 | 2 | 2 | 2 |
| ***Statewide Total*** | | | | |
| Based Aircraft | 1,291 | 1,384 | 1,455 | 1,607 |
| Airports | 72 | 72 | 72 | 72 |
| Avg. Based Aircraft/Airport | 18 | 19 | 20 | 22 |

Source: Airport Master Forecasts, FAA Terminal Area Forecast System, Mead & Hunt, Inc.

Projections of a future general aviation fleet mix at each airport were derived from available airport master plan projections for air carrier airports and by applying national FAA projections regarding trends in aircraft types to historical trends in based aircraft fleet mix at the airports without air carrier service. **Table 5** contains a summary of based aircraft fleet mix projections.

**Table 5 - Based Aircraft Fleet Mix Projections**

| Year | Single Engine | Multi-Engine | Jet | Helicopter | Other | Total |
|---|---|---|---|---|---|---|
| 2008 | 975 | 222 | 14 | 19 | 68 | 1,298 |
| 2015 | 1,056 | 227 | 16 | 14 | 80 | 1,392 |
| 2020 | 1,109 | 238 | 17 | 14 | 84 | 1,463 |
| 2030 | 1,226 | 263 | 19 | 16 | 92 | 1,616 |

Source: Airport Master Forecasts, FAA Projections, Mead & Hunt

### 4.4.c Aircraft Operations Projections

Projections for the commercial airports, NPIAS general aviation airports, and non-NPIAS general aviation airports were each developed differently.

For the air carrier airports in general, projections of operations were interpolated and summarized from available airport master plan forecasts. When recent master plan forecasts were not available or when the airport master plan forecasts were not tracking well with recent historical data, projections were obtained from the FAA's TAF system.

For the NPIAS general aviation airports, historical aircraft operations data was generally obtained from the FAA TAF system and independent projections were developed. These projections were reviewed and accepted by FAA's Airports District Office for use in this study. For airports not found in the NPIAS, there was typically little if any historical operational data available, therefore estimates of current and projected aircraft operations were prepared based on FAA 5010 forms. **Table 6** summarizes the results of the aircraft operations projections for the State's airports.

**Table 6 - Aircraft Operations Projections**

| Year | Air Carrier | General Aviation | Military | Total |
|---|---|---|---|---|
| 2008 | 35,124 | 634,136 | 12,453 | 681,713 |
| 2015 | 34,925 | 656,666 | 10,116 | 701,707 |
| 2020 | 37,357 | 673,248 | 10,116 | 720,721 |
| 2030 | 42,936 | 707,678 | 10,116 | 760,730 |

Source: Airport Master Forecasts, FAA Terminal Area Forecast System, Mead & Hunt, Inc.

## 4.5 Summary of Aviation Demand Projections

**Table 7** summarizes the aviation demand projections developed for GA based aircraft and GA operations for the public use airports included within this study effort.

**Table 7 - Summary of System Airport Projections**

| Associated City | Projection | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| **Aberdeen** | Based Aircraft | 54 | 56 | 59 | 62 |
| | Operations | 55,848 | 57,219 | 58,625 | 60,795 |
| **Arlington** | Based Aircraft | 8 | 8 | 8 | 9 |
| | Operations | 2,071 | 2,123 | 2,177 | 2,232 |
| **Belle Fourche** | Based Aircraft | 32 | 34 | 36 | 37 |
| | Operations | 12,167 | 12,475 | 12,790 | 13,113 |
| **Bison** | Based Aircraft | 11 | 11 | 12 | 12 |
| | Operations | 5,903 | 6,052 | 6,204 | 6,361 |
| **Bowdle** | Based Aircraft | 1 | 1 | 1 | 1 |
| | Operations | 269 | 276 | 283 | 290 |
| **Britton** | Based Aircraft | 9 | 9 | 9 | 10 |
| | Operations | 6,627 | 6,795 | 6,966 | 7,142 |
| **Brookings** | Based Aircraft | 43 | 45 | 47 | 50 |
| | Operations | 33,611 | 34,455 | 35,320 | 36,207 |
| **Buffalo** | Based Aircraft | 4 | 5 | 5 | 5 |
| | Operations | 2,589 | 2,654 | 2,721 | 2,790 |
| **Canton** | Based Aircraft | 14 | 15 | 15 | 16 |
| | Operations | 6,420 | 6,582 | 6,749 | 6,919 |
| **Chamberlain** | Based Aircraft | 31 | 33 | 34 | 36 |
| | Operations | 18,432 | 18,898 | 19,375 | 19,864 |
| **Clark** | Based Aircraft | 8 | 8 | 8 | 9 |
| | Operations | 2,402 | 2,463 | 2,525 | 2,589 |
| **Clear Lake** | Based Aircraft | 2 | 2 | 2 | 2 |

| Associated City | Projection | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| | Operations | 1,968 | 2,017 | 2,068 | 2,120 |
| **Corsica** | Based Aircraft | 4 | 5 | 5 | 5 |
| | Operations | 1,036 | 1,062 | 1,088 | 1,116 |
| **Custer** | Based Aircraft | 16 | 17 | 18 | 19 |
| | Operations | 7,349 | 7,532 | 7,719 | 7,912 |
| **DeSmet** | Based Aircraft | 5 | 6 | 6 | 6 |
| | Operations | 1,698 | 1,741 | 1,785 | 1,830 |
| **Eagle Butte** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 2,123 | 2,176 | 2,231 | 2,288 |
| **Edgemont** | Based Aircraft | 5 | 6 | 6 | 6 |
| | Operations | 932 | 956 | 980 | 1,004 |
| **Eureka** | Based Aircraft | 31 | 33 | 34 | 36 |
| | Operations | 621 | 637 | 653 | 670 |
| **Fairburn** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 286 | 293 | 300 | 308 |
| **Faith** | Based Aircraft | 10 | 10 | 11 | 11 |
| | Operations | 3,107 | 3,185 | 3,265 | 3,348 |
| **Faulkton** | Based Aircraft | 21 | 23 | 24 | 25 |
| | Operations | 12,944 | 13,271 | 13,606 | 13,950 |
| **Flandreau** | Based Aircraft | 13 | 14 | 14 | 15 |
| | Operations | 3,935 | 4,034 | 4,136 | 4,241 |
| **Gettysburg** | Based Aircraft | 11 | 11 | 12 | 12 |
| | Operations | 10,873 | 11,148 | 11,429 | 11,718 |
| **Gregory** | Based Aircraft | 14 | 15 | 15 | 16 |
| | Operations | 6,731 | 6,901 | 7,075 | 7,254 |
| **Herreid** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 362 | 372 | 381 | 391 |
| **Highmore** | Based Aircraft | 38 | 39 | 41 | 44 |
| | Operations | 6,317 | 6,476 | 6,640 | 6,807 |
| **Hot Springs** | Based Aircraft | 17 | 18 | 19 | 20 |
| | Operations | 8,688 | 8,900 | 9,117 | 9,339 |
| **Hoven** | Based Aircraft | 3 | 3 | 4 | 4 |
| | Operations | 2,485 | 2,548 | 2,612 | 2,678 |
| **Howard** | Based Aircraft | 5 | 6 | 6 | 6 |
| | Operations | 1,968 | 2,017 | 2,068 | 2,120 |
| **Huron** | Based Aircraft | 43 | 45 | 47 | 50 |
| | Operations | 24,798 | 25,599 | 26,207 | 26,831 |
| **Isabel** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 87 | 89 | 91 | 94 |
| **Kadoka** | Based Aircraft | 4 | 5 | 5 | 5 |
| | Operations | 725 | 743 | 762 | 781 |
| **Kimball** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 311 | 319 | 327 | 335 |
| **Lake Andes** | Based Aircraft | 1 | 1 | 1 | 1 |
| | Operations | 238 | 244 | 250 | 257 |

| Associated City | Projection | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| **Lake Preston** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 85 | 87 | 89 | 92 |
| **Lemmon** | Based Aircraft | 13 | 14 | 14 | 15 |
| | Operations | 20,193 | 20,703 | 21,225 | 21,761 |
| **Madison** | Based Aircraft | 65 | 69 | 72 | 76 |
| | Operations | 25,888 | 26,542 | 27,212 | 27,899 |
| **Martin** | Based Aircraft | 5 | 6 | 6 | 6 |
| | Operations | 3,935 | 4,034 | 4,136 | 4,241 |
| **McIntosh** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 72 | 74 | 76 | 78 |
| **McLaughlin** | Based Aircraft | 2 | 2 | 2 | 2 |
| | Operations | 2,123 | 2,176 | 2,231 | 2,288 |
| **Milbank** | Based Aircraft | 16 | 17 | 18 | 19 |
| | Operations | 7,145 | 7,326 | 7,511 | 7,700 |
| **Miller** | Based Aircraft | 13 | 14 | 14 | 15 |
| | Operations | 8,543 | 8,759 | 8,980 | 9,207 |
| **Mitchell** | Based Aircraft | 34 | 36 | 38 | 40 |
| | Operations | 24,428 | 25,037 | 25,662 | 26,302 |
| **Mobridge** | Based Aircraft | 15 | 16 | 17 | 17 |
| | Operations | 17,945 | 18,397 | 18,861 | 19,336 |
| **Murdo** | Based Aircraft | 2 | 2 | 2 | 2 |
| | Operations | 1,036 | 1,062 | 1,088 | 1,116 |
| **North Sioux City** | Based Aircraft | 4 | 5 | 5 | 5 |
| | Operations | 336 | 344 | 353 | 362 |
| **Onida** | Based Aircraft | 14 | 15 | 15 | 16 |
| | Operations | 4,763 | 4,884 | 5,007 | 5,133 |
| **Parkston** | Based Aircraft | 9 | 9 | 9 | 10 |
| | Operations | 2,537 | 2,601 | 2,667 | 2,734 |
| **Philip** | Based Aircraft | 2 | 2 | 2 | 2 |
| | Operations | 2,778 | 2,836 | 2,895 | 2,955 |
| **Pierre** | Based Aircraft | 108 | 114 | 120 | 126 |
| | Operations | 29,333 | 29,992 | 30,668 | 31,361 |
| **Pine Ridge** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 1,036 | 1,062 | 1,088 | 1,116 |
| **Platte** | Based Aircraft | 12 | 12 | 13 | 14 |
| | Operations | 3,935 | 4,034 | 4,136 | 4,241 |
| **Presho** | Based Aircraft | 8 | 8 | 8 | 9 |
| | Operations | 4,349 | 4,459 | 4,572 | 4,687 |
| **Rapid City** | Based Aircraft | 134 | 141 | 148 | 156 |
| | Operations | 41,564 | 43,545 | 45,532 | 57,511 |
| **Redfield** | Based Aircraft | 14 | 15 | 15 | 16 |
| | Operations | 9,527 | 9,767 | 10,014 | 10,267 |
| **Rosebud** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 1,450 | 1,486 | 1,524 | 1,562 |
| **Sioux Falls** | Based Aircraft | 119 | 125 | 131 | 138 |

| Associated City | Projection | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| | Operations | 48,352 | 49,973 | 51,760 | 53,715 |
| **Sisseton** | Based Aircraft | 9 | 9 | 9 | 10 |
| | Operations | 5,695 | 5,839 | 5,987 | 6,138 |
| **Clyde Ice Field** | Based Aircraft | 79 | 83 | 88 | 92 |
| | Operations | 25,988 | 26,642 | 27,312 | 27,999 |
| **Springfield** | Based Aircraft | 13 | 14 | 14 | 15 |
| | Operations | 5,178 | 5,308 | 5,442 | 5,580 |
| **Sturgis** | Based Aircraft | 28 | 29 | 31 | 32 |
| | Operations | 23,610 | 24,206 | 24,817 | 25,444 |
| **Tea** | Based Aircraft | 81 | 86 | 90 | 95 |
| | Operations | 44,321 | 45,440 | 46,587 | 47,764 |
| **Timber Lake** | Based Aircraft | 8 | 8 | 8 | 9 |
| | Operations | 4,167 | 4,272 | 4,380 | 4,491 |
| **Vermillion** | Based Aircraft | 31 | 33 | 34 | 36 |
| | Operations | 16,051 | 16,456 | 16,872 | 17,298 |
| **Wagner** | Based Aircraft | 14 | 15 | 15 | 16 |
| | Operations | 8,595 | 8,812 | 9,034 | 9,263 |
| **Wall** | Based Aircraft | 10 | 10 | 11 | 11 |
| | Operations | 4,142 | 4,247 | 4,354 | 4,464 |
| **Watertown** | Based Aircraft | 36 | 38 | 40 | 42 |
| | Operations | 12,987 | 13,277 | 13,574 | 13,878 |
| **Webster** | Based Aircraft | 5 | 6 | 6 | 6 |
| | Operations | 2,175 | 2,230 | 2,286 | 2,344 |
| **Wessington Springs** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 155 | 159 | 163 | 167 |
| **White River** | Based Aircraft | 0 | 0 | 0 | 0 |
| | Operations | 29 | 30 | 30 | 31 |
| **Winner** | Based Aircraft | 11 | 11 | 12 | 12 |
| | Operations | 21,746 | 22,295 | 22,858 | 23,435 |
| **Yankton** | Based Aircraft | 45 | 47 | 50 | 52 |
| | Operations | 19,207 | 19,691 | 20,187 | 20,695 |

Source: Airport Master Forecasts, FAA Terminal Area Forecast System, Mead & Hunt, Inc.

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# Chapter 5 – System Analysis

## Introduction

In order to evaluate the current performance of the system, an analysis must be conducted which compares the existing system to the goals and objectives which have been established for the *South Dakota State Aviation System Plan* (SDSASP). Through this evaluation, the strengths and weaknesses of the current system are highlighted, and areas are identified for future improvement. The purpose of this Chapter is to analyze existing infrastructure and services against the visions for the future of the system.

## 5.1 Review of System Goals and Objectives

Three broad goals have been established for the SDSASP, including **Safety and Security, Maintenance and Development of Infrastructure,** and **Accessibility to Users**. These goals provide the base upon which the system plan has been built, and provide guidance for future planning, decision making, and investment for the next 20 years.

Objectives have been established in order to evaluate the system's performance in meeting each goal. They define the means and methods in which to achieve the established goals through an assessment of current and future needs. These objectives target facilities and services to help identify gaps in the system where goals are not being met. Furthermore, they provide a means to quantify the success in achieving each goal. **Table 1** outlines the goals and associated objectives of the SDSASP.

**Table 1 – Overview of Goals and Objectives**

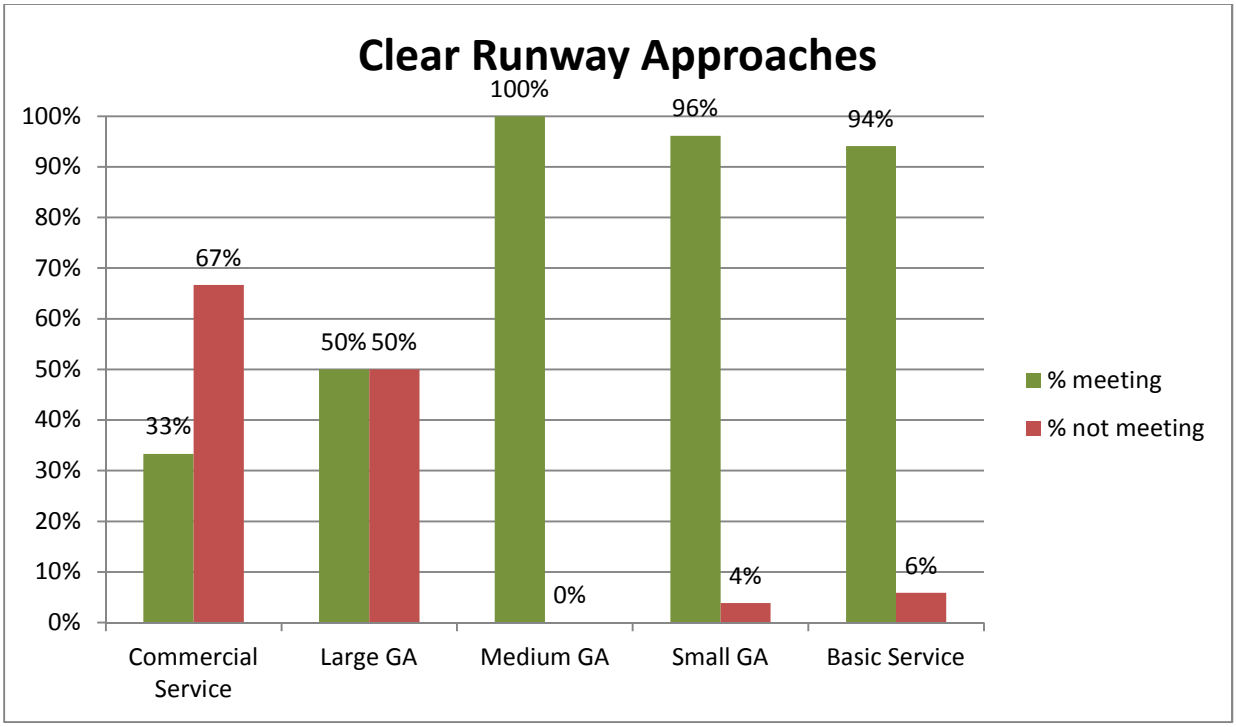
| Goals | Objectives |
|---|---|
| **Safety and Security** | • Clear Approaches |
| | • Emergency Response Plans |
| | • Airfield Access |
| **Maintenance & Development of Infrastructure** | • Infrastructure |
| | • Services |
| | • Pavement PCI |
| **Accessibility to Users** | • Reasonable Drive Time |
| | • Access to Weather Reporting |
| | • Access to Non-Precision or Instrument Approaches |

## 5.2 Safety and Security

The first goal of the SDSASP is to maintain a safe and secure system of airports. Airports can continue to function safely through the protection of existing facilities and surrounding areas. This can often be achieved through the regulation of runway approaches, the development of emergency response plans and security plans, along with controlling airfield access. Each of these elements are measured and summarized in the following sections.

- **Clear Approaches**
  The areas extending out from each runway end should be protected and kept clear of obstructions or incompatible uses. As a part of this assessment, the approaches to each runway in the system were evaluated for obstructions. Review of the current approaches indicates that 93.6 percent (93.6%) of the 220 runway ends in the system have clear approaches, while 6.4 percent (6.4%) of runway ends have an obstruction within their approach. **Table 2** identifies the percentage of airports that have clear runway approaches separated by individual airport role, while **Table 3** lists specific airports that do not have clear approaches on each end of all runways.

**Table 2 – Clear Runway Approaches**




Source: 2009/10 Survey Data

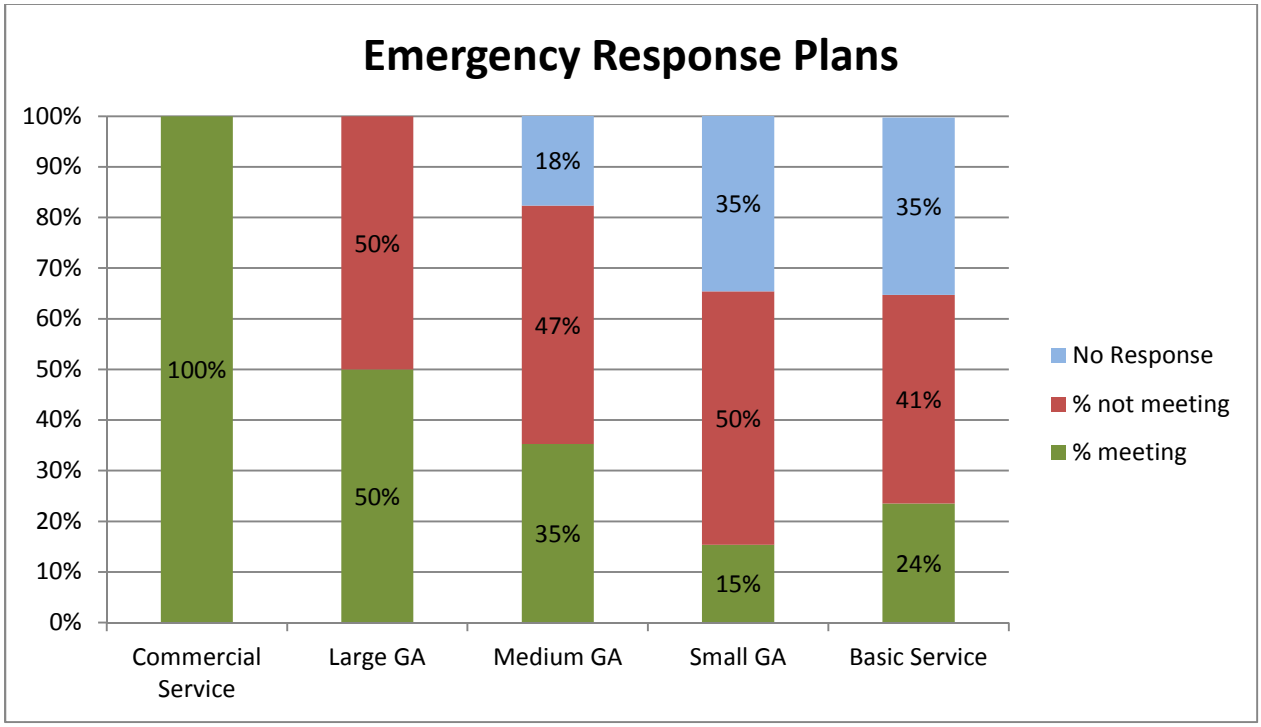
**Table 3 – Airports Not Meeting Objective for Clear Approaches**

| Commercial Service | Large GA | Medium GA | Small GA | Basic Service |
|---|---|---|---|---|
| Aberdeen (17 end) | Brookings (Rwy 12/30) | (none) | Flandreau(10 end) | Herreid (30 end) |
| Huron (30 end) | Madison (33 end) | | | |
| Sioux Falls (Rwy 3/21 & 15/33) | Yankton (13 end) | | | |
| Watertown (12 end & 35 end) | | | | |

Source: 2009/10 Survey Data

- **Emergency Response Plans**
  Emergency response plans identify procedures and guidelines for airport responses to emergencies, such as accidents and natural disasters, providing a predetermined course of action. These plans are often developed in a way that is appropriate to the size and type of operations an individual airport serves. Calculations of airports meeting this objective were broken out by airport role which can be seen in **Table 4**, while **Table 5** lists specific airports which do not have emergency response plans, or offered no response during the inventory effort.

**Table 4 – Emergency Response Plans**




Source: 2009/10 Survey Data

**Table 5 – Airports Not Meeting Objective for Emergency Response Planning**

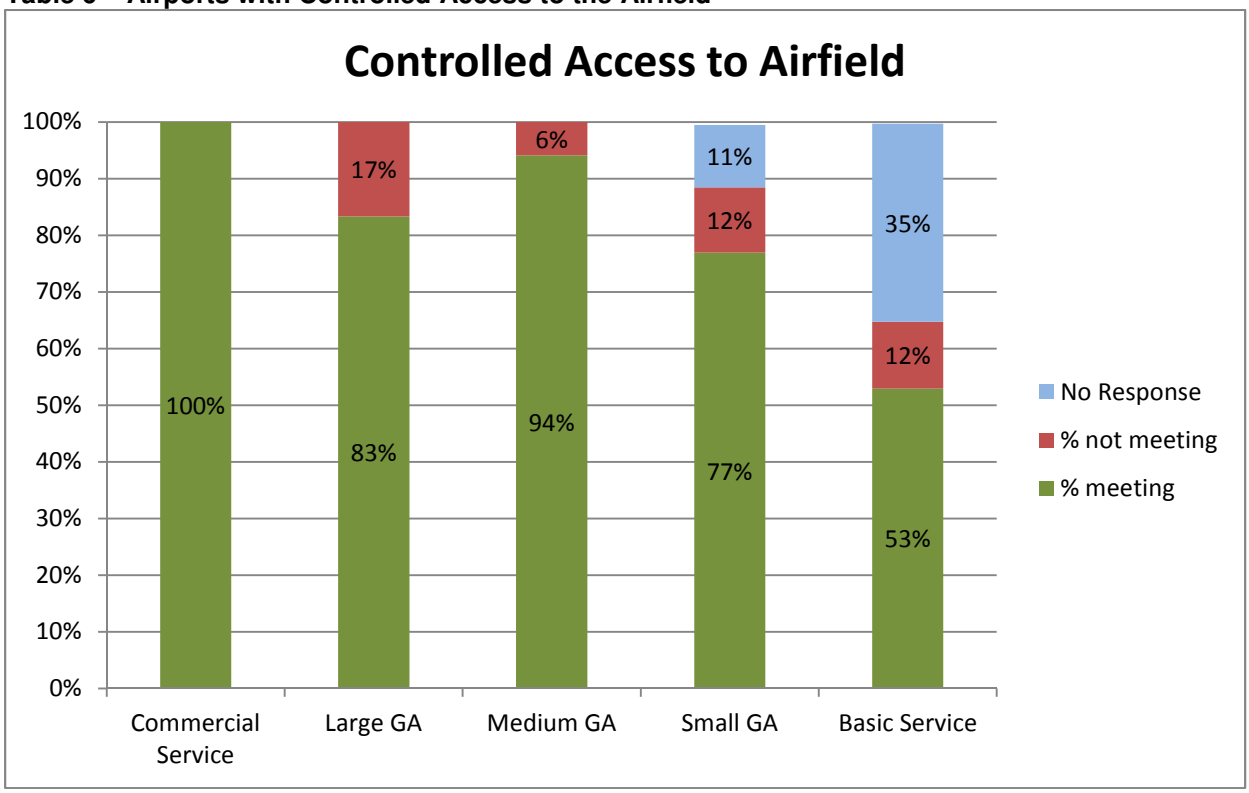
| Commercial Service | Large GA | Medium GA | Small GA | Basic Service |
|---|---|---|---|---|
| (none) | Madison<br>Black Hills Airport/ Clyde Ice Field<br>Marv Skie - Lincoln County | Belle Fourche<br>Britton<br>Miller<br>Mobridge<br>Philip<br>Redfield<br>Sturgis<br>Winner | Canton<br>Clark<br>Eagle Butte<br>Edgemont<br>Faulkton<br>Hoven<br>Martin<br>McLaughlin<br>Parkston<br>Platte<br>Rosebud Sioux Tribal Airport<br>Sisseton<br>Webster | Corsica<br>Fairburn<br>Herreid<br>Howard<br>Lake Preston<br>McIntosh<br>Presho |
| **NO RESPONSE:** | | Custer<br>Hot Springs<br>Lemmon | Bison<br>Buffalo<br>Eureka<br>Faith<br>Flandreau<br>Highmore<br>Pine Ridge<br>Springfield<br>Wessington Springs | Arlington<br>Bowdle<br>Clear Lake<br>Isabel<br>N. Sioux City<br>White River |

Source: 2009/10 Survey Data

- **Airfield Access**

  Airfield access to an airport should be properly controlled through the use of fencing and gates, and should be appropriate to the size and type of operations that an individual airport serves. Because appropriate control differs depending on the role of an individual airport, a simple question of whether or not the airfield access was controlled was asked during the airport manager survey effort. **Table 6** provides a look at the percentage of airports who indicated they have controlled access to their airfield according to airport role, while **Table 7** provides a listing of airports not meeting this objective, as well as those airports that provided no response during the inventory effort.

**Table 6 – Airports with Controlled Access to the Airfield**




Source: 2009/10 Survey Data

**Table 7 – Airports Not Meeting Objective for Controlled Airfield Access**

| Commercial Service | Large GA | Medium GA | Small GA | Basic Service |
|---|---|---|---|---|
| (none) | Marv Skie - Lincoln County | Redfield | Clark<br>Platte<br>Webster | Lake Andes<br>Lake Preston |
| **NO RESPONSE:** | | | Faith<br>Flandreau<br>Pine Ridge | Arlington<br>Bowdle<br>Clear Lake<br>Isabel<br>N. Sioux City<br>White River |

Source: 2009/10 Survey Data

## 5.3 Maintenance and Development of Infrastructure

The second goal of the SDSASP is to maintain and develop the State's aviation infrastructure to meet the existing and future needs of its users. Three objectives have been identified to maintain and develop adequate system infrastructure. Similar to the Safety and Security goal, each of these objectives are analyzed based upon individual airport roles. The following sections define the objectives in additional detail.

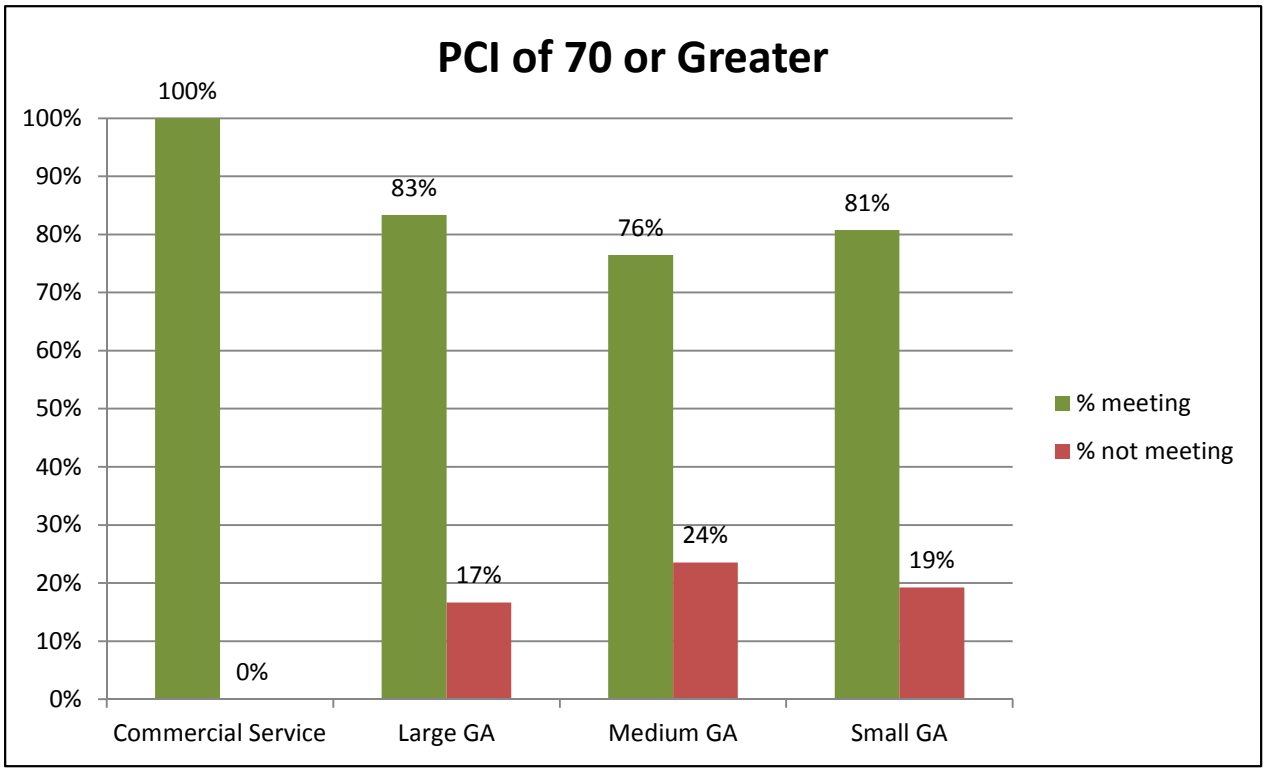
- **Infrastructure –** Existing aviation facilities, including runways, taxiways, and navigational aids (NAVAIDS) all compose system infrastructure. It is important that each element continue to meet user needs; therefore runway lengths should be adequate to support based aircraft, the taxiway system should allow for the efficient movement of aircraft around the airfield, NAVAIDS should meet the requirements of aircraft operating at an airport, and airports should be included in local land use plans to protect existing infrastructure and allow for future compatible development. Since infrastructure needs vary based upon airport role, a one-size-fits-all approach to the infrastructure objective cannot be established. Therefore a set of infrastructure targets has been developed according to airport role. A more detailed discussion of these targets can be found in Section 5.5 of this Chapter.

- **Services –** Through the provision of services, airports can serve a wide user base, and multiple types of operations. Services such as fuel availability, aircraft maintenance and repair capabilities, and ground transportation should be made available where possible, and be appropriate to the airport size and type of operations supported. Similar to the infrastructure objective, a one-size-fits-all measurement of services cannot be made for the system as a whole. As such, service targets have been identified for each of the five airport roles, which can be found in **Table 20** in Section 5.5 of this Chapter.

- **Pavement PCI –** The pavement condition index (PCI), is an indicator of the pavement condition (for runways, taxiways, and aprons) and is on a scale of 0-100, where 100 is the best condition,

and 0 is the worst. An airport with a rating of 100 is considered to be in optimal condition, whereas an airport with a PCI of 70 or greater is considered acceptable, and a PCI of less than 70 should be considered for maintenance such as rehabilitation or reconstruction. Therefore, an analysis of primary runway PCI was conducted in order to determine those runways with PCIs lower than 70 which should be considered for repair or rehabilitation in the future. **Table 8** indicates the percentage of system airports within each role which meet this objective, while **Table 9** lists specific airports which have a primary runway PCI of less than 70.

**Table 8 – Airports with Runway PCI of 70 or Greater**




Source: 2009/10 Survey Data

Note: PCI of 70 or greater was not an objective for Basic Service airports, as the majority of them have turf or gravel runways

**Table 9 – Airports Not Meeting Objective for PCI Measurement**

| Commercial Service | Large GA | Medium GA | Small GA | Basic Service |
|---|---|---|---|---|
| (none) | Marv Skie - Lincoln County | Britton<br>Redfield<br>Sturgis<br>Wagner | Canton<br>Clark<br>Flandreau<br>Hoven<br>Webster | N/A |

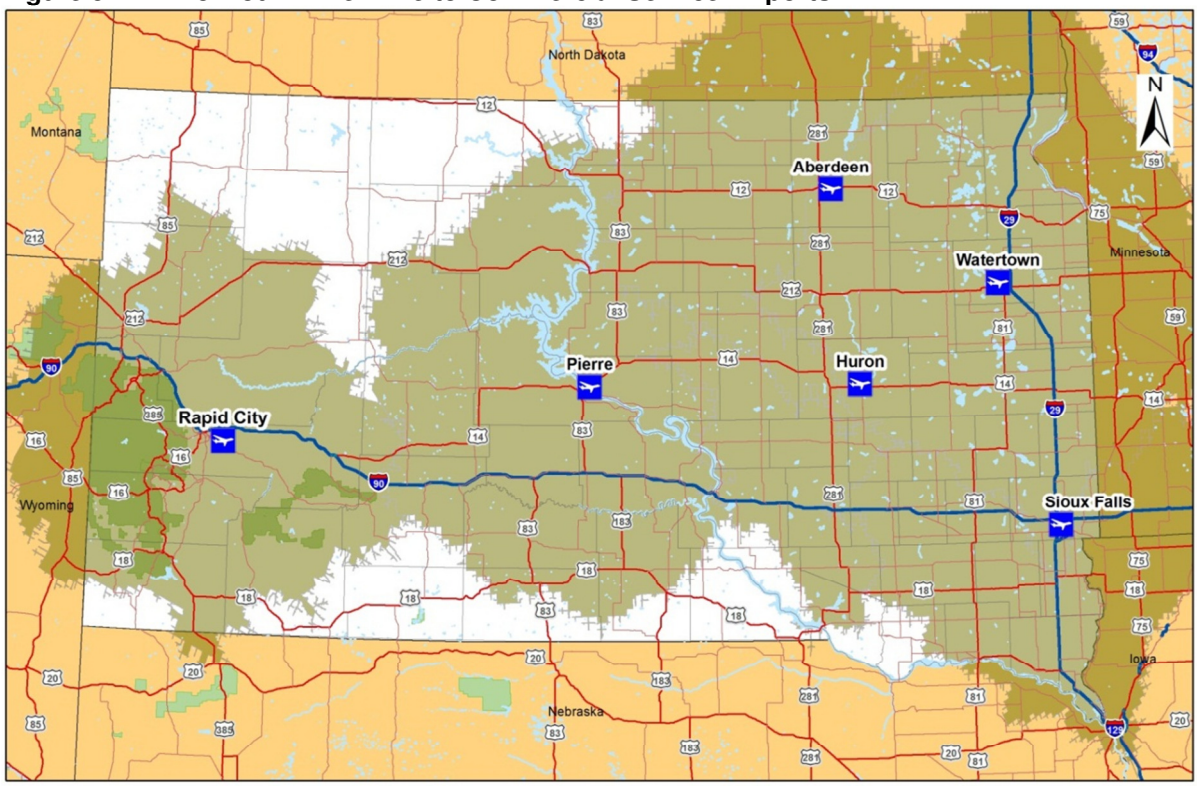
Source: 2009/10 Survey Data

## 5.4 Accessibility to Users

The third and final goal of the SDSASP is to provide airport access within a reasonable drive time for users, and to provide access to airports with adequate facilities for pilots. By providing adequate accessibility to airports from both the ground and the air, the system can serve a larger group of users and support operations in varying weather conditions. Three objectives have been developed to ensure adequate system accessibility; they are discussed in greater detail in the following sections.

- **Reasonable Drive Time** – Airports that are located within a reasonable drive time for users, provide a greater level of accessibility. Commercial service airports that are within a two-hour drive time from users, and general aviation airports that are within a 30-minute drive time are considered adequate to serve system users. As a part of this analysis, changes in both population and employment across the State has been taken into account to ensure that the majority of the population has adequate access to the aviation system. **Figure 5.1** illustrates the two-hour drive time around each of the commercial service airports, **Figure 5.2** illustrates the 30-minute drive time around each of the general aviation and basic service airports, and **Figure 5.3** illustrates both the commercial service and general aviation drive time buffers. **Figure 5.4** and **Figure 5.5** identify areas of estimated growth and decline in population and employment respectively.

**Figure 5.1 – Two-Hour Drive Time to Commercial Service Airports**

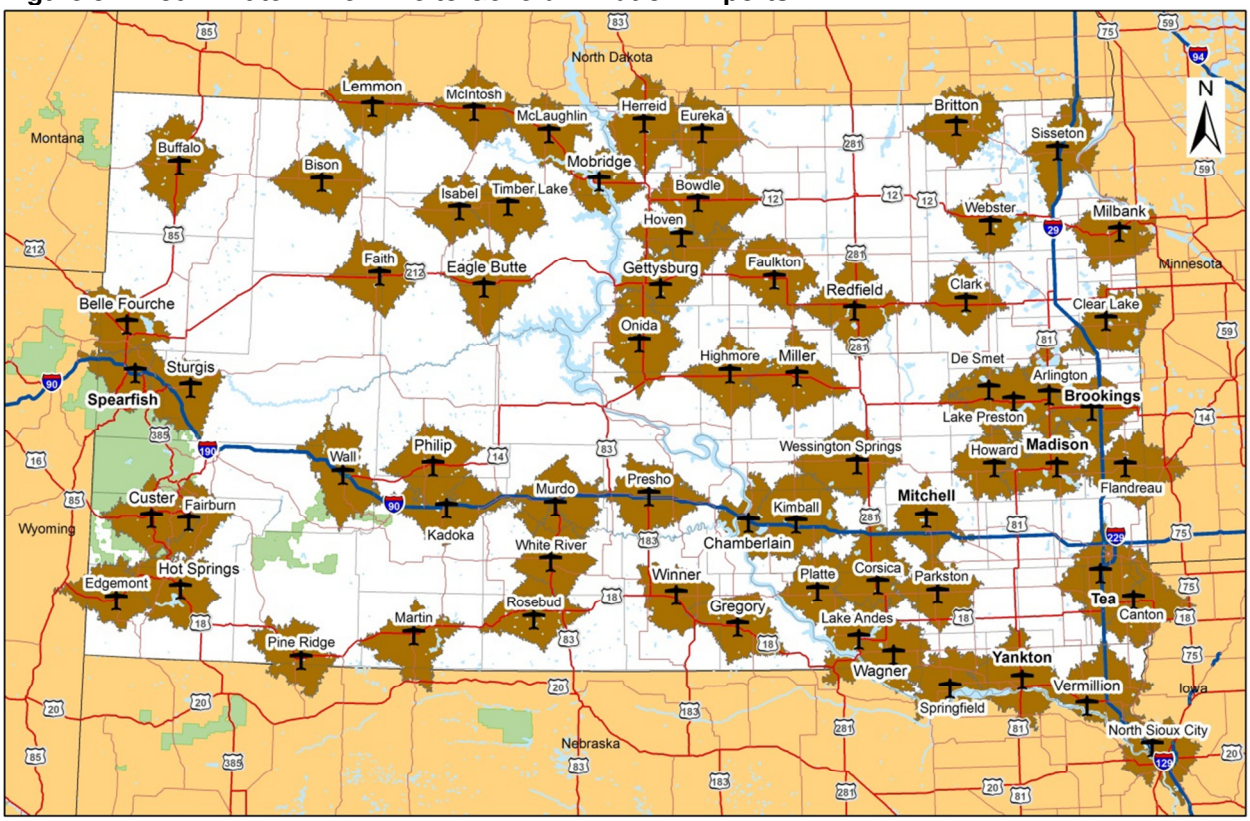



Commercial Service Airports
Commercial Airport 2 Hour Drive Time

NOTE: Airports are identified by associated City; actual Airport names may differ from the City name

Source: Kirkham Michael

**Figure 5.2 – 30-Minute Drive Time to General Aviation Airports**

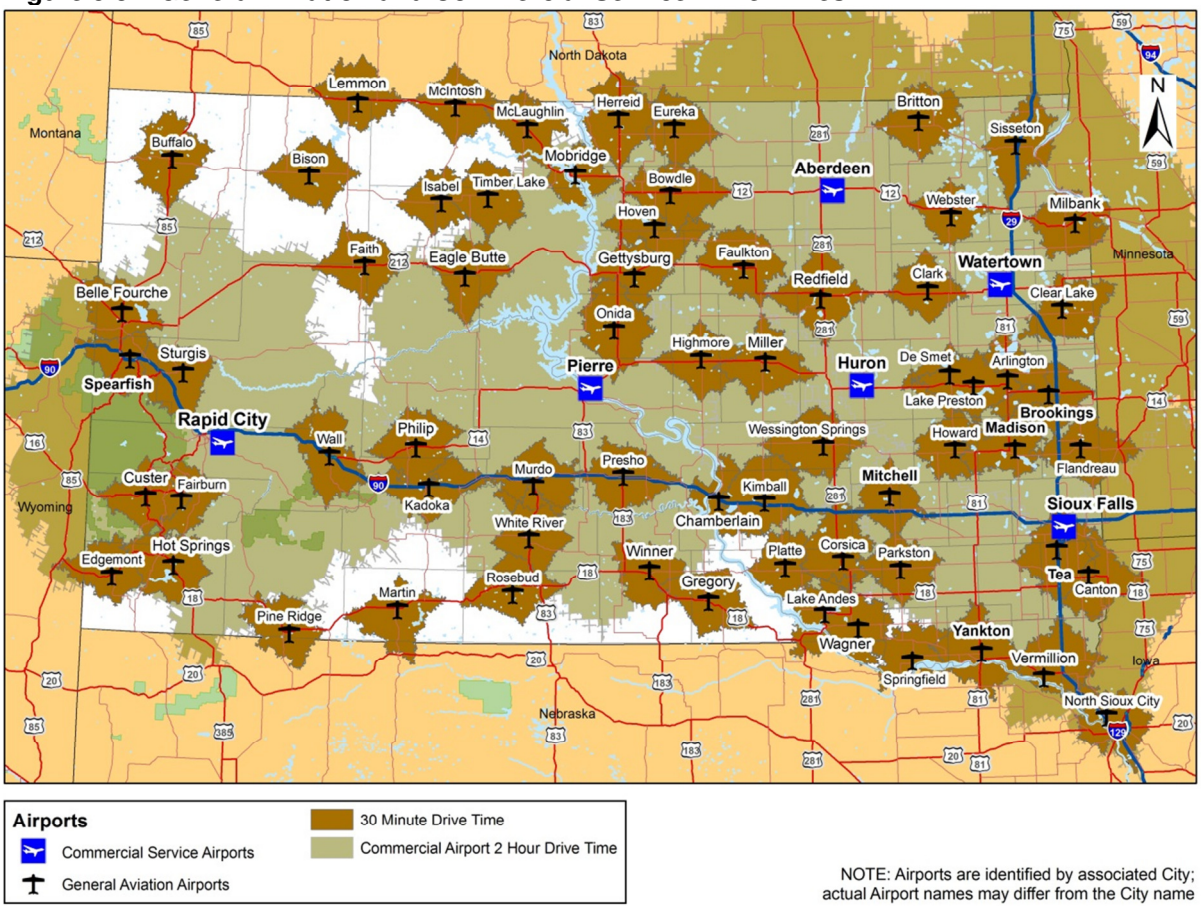



General Aviation Airports
30 Minute Drive Time

NOTE: Airports are identified by associated City; actual Airport names may differ from the City name

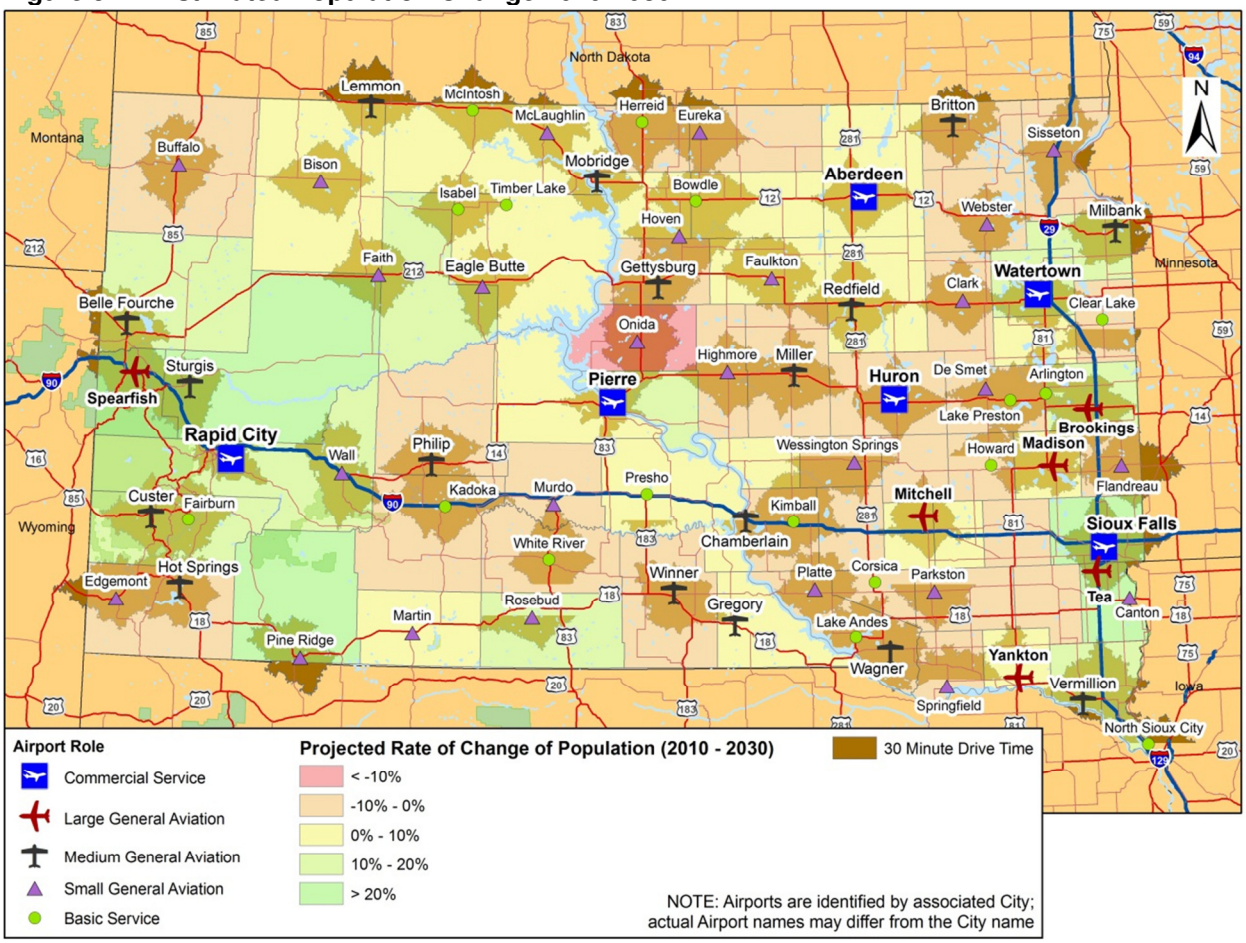
Source: Kirkham Michael

**Figure 5.3 – General Aviation and Commercial Service Drive Times**



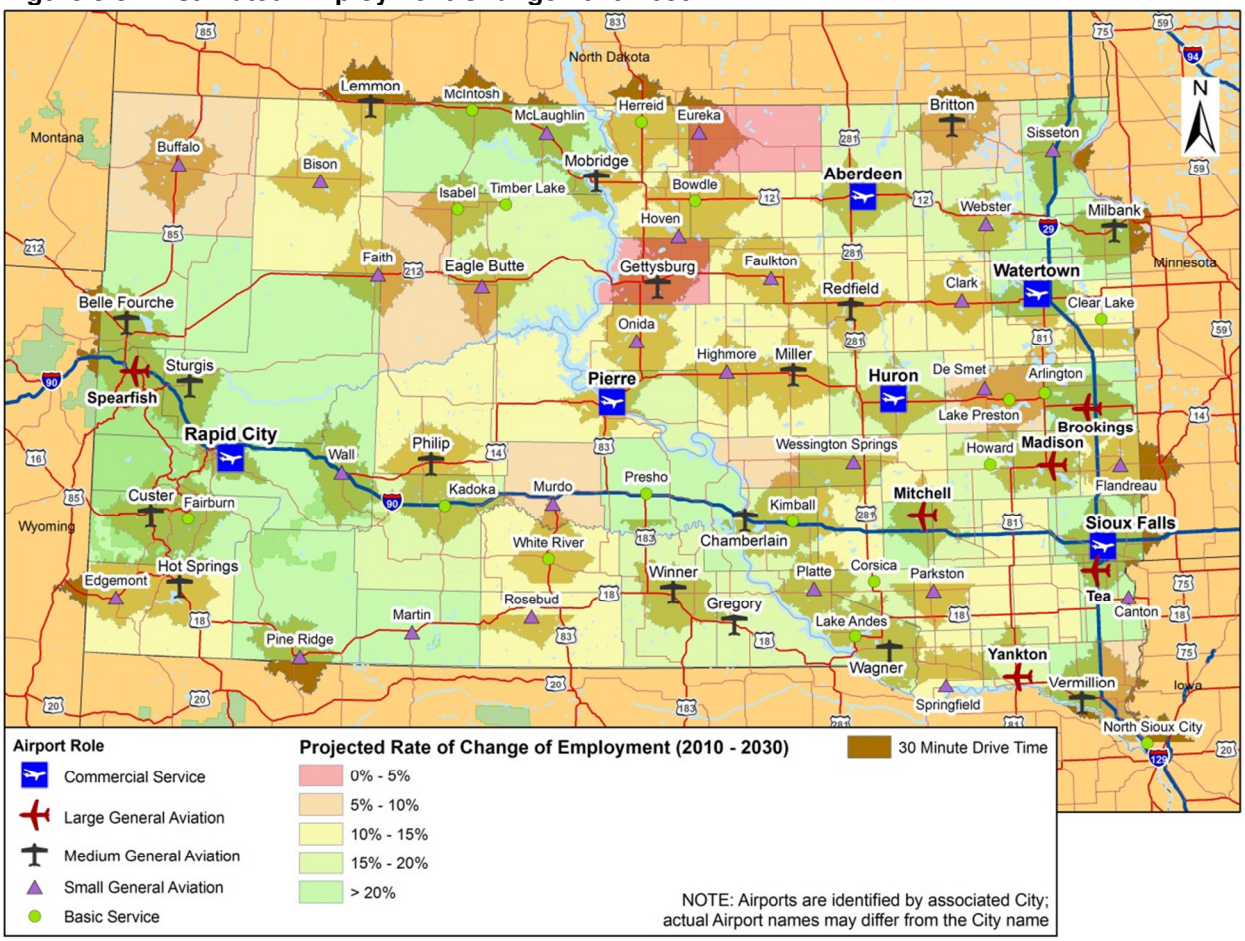

Source: Kirkham Michael

**Figure 5.4 – Estimated Population Change 2010-2030**




Source: Kirkham Michael

**Figure 5.5 – Estimated Employment Change 2010-2030**

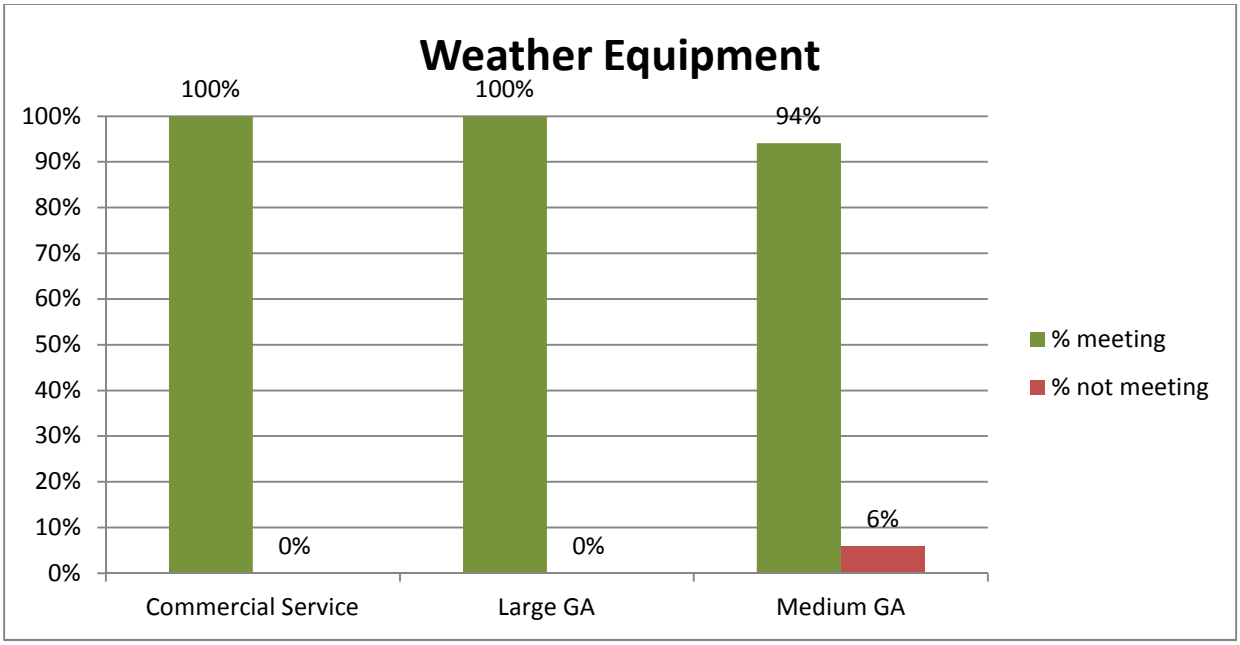



Source: Kirkham Michael

- **Access to Weather Reporting –** Weather reporting equipment at airports across the State allow pilots to operate aircraft in changing weather conditions, including adverse conditions. Furthermore, it allows pilots to plan future flights with accurate, up to date, weather information. **Table 10** highlights airports within the system which are equipped with weather reporting equipment, either ASOS or AWOS, broken up by airport role, while **Table 11** lists specific airports not meeting the objective. **Figure 5.6** illustrates a 30-minute drive time buffer around the airports which have weather reporting equipment. The following list outlines the objectives by role:

  -Commercial Service – ASOS or AWOS
  -Large General Aviation – ASOS or AWOS
  -Medium General Aviation – ASOS or AWOS
  -Small General Aviation – Not an Objective
  -Basic Service – Not an Objective

**Table 10 – Weather Reporting Equipment**



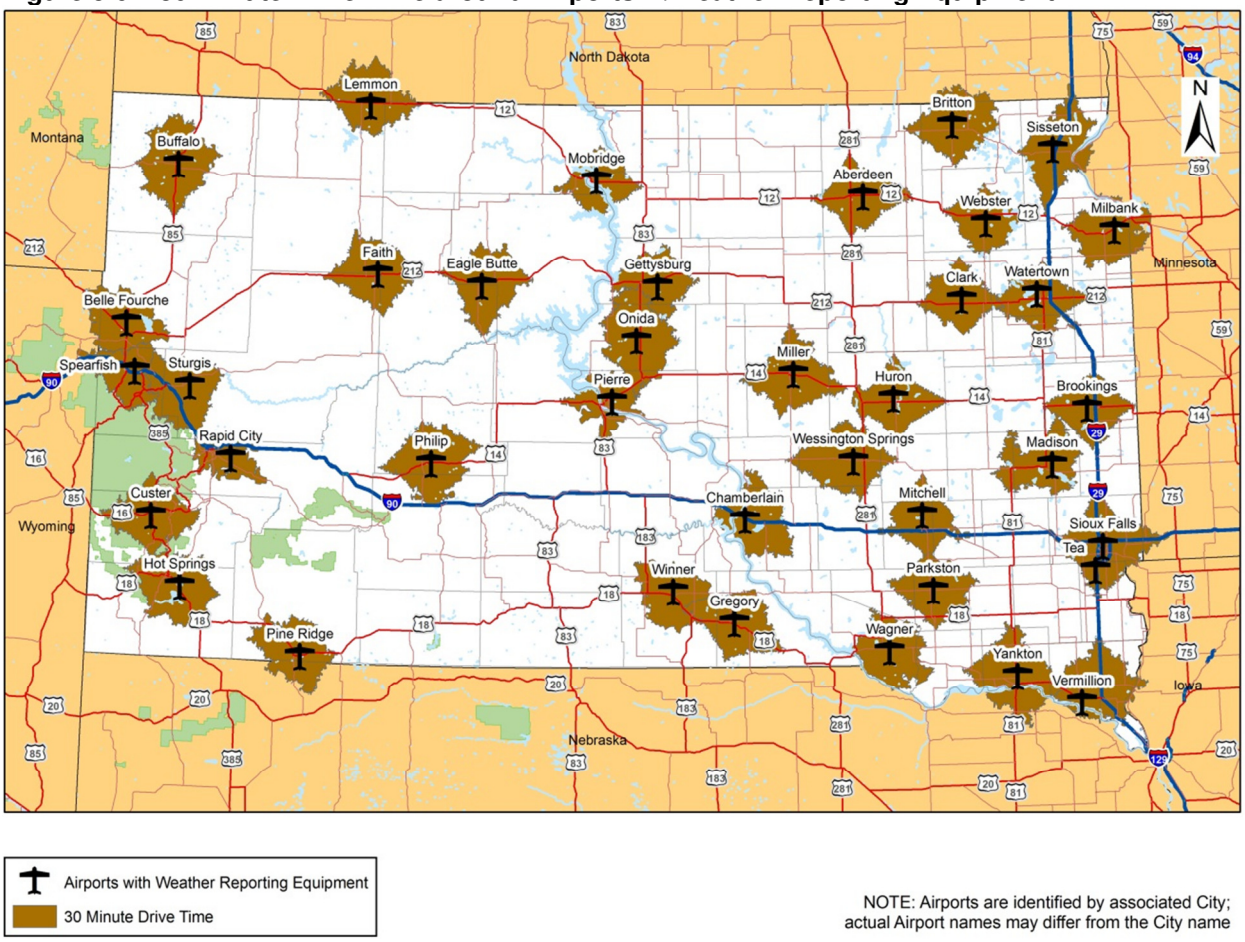

Note: Weather reporting equipment was not an objective for Small GA or Basic Service airports

**Table 11 – Airports Not Meeting Objective for Weather Reporting Equipment**

| Commercial Service | Large GA | Medium GA | Small GA | Basic Service |
|---|---|---|---|---|
| (none) | (none) | Redfield | N/A | N/A |

Source: 2009/10 Survey Data

**Figure 5.6 – 30-Minute Drive Time around Airports w/Weather Reporting Equipment**

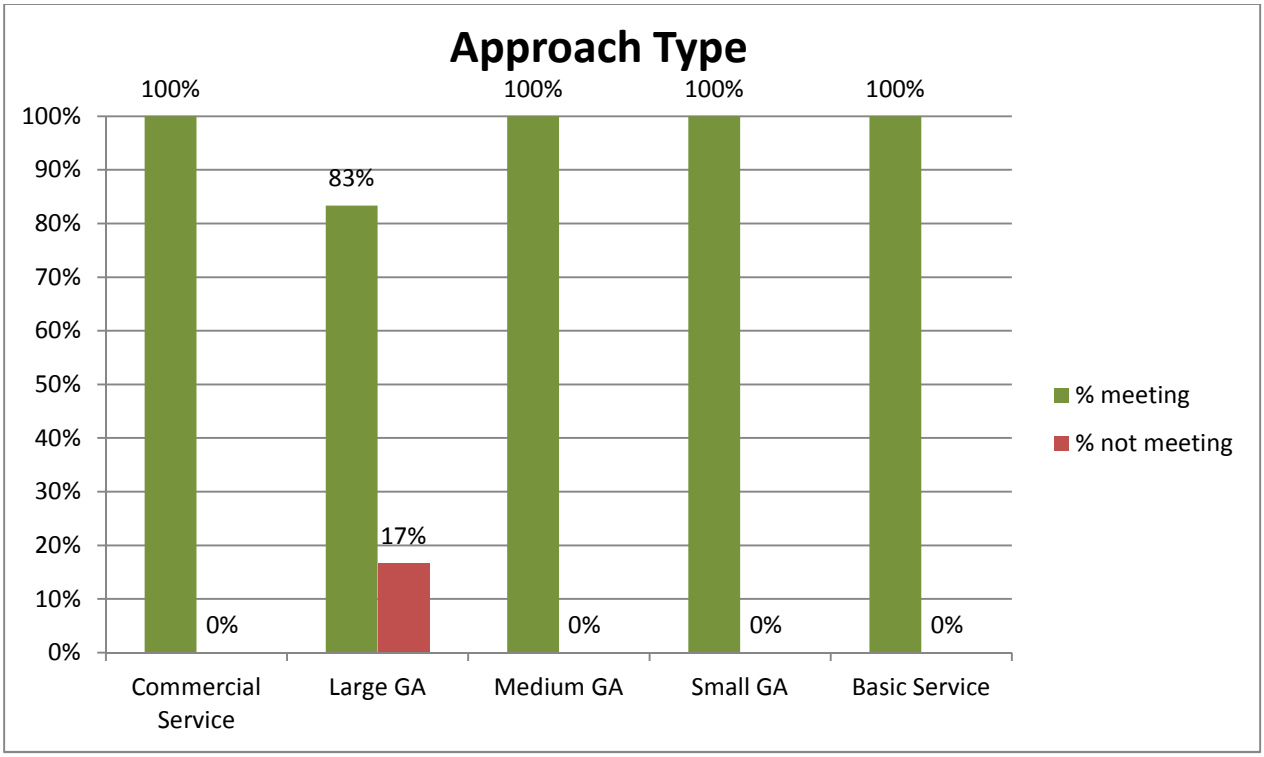



Source: Kirkham Michael

- **Access to Non-Precision or Instrument Approaches –** By providing more precise navigational aids, such as non-precision and instrument approaches – coupled with weather reporting equipment – an airport can support operations from a variety of aircraft in varying weather conditions. There are three types of approaches including precision (instrument), non-precision, and visual approaches. **Table 12** highlights the percentage of airports, per role, which are meeting their target (identified below) while **Table 13** indicates specific airports not meeting the objective.

  -Commercial Service – Precision
  -Large General Aviation – Non-Precision
  -Medium General Aviation – Non-Precision
  -Small General Aviation – Visual
  -Basic Service – Visual

**Table 12 – Primary Runway Approach Type**




Source: 2009/10 Survey Data

**Table 13 – Airports Not Meeting Objective for Approach Type**

| Commercial Service | Large GA | Medium GA | Small GA | Basic Service |
|---|---|---|---|---|
| (none) | Marv Skie - Lincoln County | (none) | (none) | (none) |

Source: 2009/10 Survey Data

The Marv Skie – Lincoln County Airport in Tea is unable to meet the non-precision approach target due to the geography of the area and surrounding development. As a result of the natural and built environment around the Airport, the land needed to establish a non-precision approach is not available, therefore this will not be able to be achieved at this location.

## 5.5 Facility and Service Targets

Beyond the development of goals and objectives for the SDSASP, the South Dakota DOT Office of Aeronautics elected to establish a set of targets for both facilities and services, which airports should strive for beyond those covered in the goals. The term target is used because the presence of these facilities or services is not required, except where used to define airport roles. These targets are recommended as suggested levels of services or facilities which would generally be considered appropriate for the type of use associated with each airport role. For example, the level of services expected at a Commercial Service or Large GA Airport are different than those associated with a Basic Service Airport. The targets are separated into three categories including airside facilities, landside

facilities, and services. Those targets which are already assessed through the role assignment process are highlighted in **Table 14.**

It is important to note that some airports may exceed their suggested targets, which is a benefit to the system. For example, the target for fueling may be to offer 100 low lead for a particular airport which provides both 100 low lead and Jet A fuel. In several instances, especially the Basic Service Airports, there are many targets that have not been established, and therefore, are listed as "not a target" for consideration. If an airport in this role meets the target, that is a benefit to the greater aviation system, however not meeting the target is not considered to be a detriment. A more detailed discussion of each target can be found in the following pages.

**Table 14 – Facility and Service Targets**

| FACILITY (Airside & Landside) AND SERVICE TARGETS | | | | | |
|---|---|---|---|---|---|
| **Description** | **Commercial Service** | **Large GA** | **Medium GA** | **Small GA** | **Basic Service** |
| **Airside Facilities** | | | | | |
| Airport Reference Code | C-II | C-I | B-II | B-I or below | A-I |
| Primary Runway Length | Minimum 6,500' | Minimum 5,000' | Minimum 4,200' | Minimum 3,000' | Not a Target |
| Primary Runway Width | Minimum 100' | Minimum 100' | Minimum 75' | Minimum 60' | Minimum 50' |
| Primary Runway Surface | Paved | Paved | Paved | Paved | Not a Target |
| Type of Parallel Taxiway | Full parallel | Full parallel | Turnarounds meet standards (both ends) | Exits as needed | Not a Target |
| Type of Runway Approach | Precision | Non-precision | Non-precision | Visual | Visual |
| Runway Lighting | MIRL | MIRL | MIRL | LIRL | Not a Target |
| Taxiway Lighting | MITL | MITL | MITL | Not a Target | Not a Target |
| Visual Guidance Slope Indicator | Both runway ends (or ILS) | Both runway ends | Both runway ends | Not a Target | Not a Target |
| Runway End Identifier Lights - as required | Both runway ends (or ILS) | Both runway ends | Both runway ends | Not a Target | Not a Target |
| Rotating Beacon | Yes | Yes | Yes | Yes | Not a Target |
| Lighted Wind Indicator | Yes - multiple as needed | Yes | Yes | If open for night | If open for night |
| RCO Facilities | Tower or RCO | Not a Target | Not a Target | Not a Target | Not a Target |
| Wind coverage or crosswind runway | Crosswind runway or 95% wind coverage for NPIAS facilities | Crosswind runway or 95% wind coverage for NPIAS facilities | Crosswind runway or 95% wind coverage for NPIAS facilities | Not a Target | Not a Target |

**Table 14 – Facility and Service Targets**

| FACILITY (Airside & Landside) AND SERVICE TARGETS | | | | | |
|---|---|---|---|---|---|
| **Description** | **Commercial Service** | **Large GA** | **Medium GA** | **Small GA** | **Basic Service** |
| **Landside Facilities** | | | | | |
| Covered storage | 100% of based aircraft | 100% of based aircraft | 100% of based aircraft | 100% of based aircraft | Not a Target |
| Overnight storage for business aircraft | Typical average aircraft/business user demand | Typical average aircraft/business user demand | Typical average aircraft/business user demand | Not a Target | Not a Target |
| Aircraft apron | 100% of average daily transients | 100% of average daily transients | 100% of average daily transients | 50% of average daily transients | Not a Target |
| Terminal/administration building | Yes | Yes | Yes | Waiting area | Not a Target |
| Paved entry/terminal parking | Yes | Yes | Yes | Not a Target | Not a Target |
| **Services** | | | | | |
| Fuel | 100LL & Jet A | 100 LL & Jet A | 100LL | Not a Target | Not a Target |
| Planning | | | | | |
| Height zoning | Yes | Yes | Yes | Yes | Yes |
| Comp plan define land uses | Yes | Yes | Yes | Yes | Yes |
| Emergency plan | Yes | Yes | Yes | Yes | Yes |
| Airport Layout Plan | ALP update within last 8 years | ALP update within last 10 years | ALP update within last 10 years | Yes | Not a Target |
| Attendance | | | | | |
| Weekday hours of operation | Standard business hours, after hours on-call | Standard business hours, after hours on-call | Standard business hours, after hours on-call | On-call | Not a Target |
| Weekend hours of operation | Standard business hours, after hours on-call | Standard business hours, after hours on-call | Standard business hours, after hours on-call | On-call | Not a Target |
| Ground transportation | Courtesy car/car rental available | Courtesy car/car rental available | Courtesy car/car rental available | Not a Target | Not a Target |
| Food & Beverage | Vending | Vending | Vending | Not a Target | Not a Target |
| Posted contact info | Yes | Yes | Yes | Yes | Yes |
| Internet access | Yes | Yes | Yes | Not a Target | Not a Target |
| Restroom | Yes | Yes | Yes | Yes | Not a Target |
| Pilot area | Yes | Yes | Yes | Not a Target | Not a Target |
| Security | Security plan | Security plan | Security plan | Security plan | Security plan |

**Table 14 – Facility and Service Targets**

| FACILITY (Airside & Landside) AND SERVICE TARGETS | | | | | |
|---|---|---|---|---|---|
| **Description** | **Commercial Service** | **Large GA** | **Medium GA** | **Small GA** | **Basic Service** |
| Rental aircraft | Based | Available | Available | Not a Target | Not a Target |
| Flight training | Available | Available | Available | Available | Not a Target |
| Aircraft maintenance/repair | Major | Minor | On-Call | Not a Target | Not a Target |
| Aircraft charter | Based | Available | Available | Available | Not a Target |
| Minimum FBO Standards | Yes | Yes | Yes | Not a Target | Not a Target |
| Weather reporting | Yes | Yes | Yes | Not a Target | Not a Target |

### 5.5.a Airside Facility Targets

- **Airport Reference Code (ARC)** – The ARC for each airport is generally defined by the types of facilities in place on the airfield or by the types of aircraft currently using the facility. The targets range from C-II for Commercial Service to A-I for Basic Service Airports.

- **Primary Runway Length** – The target runway lengths vary by the needs of the individual airports, however general classifications provide for a minimum of 6,500 feet in length for Commercial Service and 3,000 feet in length for Small GA, while Basic Service Airports do not have an objective since the majority have turf or gravel surfaces.

- **Primary Runway Width** – The runway width target is a product of the critical aircraft and the FAA design standards, ranging from a minimum of 100 feet in width for Commercial Service and Large GA Airports to a minimum of 50 feet in width for Basic Service Airports.

- **Type of Parallel Taxiway** – To increase the safe operations at an airport, taxiways are recommended in various configurations. Full parallel taxiways are recommended for Commercial and Large GA Airports while turnarounds at both runway ends that meet the individual design standards are recommended for Medium GA Airports. Small GA Airports are recommended to have exits as necessary from the runway to aircraft parking and hangar areas.

- **Type of Runway Approach** – Three targets are suggested to meet these criteria with Commercial Service Airports having vertically guided approaches, Large and Medium GA Airports having non-precision approaches and Small and Basic Service having only visual approaches.

- **Runway Lighting** – The runway lighting associated with the airport roles suggests a minimum of Medium Intensity Runway Lighting (MIRL) for Commercial Service, Large, and Medium GA Airports while Small GA Airports should have at least Low Intensity Runway Lighting (LIRL). Runway lighting is not a target for Basic Service Airports.

- **Taxiway Lighting** – Medium Intensity Taxiway Lighting (MITL) is recommended for Commercial Service, Large GA, and Medium GA Airports while no target is named for Small GA and Basic Service Airports.

- **Visual Guidance Slope Indicators (VGSI)** – To facilitate use of an airport in low-visibility situations, a recommended target for the Commercial Service Airports is to have indicators at both runway ends with a preferred option being an Instrument Landing System (ILS), while Large and Medium GA Airports should have guidance at both runway ends of their primary runway, using various methods.

- **Runway End Identifier Lights (REILs)** – Provision of REILs is a recommended target for the Commercial Service Airports at both runway ends with a preferred option being an ILS, while Large and Medium GA Airports should have these NAVAIDS at both runway ends for their primary runway.

- **Rotating Beacons** – To increase the visibility of an airport to the flying public, it is recommended that rotating beacons be installed at the four higher classifications of airports.

- **Lighted Wind Indicators** – Providing pilots with information on wind conditions at an airport, via lighted wind indicators is important and is a target for all of the airports in the system.

- **Remote Communications Outlets (RCOs)** – Providing RCOs for communication purposes are only established as a target for Commercial Service Airports.

- **Adequate Wind Coverage or a Crosswind Runway –** Criteria established by the FAA calls for an airport to provide adequate wind coverage of 95% with runways. Consequently, a target for Commercial Service, Large GA, and Medium GA Airports within the NPIAS is to meet 95% coverage.

### 5.5.b Landside Facility Targets

- **Covered Aircraft Storage** – Providing adequate storage of all based aircraft at an individual airport is a target and for all but the Basic Service Airports.

- **Overnight Storage for Business Aircraft** – Providing adequate overnight covered storage options for business and itinerant aircraft is a target for the Commercial Service and Large and Medium GA Airports.

- **Adequate Aircraft Apron Area** – Parking of transient aircraft is an important part of airport operations, therefore airports are encouraged to meet the needs of airport users by providing adequate apron areas. This is a target for all but the Basic Service Airports.

- **Terminal/Administration Building** - Having a dedicated structure that supports landside operations is a recommended target for Commercial Service, Large GA, and Medium GA Airports. Just a waiting area is considered to be acceptable for Small GA Airports, while Basic Service Airports do not have a target.

- **Paved Entry/Terminal Parking –** Providing adequate vehicular access and vehicular parking to accommodate the users of an airport is also important, therefore targets are established for Commercial Service, Large GA, and Medium GA Airports to meet the needs of their local user base.

**5.5.c Service Targets**

- **Fuel (type and hours) –** Targets for fuel types and hours of operation vary greatly by airport role, ranging from 24-hour single point access to 100 low lead fuel and Jet A fuel at Commercial Service and Large GA Airports to only 100 low lead fuel at Medium GA Airports.

- **Established Height Zoning –** To protect the airspace around an airport, the establishment of height zoning in proximity of an airport is encouraged for all airports, regardless of their role.

- **Local Comprehensive Plans Define Compatible Land Uses –** Since the local land use decisions that take place beyond the airport boundary are often governed by entities other than the airport sponsor, it is important to have local comprehensive plans both acknowledge the existence of local airports as well as include provisions to address compatible land use concerns in areas around the airports. This is an important issue for all airports and is encouraged for all airport roles.

- **Current Emergency Plans –** Airports of any size have the potential to have an emergency event take place on or near the airport and thus are encouraged to have adequate emergency plans in place that address the needs of the specific types of users. The Office of Aeronautics acknowledges that emergency plans should be tailored to meet the specific needs of an airport and individual airport roles should be used as a guide.

- **Current Airport Layout Plan (ALP) –** Airports that are part of the NPIAS are required to have an ALP on file with the FAA, consequently it is recommended that airports have a current ALP on file that accurately depicts the most recent development on the airport. For Commercial Service Airports an update is recommended to have taken place in the past eight years while Large and Medium GA Airports are encouraged to have updated their ALPs within the past ten years. Small GA Airports, even those that are not NPIAS airports, are encouraged to have a minimal ALP while Basic Service Airports are not expected to have an ALP**.**

- **Attendance**
  - **Weekday Hours of Operation –** Commercial Service, Large GA, and Medium GA Airports are expected to maintain standard business hours during the week and be available on-call after hours to meet user needs. Small GA Airports are encouraged to have attendance on-call as a minimum.

  - **Weekend Hours of Operation –** Commercial Service, Large GA, and Medium GA Airports are expected to maintain standard business hours on the weekend and be available on-call after hours to meet user needs. Small GA Airports are encouraged to have attendance on-call as a minimum.

- **Ground Transportation –** Providing some form of ground transportation is critical the busier the airport is. As such, Commercial Service, Large GA, and Medium GA Airports are all encouraged to provide courtesy cars and rental cars for use to reach destinations in the communities around airports. At Medium GA Airports, this does not mean there is an on-site rental car facility, but more likely there is a method or agreement in place where a local rental facility or car dealership can provide a car should one be requested.

- **Food & Beverage –** Providing at least vending machines for food and beverages is recommended for Commercial Service, Large GA, and Medium GA Airports.

- **Posted Contact Information** – To allow users to contact airport management or emergency contacts, providing a posted list of contact information is suggested for all airports.

- **Internet Access –** With the continued use of computers to access weather information and flight planning services, as well as general business use, Commercial Service, Large GA, and Medium GA Airports are encouraged to have internet access available, either wirelessly or through a dedicated computer.

- **Restroom Facilities –** Commercial Service, Large GA, Medium GA, and Small GA Airports are all recommended to have restroom facilities that are available to the public for use.

- **Pilot Area –** Since Commercial Service, Large GA, and Medium GA Airports serve corporate pilots, it is recommend that these airports provide a pilot area so they may relax and rest while waiting for their passengers to return.

- **Security –** All airports are encouraged to have a security plan that is appropriate to meet their individual needs, based upon their role classification.

- **Rental Aircraft –** In an effort to provide access to aircraft, it is recommended that Commercial Service Airports provide based rental aircraft, while Large GA and Medium GA Airports have access to rental aircraft through other means.

- **Flight Training –** In an effort to provide access to flight training, it is recommended that Commercial Service, Large GA, Medium GA, and Small GA Airports have flight training opportunities available at their airports. Based opportunities are preferred but on-call services are considered acceptable.

- **Aircraft Maintenance/Repair –** Providing access to aircraft maintenance and repair is important element in serving the aircraft within the State, consequently, it is recommended that Commercial Service Airports offer major repair, Large GA Airports offer minor repair, and Medium GA Airports have aircraft maintenance and repair opportunities on an on-call basis.

- **Aircraft Chapter Operations –** Providing access to aircraft charter opportunities is important in order to serve the flying public within the State, consequently, it is recommended that Commercial Service Airports have this service based at their airports while Large, Medium, and Small GA Airports are encouraged to have this service available on call at their airports.

- **Minimum FBO Standards** – The establishment of minimum FBO standards is a target for Commercial Service Airports, as well as Large and Medium GA Airports. Standards have not been identified as a target by the Office of Aeronautics for Small GA or Basic Service Airports**.**

- **Weather Reporting Equipment –** Since weather conditions have a significant impact on flight operations, the provision of weather reporting equipment is recommended as targets for Commercial Service, Large GA, and Medium GA Airports to meet the needs of their local user base.

## 5.6 Summary

Several elements both facility and service oriented within South Dakota's aviation system have been evaluated as a part of the system analysis. Overall, the system is meeting the majority of the objectives which have been established for the SDSASP; however this analysis has provided specific airports that are currently not meeting the system goals which should be targeted for future facility and service development.

Since the system is currently meeting the majority of the goals and objectives, efforts should be made to meet the targets identified for each airport role. These targets should guide future system development beyond the objectives in order to meet the existing and future needs of airport users.

# Chapter 6 – Economic Impact

## Introduction

This Chapter of the *South Dakota State Aviation System Plan* (SDSASP) takes a look at the economic contributions of airports and the aviation industry to both the State economy as well as local economies. These economic activities include on-airport economic activities, off-airport spending by visitors, and air travel and air cargo services required by South Dakota businesses.

To determine the total economic impacts of airports within South Dakota, on-airport economic activities, off-airport visitor spending, and spin-off impacts[1] are added together. Data for this economic impact study was collected directly from South Dakota airports, along with airport-related businesses, user survey efforts, the South Dakota Department of Transportation (DOT), the Nielson-Claritas Site Reports and U.S. Department of Commerce data.[2] All results are reported in 2010 dollars, and are reported to the nearest thousand to avoid false precision. Sections of this Chapter include:


6.1 Definitions
6.2 Surveys
6.3 Methodology
6.4 Total Statewide Contribution
6.5 On Airport Impact
6.6 Visitor Spending Impact
6.7 Agricultural Spraying Impact
6.8 Airport-Related Construction Impact
6.9 Off-Airport Dependency
6.10 Summary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[1] Spin-off impacts are also known as multiplier impacts, and are defined in Section 6.1.m.
[2] Nielson-Claritas Site Reports is an online data service that joins an establishment level data base with GIS capabilities. Department of Commerce data were aggregated and provided by MIG, Inc.

## 6.1 Definitions

The following section discusses the terms which are used to analyze the economic value of aviation to the State. These terms include various types of impacts and methods of assessing economic activity such as jobs, personal income, and business sales. Also included are some definitions related to the actual calculations such as false precision and core airports.

**6.1.a On-Airport Direct Impacts** represent economic activities that occur on airport grounds. Aviation related activities are those that would not occur without the airport, such as terminal services for passengers and pilots, aircraft maintenance, and security provided by the Transportation Security Administration (TSA). This category includes airport management and other individuals employed directly by the airport. Also included are the economic effects of temporary construction activities that have been calculated on a statewide basis from data supplied by the South Dakota DOT.

**Aviation Related Activities**

- Airlines
- Fixed Base Operators (FBO)
- Government, and other airport tenants
- Retail and service operations
- And more

**6.1.b Off-Airport Visitor Spending** is off-airport expenditures made by air travelers who are visiting from outside the region. Off-airport spending includes expenditures by general aviation pilots and passengers as well as commercial service passengers arriving via the six commercial service airports.

**Visitor Spending**

- Lodging
- Food
- Entertainment
- Recreation
- Retail purchases
- Ground transportation

**6.1.c Aviation-Dependent Impacts** represent area businesses that rely on aviation for business travel and cargo shipping services, and are not themselves located on airport or part of the visitor spending. For this study, these businesses include business owned based aircraft and other companies that were directly identified by airport managers. As a result, this is a conservative subset of the number of business within South Dakota that actually relies on aviation. These do not include businesses engaged in visitor services to avoid double counting with visitor spending.

**6.1.d Spin-Off Impacts** (economic multipliers) reflect the recycling of dollars through both the regional and state economy. Spin-off impacts are often reported as indirect and induced impacts. Indirect effects include the income of businesses that supply goods and services to airports, airport tenants, companies that receive visitors (hotels, restaurants, etc.) and off airport dependent businesses. Induced effects include the economic activity generated when direct employees (on airport, companies, visitor industries, and off-airport dependent businesses) and suppliers re-spend their wages on local consumer purchases.

The core concept behind spin-off impacts is that dollars spent in the economy do not disappear; rather, they move through the economy in successive rounds until incrementally exported from the region and

state. As aviation-related expenditures enter the economy, they circulate among other industry sectors, creating successive waves of additional economic benefit in the form of business sales, jobs, and personal income. These successive rounds of spending are the spin-off impacts and represent the full impact of each dollar generated due to aviation in South Dakota. Spending occurring outside the area is considered economic leakage and is not reflected in the economic multiplier. See **Figure 6.2** for an illustration of the relationship between direct and spinoff impacts.

**6.1.e Local Impact** refers to the contribution of each airport to the economy of its specific catchment area. These local areas may be one or more counties, depending on the size of an airport.

**6.1.f Regional Impact** refers to the contributions of airports within an area that is larger than the local area. In this instance, regional impact refers to areas that lie within regions defined by the Governor's Office of Economic Development, which is discussed in Section 6.1.l.

**6.1.g Statewide Impact** refers to the contributions of airports to the South Dakota state economy as a whole.

**6.1.h Business Sales** are the transactions that are made between customers and businesses that are made either as a result of the aviation industry directly (such as the purchase of fuel from a fixed base operator [FBO]), or indirectly between businesses that rely on air transportation of goods and people to conduct operations. In the case of public agencies, budget expenditures are used. Portions of these business sales/expenditures are used to (1) – purchase business supplies and services (generating indirect impacts); and (2) – to pay employees (generating induced impacts when the employees spend their pay).

**6.1.i Personal Income** refers to payroll. This includes the amount of money earned in a calendar year by an employee, as well as benefits, which are paid by an employer from the business sales that they earn.

**6.1.j Jobs** as referred to in the economic analyses found in this Chapter are those positions which are created as a result of the aviation industry in South Dakota. These positions are supported through the business sales/budget expenditures that are made.

**6.1.k Core Airports** were identified by the South Dakota DOT for analysis as a part of the SDSASP. These 27 airports (listed in **Table 1**) comprise the nucleus of the 72 public use airports within the aviation system. All six commercial service airports along with 21 general aviation airports were chosen. Combined, these 27 airports account for 100% of air carrier enplanements, 77% of total GA operations, and 87% of itinerant operations among public use airports in South Dakota. In addition to the analyses presented in the following pages, an individual airport report was generated for each of the core airports, which capture the economic impact of each airport individually. These can be found in **Appendix C**.

**6.1.l Regions** are based on the Governor's Office of Economic Development (GEOD) regions. Core airports were analyzed by each of the four GOED regions to identify the impact of aviation on a regional

level across the State. These regional analyses can be found in **Appendix D**. **Table 1** indicates the regional location of each of the core airports, while **Figure 6.1** shows their geographic location within the State.

**6.1.m Spinoff Impacts** are often referred to as multipliers. Spinoff impacts are generated when airports or airport dependent firms buy goods and services from other businesses within the local, regional or statewide areas, and by spending wages earned by workers on household purchases. The size of the spinoff effects vary with the scale of the economic region. For example, the multipliers of local areas are smaller than a broader region, which in turn is smaller than the State as whole. This is because more business suppliers and household services are found as geographic regions expand.

**6.1.n False Precision** is the use of limited data to convey precise totals. Throughout this analysis, an attempt was made to avoid misleading readers in giving the appearance of more accuracy than warranted by the data.

To avoid misleading readers, rounding was employed in two places. First, visitor spending per passenger, which is the aggregation of off-airport purchases of lodging, meals, transportation, entertainment, and retail, was rounded to the dollar. Secondly, and more importantly, all final totals for visitor spending, on-airport impacts, and airport dependency impacts were rounded to the nearest thousand. By rounding to the closest thousand dollar unit, this Study attempts to maximize reliability and avoid misleading readers by claiming false precision.

**Table 1 – Core Airports and Associated Regions**

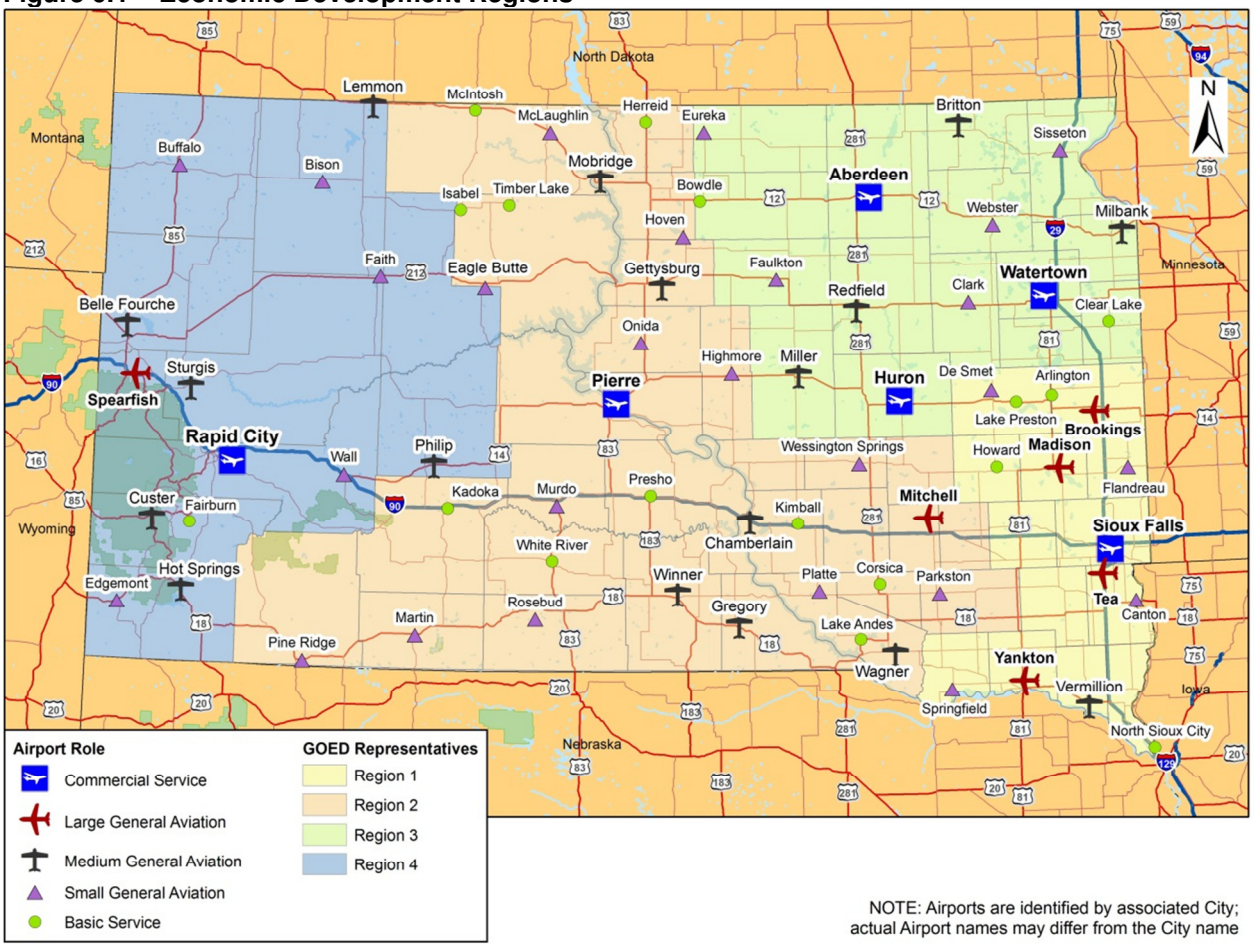
| Airport Name | County | GEOD Region |
|---|---|---|
| Gettysburg Municipal | Potter | 2 |
| Redfield Municipal Airport | Spink | 3 |
| Sturgis Municipal | Meade | 4 |
| Wall Municipal | Pennington | 4 |
| Canton Municipal | Lincoln | 1 |
| Cheyenne Eagle Butte | Ziebach | 4 |
| Parkston Municipal | Hutchinson | 2 |
| Highmore Municipal | Hyde | 2 |
| Harding County | Harding | 4 |
| Chamberlain Municipal | Brule | 2 |
| Aberdeen Airport | Brown | 3 |
| Watertown Airport | Codington | 3 |
| Brookings Airport | Brookings | 1 |
| Britton Municipal | Marshall | 3 |
| Custer County | Custer | 4 |
| Sioux Falls Airport | Minnehaha | 1 |
| Huron Airport | Beadle | 3 |

**Table 1 – Core Airports and Associated Regions**

| Airport Name | County | GEOD Region |
|---|---|---|
| Hot Springs Municipal | Fall River | 4 |
| Marv-Skie Lincoln Co/Tea | Lincoln | 1 |
| Winner Regional Airport | Tripp | 2 |
| Madison Municipal Airport | Lake | 1 |
| Mitchell Municipal Airport | Davison | 2 |
| Pierre Regional Airport | Hughes | 2 |
| Rapid City Airport | Pennington | 4 |
| Black Hills-Clyde Ice Field | Lawrence | 4 |
| Harold Davidson Field | Clay | 1 |
| Chan Gurney Muni / Yankton | Yankton | 1 |

Source: South Dakota DOT GEOD regions and EDR Group

**Figure 6.1 – Economic Development Regions**




Source: Kirkham Michael and South Dakota GOED

## 6.2 Surveys

To capture an accurate portrayal of the impact the aviation industry on the State economy, a multi-part survey effort was conducted over approximately eight months. Five surveys were developed including an airport manager survey, general aviation (GA) and commercial service passenger surveys, an agricultural spraying survey, and a business survey. The surveys were distributed in a hard copy format; however an on-line survey tool was available for completion of the various surveys on the internet. In some instances, additional follow-up was conducted via email and phone calls. Each survey is discussed in more detail in the following sections.

### 6.2.a Airport Manager Survey

An airport manager survey was distributed to each of the 72 public use airports in South Dakota. The survey asked airport managers to provide employment and aggregate payroll required for airport administration. In addition, managers were asked for contact information for airport tenants, businesses that base aircraft at their airport, businesses that rely upon the airport for the transportation of goods or personnel but do not own aircraft, and agricultural sprayers that use their airport. These contacts were used in the distribution of business and agricultural spraying surveys as discussed in Sections 6.2.c and 6.2.d.

### 6.2.b Passenger Surveys

GA and commercial service passenger surveys were distributed to each airport within the system according to the users they serve. Surveys were collected beginning in June 2010 and the survey period ended in January 2011. The responses received were catalogued and analyzed after the survey period had closed. The spending data collected as a part of the commercial service and GA survey effort was summarized by category including:

- Lodging
- Meals
- Transportation
- Entertainment
- Retail
- Other[3]

Survey distribution/collection centers were sent to all system airports that were willing to participate in an effort to be as inclusive in the data collection as possible. These survey collection centers included displays of surveys and ballot boxes for collection. Airport managers were responsible for the placement of the surveys within their individual airports. They also were responsible for returning completed surveys to the project team for analysis.

**Table 2** and **Table 3** summarize the average amount of money spent at both commercial service and GA airports in South Dakota. The results indicate a large difference in the amount of money spent by out-of-state visitors, versus in-state visitors which is to be expected since out-of-state visitors often have higher travel expenditures such as car rental

[3] Used to identify purchases specific to the Sturgis Motorcycle Rally or pheasant hunting activities made by air travelers.

and hotel costs. The Sioux Falls Regional Airport did not participate in the survey effort because they were concluding their own economic study. Consequently, the visitor spending listed for Sioux Falls is based upon their figures and not SDSASP surveys. It is important to note that airfare costs are not included in the "transportation" category since airfare is typically purchased at a visitor's home (not within the State) and the airlines are not located within the State.

**Table 2 – Average Visitor Spending at Commercial Service Airports (per visit)**

| Commercial Service Spending | | | | | | |
|---|---|---|---|---|---|---|
| **Out of State Visitors** | | | | | | |
| | Aberdeen | Watertown | Sioux Falls* | Huron | Pierre | Rapid City |
| Lodging | $63 | $38 | n/a | $74 | $138 | $111 |
| Meals | $80 | $70 | n/a | $110 | $82 | $81 |
| Transportation | $41 | $14 | n/a | $15 | $34 | $55 |
| Entertainment | $19 | $0 | n/a | $28 | $18 | $28 |
| Retail | $38 | $9 | n/a | $36 | $28 | $38 |
| **Total** | **$241** | **$130** | **$150** | **$263** | **$300** | **$313** |
| **In State Visitors** | | | | | | |
| Lodging | $72 | $40 | n/a | $18 | $22 | $23 |
| Meals | $35 | $40 | n/a | $17 | $15 | $13 |
| Transportation | $9 | $20 | n/a | $19 | $3 | $6 |
| Entertainment | $8 | $0 | n/a | $7 | $0 | $3 |
| Retail | $8 | $0 | n/a | $5 | $0 | $13 |
| **Total** | **$133** | **$100** | **$150** | **$66** | **$40** | **$58** |

*Commercial service passenger surveys were not received from Sioux Falls, however the Sioux Falls Convention and Visitors Bureau reports that the average Sioux Falls area visitor spends an estimate of $150 per day.
Source: Passenger survey responses analyzed by EDR Group, Sioux Falls Convention and Visitors Bureau

**Table 3 – Average Visitor Spending at General Aviation Airports (per visit)**

| General Aviation Spending (by region)* | | | | | | |
|---|---|---|---|---|---|---|
| **Out of State Visitors** | | | | | | |
| | 0 | 1 | 2 | 3 | 4 | Statewide |
| Lodging | $62 | $34 | $82 | $49 | $57 | $52 |
| Meals | $16 | $22 | $27 | $63 | $42 | $38 |
| Transportation | $11 | $7 | $6 | $18 | $16 | $13 |
| Entertainment | $0 | $6 | $34 | $11 | $19 | $15 |
| Retail | $5 | $7 | $10 | $10 | $17 | $12 |
| Other | $22 | $49 | $24 | $18 | $15 | $25 |
| **Total** | **$117** | **$125** | **$184** | **$168** | **$166** | **$156** |
| **In State Visitors** | | | | | | |
| Lodging | $0 | $5 | $7 | $10 | $3 | $6 |
| Meals | $6 | $3 | $20 | $17 | $6 | $9 |
| Transportation | $21 | $1 | $3 | $5 | $3 | $3 |
| Entertainment | $1 | $1 | $17 | $5 | $12 | $7 |
| Retail | $0 | $1 | $12 | $8 | $2 | $4 |
| Other | $0 | $16 | $0 | $22 | $16 | $15 |
| **Total** | **$28** | **$26** | **$60** | **$68** | **$42** | **$45** |

*Region 0 is comprised of survey responses which did not indicate an airport of destination.
Source: Passenger survey responses analyzed by EDR Group

### 6.2.c Agricultural Spraying Survey

An agricultural spraying survey was distributed to the businesses identified through the airport manager survey effort. Specific information was requested related to agricultural spraying activities including the number of employees at each company, the total annual business payroll, and the airports they use to base their agricultural spraying activities at (in many instances, more than one airport was reported). In addition, responses to the Business Survey (see Section 6.2.d) included agricultural sprayers that did not respond to this specific survey. The data received from sprayers through both survey efforts are summarized in Section 6.7.

### 6.2.d Business Survey

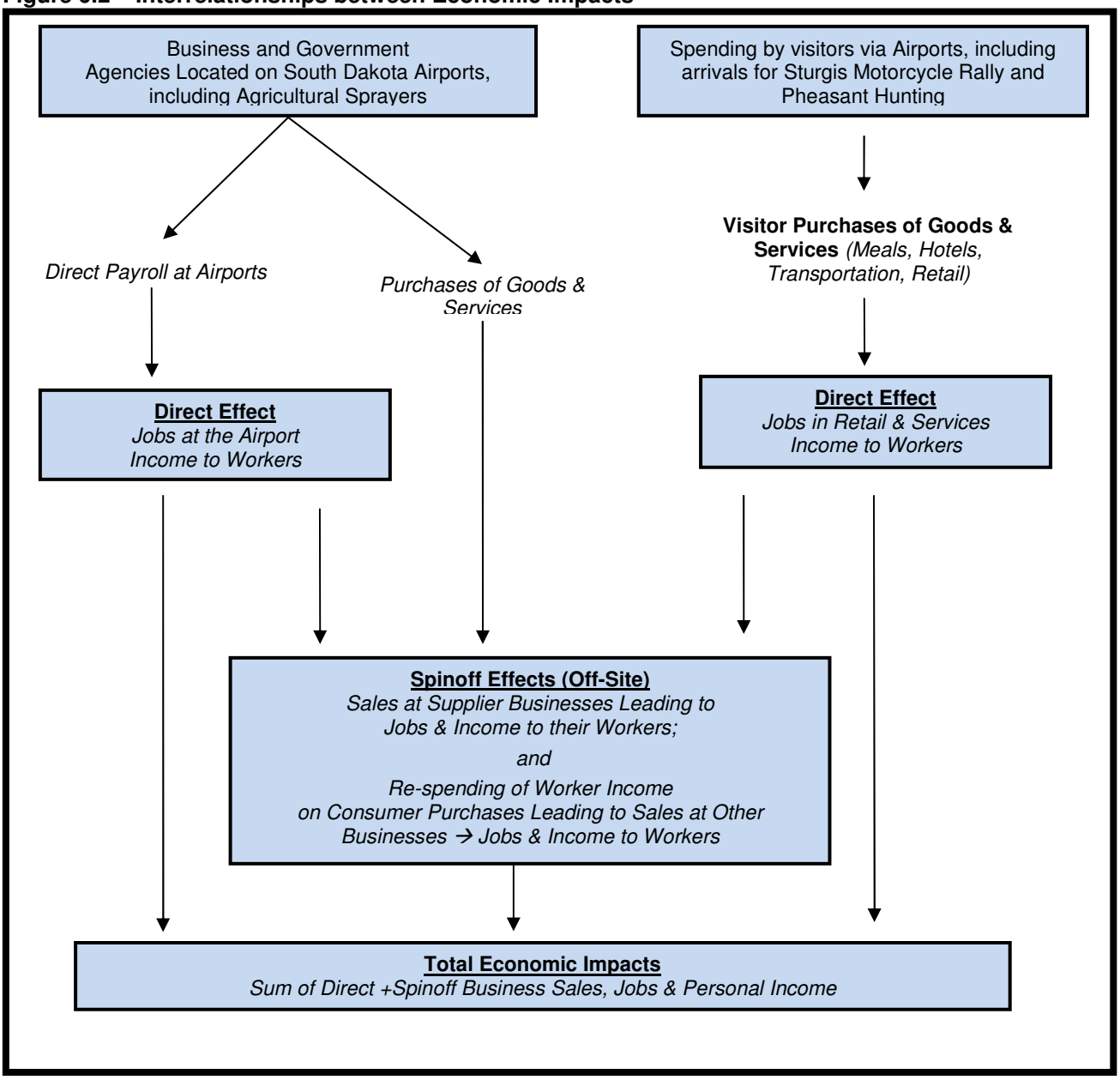
Similar to the agricultural spraying survey, the business survey was distributed to businesses identified through the airport manager survey effort. It is important to note that while these businesses rely directly on an airport, there are numerous additional businesses that are indirect beneficiaries of air transportation. The information collected through this survey effort is summarized in Sections 6.5 and 6.9.

## 6.3 Methodology

The term "economic impact" is commonly used to describe what is more accurately the "economic contribution" of airports to their local area; the broader economic development regions (GOED regions) defined by the State; and the statewide economy of South Dakota. As previously defined, the economic contributions of the State's public use airports are traced through several impacts including: on-airport, visitor effects, off-airport aviation dependent businesses, and spinoff effects.

These overall economic effects which include business sales, employment, and personal income—are interrelated and are part of a chain of economic activity. By generating additional business sales, airports also support the jobs created by this increase in business activity. A portion of the business sales revenue is used to pay wages and benefits for those jobs. Business sales, employment (jobs), and personal income are analyzed in each of the following sections. **Figure 6.2** identifies the interrelationships between direct and spinoff effects of business sales, jobs, and personal income, both direct and indirect to aviation activity.

**Figure 6.2 – Interrelationships between Economic Impacts**




Source: EDR Group.

An analysis of the impact of business sales, jobs, and personal income at three different levels has been conducted for this economic impact study. A different multiplier has been used for each of the levels to determine spinoff impacts:

- Local Impact – A smaller multiplier is applied to determine the spinoff effects (or recycling of money) within the immediate area surrounding an airport.
- Regional Impact – A larger multiplier is applied to determine the spinoff effects within the region an airport falls into as seen in **Figure 6.1**.

- State Impact – An even larger multiplier is applied to determine the spinoff effects within the State of South Dakota.

Statewide multipliers are higher than regional multipliers and regional multipliers are higher than multipliers of local catchment areas. The size of multipliers generally follows the size of an economy and the state economy is larger than its sub regions, and the regions (generally 25% of the State) have larger economies than local areas.

The local, regional, and statewide analyses examine the impacts of South Dakota's public use airports from different geographical perspectives. The primary difference is the reach of spin-off effects which are limited to local geographies, expanded to incorporate businesses across broader multi-county GOED regions, and include the total economy of South Dakota for the statewide analysis. Consequently, there is significant overlap among these three analyses. The statewide analyses of the impact of aviation on South Dakota's economy can be found in the following sections, while the regional and local analyses can be found in **Appendix D**.

To quantify the effect of continued re-investment of spending resulting from on-airport direct, off-airport direct (visitor spending), and airport dependent impacts – local, regional and statewide South Dakota multipliers were used from MIG, Inc. (formerly Minnesota IMPLAN Group, Inc.)[4]. Separate multipliers for each major industry group that represented on-airport tenants and visitor expenditures were used in order to increase accuracy. Industry groupings included air transportation, eating and drinking establishments, federal and state/local government, and other tenants and dependent industries.

MIG, Inc. provides the most widely used input-output economic modeling system in the U.S., with a client list of 500 public and private entities including several federal agencies and numerous state agencies. It utilizes U.S. Commerce Department ("National Income and Product Accounts") data on inter-industry technology relationships (also known as input-output structural matrices), countywide employment and income data from the Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS), and its own industry and county-specific estimates of local purchasing rates ("regional purchase coefficients"). It is enhanced over most other input-output models in that it also includes coverage of public sector activity and consumer activity (reflected in its "social accounting matrix"). The industry detail is at the level of 440 industries, and is based on categories of BEA, which correspond to 3 and 4-digit groups in the North American Industrial Classification System (NAICS).

[4] IMPLAN data at local geographical levels were used to calculate business sales and personal income from employment. Actual survey responses were used when wages were provided. In cases where multiple firms were present in a sector, but not all firms provided payroll, a weighted average based on employment was developed with IMPLAN data. In all cases the ratio of productivity to payroll ("business output"/payroll) derived from IMPLAN was used to estimate business sales.

## 6.4 Total Statewide Contribution

To determine the total impact of the aviation industry on the statewide economy, the impact coming from each of the core 27 airports including on-airport impacts, visitor spending (including the impact of the Sturgis Motorcycle Rally and pheasant hunting), agricultural spraying impacts, and impacts from airport construction have been combined. **Table 4** indicates that at the statewide level, over 7,000 jobs are supported, over $250 million is earned in personal income, and nearly $800 million in business sales are accounted for as a result of the air transportation system within South Dakota.

**Table 4 – Total Statewide Impact**

| Airport Name | Jobs | | | Personal Income | | | Business Sales | | |
|---|---|---|---|---|---|---|---|---|---|
| **Core Airports** | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| Aberdeen Airport | 198 | 107 | 305 | $6,971,000 | $3,823,000 | $10,794,000 | $20,687,000 | $11,041,000 | $31,729,000 |
| Black Hills-Clyde Ice Field | 85 | 39 | 124 | $2,414,000 | $1,668,000 | $4,082,000 | $8,639,000 | $4,141,000 | $12,781,000 |
| Britton Municipal | 8 | 2 | 10 | $205,000 | $73,000 | $278,000 | $629,000 | $276,000 | $904,000 |
| Brookings Airport | 94 | 46 | 141 | $5,459,000 | $1,568,000 | $7,027,000 | $8,664,000 | $4,897,000 | $13,561,000 |
| Canton Municipal | 5 | 2 | 7 | $137,000 | $68,000 | $205,000 | $505,000 | $216,000 | $721,000 |
| Chamberlain Municipal | 16 | 6 | 22 | $350,000 | $186,000 | $536,000 | $1,237,000 | $616,000 | $1,854,000 |
| Chan Gurney Muni / Yankton | 29 | 11 | 40 | $642,000 | $310,000 | $952,000 | $3,147,000 | $1,411,000 | $4,559,000 |
| Cheyenne Eagle Butte | 4 | 1 | 5 | $64,000 | $38,000 | $102,000 | $227,000 | $136,000 | $363,000 |
| Custer County | 18 | 10 | 27 | $664,000 | $234,000 | $898,000 | $1,330,000 | $756,000 | $2,087,000 |
| Gettysburg Municipal | 11 | 3 | 14 | $427,000 | $135,000 | $563,000 | $1,320,000 | $531,000 | $1,850,000 |
| Harding County | 2 | 1 | 3 | $37,000 | $29,000 | $66,000 | $228,000 | $110,000 | $339,000 |
| Harold Davidson Field | 7 | 5 | 12 | $150,000 | $116,000 | $266,000 | $729,000 | $295,000 | $1,024,000 |
| Highmore Municipal | 12 | 4 | 17 | $314,000 | $106,000 | $420,000 | $1,060,000 | $415,000 | $1,474,000 |
| Hot Springs Municipal | 10 | 5 | 15 | $184,000 | $122,000 | $305,000 | $384,000 | $219,000 | $603,000 |
| Huron Airport | 273 | 184 | 457 | $10,956,000 | $7,829,000 | $18,786,000 | $59,185,000 | $27,268,000 | $86,453,000 |
| Madison Municipal Airport | 42 | 18 | 60 | $1,006,000 | $443,000 | $1,448,000 | $4,467,000 | $1,943,000 | $6,411,000 |
| Marv-Skie Tea | 31 | 19 | 50 | $941,000 | $706,000 | $1,646,000 | $4,443,000 | $2,055,000 | $6,498,000 |
| Mitchell Municipal Airport | 223 | 87 | 310 | $3,990,000 | $2,365,000 | $6,355,000 | $13,432,000 | $7,886,000 | $21,317,000 |
| Parkston Municipal | 3 | 1 | 5 | $73,000 | $44,000 | $118,000 | $348,000 | $164,000 | $512,000 |
| Pierre Regional Airport | 671 | 269 | 940 | $12,741,000 | $7,314,000 | $20,056,000 | $44,138,000 | $24,796,000 | $68,934,000 |
| Rapid City Airport | 800 | 436 | 1,235 | $25,094,000 | $18,426,000 | $43,521,000 | $117,802,000 | $61,165,000 | $178,966,000 |
| Redfield Municipal Airport | 10 | 3 | 14 | $210,000 | $108,000 | $317,000 | $648,000 | $362,000 | $1,010,000 |
| Sioux Falls Airport [1] | 1,440 | 762 | 2,202 | $68,927,000 | $22,346,000 | $91,273,000 | $121,650,000 | $86,863,000 | $208,513,000 |
| Sturgis Municipal | 36 | 27 | 64 | $2,309,000 | $1,912,000 | $4,222,000 | $14,164,000 | $6,665,000 | $20,829,000 |
| Wall Municipal | 6 | 2 | 7 | $140,000 | $47,000 | $186,000 | $422,000 | $176,000 | $598,000 |
| Watertown Airport | 64 | 39 | 104 | $1,535,000 | $1,155,000 | $2,690,000 | $7,920,000 | $3,644,000 | $11,564,000 |
| Winner Regional Airport (Bob Wiley Field) | 150 | 58 | 208 | $2,764,000 | $1,580,000 | $4,343,000 | $9,160,000 | $5,371,000 | $14,532,000 |
| **Subtotal Profiled Airports** | 4,247 | 2,147 | 6,394 | $148,704,000 | $72,751,000 | $221,455,000 | $446,565,000 | $253,418,000 | $699,986,000 |
| Other Airports [2] | 252 | 113 | 365 | $7,876,000 | $3,837,000 | $11,714,000 | $21,379,000 | $12,425,000 | $33,800,000 |
| State Consrtruction | 260 | 170 | 430 | $11,731,000 | $6,228,000 | $17,958,000 | $38,759,000 | $19,037,000 | $57,796,000 |
| **Total Airport Related Impacts [3]** | **4,759** | **2,430** | **7,189** | **$168,311,000** | **$82,816,000** | **$251,127,000** | **$506,703,000** | **$284,880,000** | **$791,582,000** |

[1] Data for Sioux Falls Regional Airport is taken from the study, *Economic Impact of Sioux Falls Regional Airport on Minnehaha and Lincoln Counties*, prepared by Sixel Consulting Group for the Sioux Falls Regional Airport. The Sioux Falls study is based on full-time-equivalent workers (FTE), and the economic element of the State System Plan is based on "head-count" of full -time and part-time workers. To maintain consistency with the other Airports profiled in the System Plan, a conversion rate from FTE to head-count of 1.17 (Bureau of Economic Analysis, US Department of Commerce) was applied. In addition, the reported contribution of FSD to pheasant hunting is added to the totals. Total employment reported in *Sioux Falls Regional Airport on Minnehaha and Lincoln Counties* is 1,226 direct jobs and 554 spinoff jobs, for a total of 1,780 FTE jobs

[2] Airports not included in the core airport group

[3] Note this total reflects on-airport surveys, visitor spending surveys (including Sturgis Motorcycle Rally and Pheasant Hunting), Agricultural Spraying Surveys, and impacts from airport construction. It does not include off airport dependent survey results.

Sources: Surveys responses analyzed by EDR Group. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc.)

## 6.5 On-Airport Economic Impact

The existence of airports provides numerous jobs and generated over 500 million dollars in 2010 within the State. On-airport impacts include those jobs, as well as sales, which are generated through fixed base operators, fuel sales, landing fees, on-airport businesses such as flight schools, rental car agencies, food vendors, and more, agricultural sprayers, and other businesses that service passengers, airlines and general aviation pilots. Annual on-airport impacts at the statewide level at the 27 core airports are shown in **Table 5**.

**Table 5 – Impact of On-Airport Activities at the State Level**

| Airport Name | Jobs | | | Personal Income | | | Business Sales | | |
|---|---|---|---|---|---|---|---|---|---|
| **Core Airports** | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| Aberdeen Airport | 106 | 78 | 184 | $5,440,000 | $2,963,000 | $8,403,000 | $15,818,000 | $8,131,000 | $23,950,000 |
| Black Hills-Clyde Ice Field | 14 | 15 | 29 | $912,000 | $788,000 | $1,700,000 | $4,071,000 | $1,403,000 | $5,474,000 |
| Britton Municipal | 4 | 1 | 5 | $134,000 | $33,000 | $167,000 | $403,000 | $141,000 | $543,000 |
| Brookings Airport | 91 | 45 | 136 | $5,387,000 | $1,526,000 | $6,913,000 | $8,449,000 | $4,769,000 | $13,218,000 |
| Canton Municipal | 4 | 2 | 6 | $120,000 | $58,000 | $177,000 | $454,000 | $185,000 | $639,000 |
| Chamberlain Municipal | 6 | 2 | 8 | $185,000 | $80,000 | $265,000 | $629,000 | $248,000 | $878,000 |
| Chan Gurney Muni / Yankton | 13 | 6 | 19 | $374,000 | $155,000 | $529,000 | $2,298,000 | $903,000 | $3,201,000 |
| Cheyenne Eagle Butte | - | - | - | $0 | $0 | $0 | $0 | $0 | $0 |
| Custer County | 10 | 7 | 17 | $505,000 | $141,000 | $646,000 | $847,000 | $466,000 | $1,314,000 |
| Gettysburg Municipal | 7 | 2 | 9 | $349,000 | $85,000 | $435,000 | $1,048,000 | $367,000 | $1,414,000 |
| Harding County | 1 | 1 | 2 | $28,000 | $24,000 | $52,000 | $201,000 | $94,000 | $295,000 |
| Harold Davidson Field | 2 | 3 | 5 | $67,000 | $68,000 | $135,000 | $467,000 | $138,000 | $605,000 |
| Highmore Municipal | 11 | 4 | 15 | $293,000 | $93,000 | $386,000 | $988,000 | $371,000 | $1,358,000 |
| Hot Springs Municipal | 6 | 4 | 10 | $118,000 | $81,000 | $198,000 | $173,000 | $92,000 | $265,000 |
| Huron Airport | 241 | 174 | 415 | $10,459,000 | $7,544,000 | $18,003,000 | $57,556,000 | $26,294,000 | $83,850,000 |
| Madison Municipal Airport | 23 | 11 | 34 | $572,000 | $196,000 | $768,000 | $3,211,000 | $1,193,000 | $4,405,000 |
| Marv-Skie Tea | 11 | 12 | 23 | $518,000 | $462,000 | $980,000 | $3,189,000 | $1,305,000 | $4,494,000 |
| Mitchell Municipal Airport | 7 | 7 | 14 | $177,000 | $153,000 | $330,000 | $1,154,000 | $538,000 | $1,692,000 |
| Parkston Municipal | 2 | 1 | 3 | $53,000 | $31,000 | $85,000 | $276,000 | $120,000 | $396,000 |
| Pierre Regional Airport | 112 | 74 | 186 | $2,998,000 | $1,649,000 | $4,647,000 | $12,231,000 | $5,694,000 | $17,925,000 |
| Rapid City Airport | 317 | 277 | 594 | $14,853,000 | $12,677,000 | $27,530,000 | $87,514,000 | $43,067,000 | $130,580,000 |
| Redfield Municipal Airport | 1 | - | 1 | $34,000 | $8,000 | $42,000 | $101,000 | $35,000 | $136,000 |
| Sioux Falls Airport [1] | 937 | 536 | 1,473 | $59,193,000 | $15,864,000 | $75,057,000 | $94,495,000 | $66,939,000 | $161,434,000 |
| Sturgis Municipal | 26 | 24 | 50 | $2,091,000 | $1,783,000 | $3,875,000 | $13,481,000 | $6,261,000 | $19,742,000 |
| Wall Municipal | 4 | 1 | 5 | $103,000 | $25,000 | $128,000 | $309,000 | $108,000 | $417,000 |
| Watertown Airport | 24 | 27 | 51 | $922,000 | $808,000 | $1,730,000 | $5,951,000 | $2,470,000 | $8,421,000 |
| Winner Regional Airport (Bob Wiley Field) | 11 | 7 | 18 | $165,000 | $63,000 | $227,000 | $526,000 | $201,000 | $727,000 |
| **Subtotal Profiled Airports** | 1,991 | 1,321 | 3,312 | $106,050,000 | $47,358,000 | $153,408,000 | $315,840,000 | $171,533,000 | $487,373,000 |
| Subtotal Other Airports in SD [2] | 52 | 47 | 99 | $2,271,000 | $1,646,000 | $3,917,000 | $9,909,000 | $4,700,000 | $14,606,000 |
| **Total** | 2,043 | 1,368 | 3,411 | $108,321,000 | $49,004,000 | $157,325,000 | $325,749,000 | $176,233,000 | $501,979,000 |

[1] Data for Sioux Falls Regional Airport is taken from the study, *Economic Impact of Sioux Falls Regional Airport on Minnehaha and Lincoln Counties*, prepared by Sixel Consulting Group for the Sioux Falls Regional Airport. The Sioux Falls study is based on full-time-equivalent workers (FTE), and the economic element of the State System Plan is based on "head-count" of full -time and part-time workers. To maintain consistency with the other Airports profiled in the System Plan, a conversion rate from FTE to head-count of 1.17 (Bureau of Economic Analysis, US Department of Commerce) was applied. On airport employment reported in the study was 801 direct workers on airport and 400 spinoff jobs, for a total employment of 1,201 FTE jobs. The Sioux Falls Study did not calculate state impacts. To approximate statewide impacts, the overall local multipliers for workers, personal income and business sales were proportionally increased to statewide totals based on the averaged ratio spinoff effects from state to local [multiplier state/multiplier local] for each measure based on other airports in Region 1 (Brookings, Canton, Yankton, Davidson, Madison and Tea).

[2] Other Airports include: Belle Fourche, Clark County, Custer County, Edgemont Municipal, Faulkton Municipal, Gregory Municipal/Flynn Field, Hoven Municipal, Howard Municipal, Kadoka Municipal, Lake Preston Municipal, McLaughlin Municipal, Milbank Municipal, Mobridge Municipal, Parkston Municipal, Philip, Platte Municipal, Timber Lake Municipal, Wagner Municipal Webster Municipal

Source: Airport Manager survey responses and Nielson Claritas Site Reports analyzed by EDR Group. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc.).

## 6.6 Visitor Spending

Visitor spending at airports across the state supports numerous jobs and contributed 138 million dollars to the economy of South Dakota in 2010. Money spent by individuals who are coming into the State from another location on items such as rental cars, hotels, entertainment, and food support the local, regional, and State economy. The annual impact from visitor spending at the 27 core airports at the statewide level is shown in **Table 6.** It is important to note that these values do not include the impact from the Sturgis Motorcycle Rally or the pheasant hunting season. The impact from these two special events can be added to the total value presented in **Table 6** to obtain the total impact of visitor spending.

**Table 6 – Impact of Visitor Spending at the State Level**

| Airport Name | Jobs | | | Personal Income | | | Business Sales | | |
|---|---|---|---|---|---|---|---|---|---|
| **Core Airports** | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| Aberdeen Airport | 92 | 29 | 121 | $1,531,000 | $860,000 | $2,391,000 | $4,869,000 | $2,910,000 | $7,779,000 |
| Black Hills-Clyde Ice Field | 69 | 23 | 91 | $1,444,000 | $846,000 | $2,290,000 | $4,379,000 | $2,629,000 | $7,009,000 |
| Britton Municipal | 4 | 1 | 5 | $71,000 | $40,000 | $111,000 | $226,000 | $135,000 | $361,000 |
| Brookings Airport | 3 | 1 | 5 | $72,000 | $42,000 | $114,000 | $215,000 | $128,000 | $343,000 |
| Canton Municipal | 1 | 0 | 1 | $17,000 | $10,000 | $28,000 | $51,000 | $31,000 | $82,000 |
| Chamberlain Municipal | 10 | 4 | 14 | $165,000 | $106,000 | $271,000 | $608,000 | $368,000 | $976,000 |
| Chan Gurney Muni / Yankton | 16 | 5 | 21 | $268,000 | $155,000 | $423,000 | $849,000 | $508,000 | $1,358,000 |
| Cheyenne Eagle Butte | 4 | 1 | 5 | $64,000 | $38,000 | $102,000 | $227,000 | $136,000 | $363,000 |
| Custer County | 8 | 3 | 10 | $159,000 | $93,000 | $252,000 | $483,000 | $290,000 | $773,000 |
| Gettysburg Municipal | 4 | 1 | 5 | $78,000 | $50,000 | $128,000 | $272,000 | $164,000 | $436,000 |
| Harding County | 1 | 0 | 1 | $9,000 | $5,000 | $14,000 | $27,000 | $16,000 | $44,000 |
| Harold Davidson Field | 5 | 2 | 7 | $83,000 | $48,000 | $131,000 | $262,000 | $157,000 | $419,000 |
| Highmore Municipal | 1 | 0 | 2 | $21,000 | $13,000 | $34,000 | $72,000 | $44,000 | $116,000 |
| Hot Springs Municipal | 4 | 1 | 5 | $66,000 | $41,000 | $107,000 | $211,000 | $127,000 | $338,000 |
| Huron Airport | 32 | 10 | 42 | $497,000 | $285,000 | $783,000 | $1,629,000 | $974,000 | $2,603,000 |
| Madison Municipal Airport | 11 | 4 | 15 | $242,000 | $139,000 | $381,000 | $713,000 | $426,000 | $1,139,000 |
| Marv-Skie Tea | 20 | 7 | 27 | $423,000 | $244,000 | $666,000 | $1,254,000 | $750,000 | $2,004,000 |
| Mitchell Municipal Airport | 41 | 15 | 57 | $670,000 | $428,000 | $1,098,000 | $2,350,000 | $1,421,000 | $3,771,000 |
| Parkston Municipal | 1 | 0 | 2 | $20,000 | $13,000 | $33,000 | $72,000 | $44,000 | $116,000 |
| Pierre Regional Airport | 92 | 33 | 125 | $1,614,000 | $1,001,000 | $2,616,000 | $5,500,000 | $3,313,000 | $8,813,000 |
| Rapid City Airport | 454 | 149 | 603 | $9,627,000 | $5,411,000 | $15,039,000 | $28,399,000 | $17,000,000 | $45,399,000 |
| Redfield Municipal Airport | 3 | 1 | 4 | $47,000 | $27,000 | $73,000 | $150,000 | $90,000 | $240,000 |
| Sioux Falls Airport [1] | 497 | 224 | 721 | $9,605,000 | $6,401,000 | 16,006,000 | $26,750,000 | $19,678,000 | $46,428,000 |
| Sturgis Municipal | 6 | 2 | 8 | $132,000 | $78,000 | $210,000 | $402,000 | $241,000 | $643,000 |
| Wall Municipal | 2 | 1 | 2 | $37,000 | $22,000 | $58,000 | $113,000 | $68,000 | $181,000 |
| Watertown Airport | 40 | 12 | 53 | $613,000 | $347,000 | $960,000 | $1,969,000 | $1,174,000 | $3,143,000 |
| Winner Regional Airport (Bob Wiley Field) | 33 | 12 | 45 | $563,000 | $359,000 | $922,000 | $2,016,000 | $1,219,000 | $3,235,000 |
| **Total** | **1,454** | **541** | **1,995** | **$28,138,000** | **$17,102,000** | **$45,241,000** | **$84,068,000** | **$54,041,000** | **$138,112,000** |

[1] Data for Sioux Falls Regional Airport is taken from the study, *Economic Impact of Sioux Falls Regional Airport on Minnehaha and Lincoln Counties*, prepared by Sixel Consulting Group for the Sioux Falls Regional Airport. The Sioux Falls study is based on full-time-equivalent workers (FTE), and the economic element of the State System Plan is based on "head-count" of full -time and part-time workers. To maintain consistency with the other Airports profiled in the System Plan, a conversion rate from FTE to head-count of 1.17 (Bureau of Economic Analysis, US Department of Commerce) was applied. Employment reported in the study was 425 direct workers on airport and 154 spinoff jobs, for a total employment of 579 FTE jobs from visitor spending. The Sioux Falls Study did not calculate state impacts. To approximate statewide impacts, the overall local multipliers for workers, personal income and business sales generated by visitor spending were proportionally increased to statewide totals based on the averaged ratio spinoff effects from state to local [multiplier state/multiplier local] for each measure based on other airports in Region 1 (Brookings, Canton, Yankton, Davidson, Madison and Tea). Source: Passenger survey responses analyzed by EDR Group. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc,).

### 6.6.a Special Events

Two economic stimulators in the State have ties to the aviation industry: the Sturgis Motorcycle Rally and pheasant hunting. The contribution of aviation to these events exceeded 86 million dollars to South Dakota in 2010. Since each event attracts visitors from around the United States as well as the world to South Dakota, a large amount of money is spent on lodging, transportation, food, and retail purchases. These two events are looked at separately from the general visitor spending analysis so that the true value of each event can be realized. The same GA and commercial service surveys were utilized in this effort; however responses from individuals attending the Sturgis Motorcycle Rally, or those who indicated they were on a pheasant hunting trip were analyzed independently from the responses found in **Table 6** due to their more unique spending patterns.

#### *Sturgis Motorcycle Rally*

In-person passenger surveys were conducted at the Rapid City Regional Airport and two GA airports – Black Hills/Clyde Ice Field in Spearfish and the Sturgis Municipal Airport, to capture an average amount of money being spent during the event. Special types of purchases of rally attendees that fall outside of the usual visitor spending profile include motorcycle maintenance and repairs, new purchases of gear (including motorcycles) and shipping bikes to and from Sturgis by air. **Table 7** summarizes the jobs supported, personal income earned, and business sales as a result of the week-long event in August 2010 based upon the study results. The total calculated impact of airports to the Sturgis Motorcycle Rally was $3.7 million.

**Table 7 – Statewide Impact of the Sturgis Motorcycle Rally 2010**

| Airport Name | Jobs | | | Personal Income | | | Business Sales | | |
|---|---|---|---|---|---|---|---|---|---|
| | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| Black Hills-Clyde Ice Field | 3 | 1 | 3 | $58,000 | $34,000 | $92,000 | $189,000 | $109,000 | $298,000 |
| Rapid City Airport | 29 | 9 | 38 | $614,000 | $338,000 | $952,000 | $1,889,000 | $1,098,000 | $2,987,000 |
| Sturgis Municipal | 4 | 1 | 5 | $86,000 | $51,000 | $137,000 | $281,000 | $163,000 | $444,000 |
| **Total** | **35** | **12** | **47** | **$758,000** | **$423,000** | **$1,181,000** | **$2,359,000** | **$1,370,000** | **$3,729,000** |

Source: Sturgis Motorcycle Rally Passenger survey responses analyzed by EDR Group. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc.).

#### *Pheasant Hunting Season*

Pheasant hunting typically runs from early October to the end of January in South Dakota, during which time thousands of hunters travel to the State to partake in the hunting opportunities. This includes use of pheasant preserves as well other private and public lands. Money is spent not only on lodging, travel expenses, and food but also guns, guides, and other hunting gear. **Table 8** summarizes the jobs supported, personal income earned, and business sales made as a result of the four month long pheasant hunting season

beginning in October 2010. The total economic impact from the use of aviation during the pheasant hunting season is estimated at $82.9 million for 2011.

This is estimated to be much greater than the Rally impact due to the longer duration of the event, upscale resort spending by hunters, and the greater number of locations involved compared to only three for Sturgis.

**Table 8 – Statewide Impact of the Pheasant Hunting Season 2010/2011**

| Airport Name | Jobs | | | Personal Income | | | Business Sales | | |
|---|---|---|---|---|---|---|---|---|---|
| **Core Airports** | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| Madison Municipal Airport | 8 | 3 | 11 | $192,000 | $108,000 | $299,000 | $543,000 | $324,000 | $867,000 |
| Mitchell Municipal Airport | 175 | 65 | 239 | $3,143,000 | $1,784,000 | $4,927,000 | $9,928,000 | $5,927,000 | $15,854,000 |
| Pierre Regional Airport | 467 | 162 | 629 | $8,129,000 | $4,664,000 | $12,793,000 | $26,407,000 | $15,789,000 | $42,196,000 |
| Redfield Municipal Airport | 6 | 2 | 9 | $129,000 | $73,000 | $202,000 | $397,000 | $237,000 | $634,000 |
| Sioux Falls Airport | 6 | 2 | 8 | $129,000 | $81,000 | $210,000 | $405,000 | $246,000 | $651,000 |
| Winner Regional Airport | 106 | 39 | 144 | $2,036,000 | $1,158,000 | $3,194,000 | $6,618,000 | $3,951,000 | $10,570,000 |
| **Subtotal Profiled Airports** | 767 | 273 | 1,040 | $13,757,000 | $7,868,000 | $21,625,000 | $44,298,000 | $26,474,000 | $70,771,000 |
| Subtotal Other Airports in SD [1] | 115 | 43 | 158 | $2,561,000 | $1,447,000 | $4,009,000 | $7,598,000 | $4,536,000 | $12,134,000 |
| **Total** | **882** | **316** | **1,198** | **$16,318,000** | **$9,315,000** | **$25,634,000** | **$51,896,000** | **$31,010,000** | **$82,905,000** |

[1] Other airports which receive pheasant hunting traffic which are not included in the list of core airports include: Faulkton, Gregory, Hoven, Miller, and Platte

Source: Passenger survey responses analyzed by EDR Group and data provided by the South Dakota DOT. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc)

## 6.7 Agricultural Spraying Impact

As discussed previously, one of the largest industries within South Dakota is agriculture. In order for this industry to survive, the application of pesticides and fertilizer to large crop areas is critical. The use of aircraft for agricultural spraying affects local economies across the State as well as South Dakota's economy as a whole, through the provision of jobs, fuel, and larger crop yields. **Table 9** identifies the impact of agricultural spraying on business sales and resulting jobs and personal income at the statewide level on an annual basis. This information is based upon data from 44 agricultural sprayers which represent a large geographic coverage of the State, as well as additional responses from the Off-Airport Dependent Business Survey. The economic impact of the use of agricultural spraying based upon this analysis is nearly $32 million annually.

**Table 9 – Statewide Impact of Agricultural Spraying**

| Airport Name | Jobs | | | Personal Income | | | Business Sales | | |
|---|---|---|---|---|---|---|---|---|---|
| **Core Airports** | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| Aberdeen Airport | 6 | 2 | 8 | $154,000 | $38,000 | $192,000 | $463,000 | $162,000 | $625,000 |
| Britton Municipal | 4 | 1 | 5 | $134,000 | $33,000 | $167,000 | $403,000 | $141,000 | $543,000 |
| Brookings Airport | 5 | 1 | 6 | $80,000 | $19,000 | $99,000 | $239,000 | $84,000 | $323,000 |
| Canton Municipal | 3 | 1 | 4 | $75,000 | $18,000 | $93,000 | $224,000 | $78,000 | $302,000 |
| Chamberlain Municipal | 5 | 1 | 6 | $129,000 | $31,000 | $160,000 | $386,000 | $135,000 | $521,000 |
| Chan Gurney Muni / Yankton | 8 | 2 | 10 | $263,000 | $64,000 | $328,000 | $1,602,000 | $561,000 | $2,162,000 |
| Gettysburg Municipal | 7 | 2 | 9 | $349,000 | $85,000 | $435,000 | $1,048,000 | $367,000 | $1,414,000 |
| Highmore Municipal | 10 | 3 | 13 | $257,000 | $63,000 | $320,000 | $772,000 | $270,000 | $1,042,000 |
| Hot Springs Municipal | 1 | 0 | 1 | $26,000 | $6,000 | $32,000 | $77,000 | $27,000 | $104,000 |
| Huron Airport | 54 | 14 | 68 | $2,241,000 | $548,000 | $2,789,000 | $6,720,000 | $2,352,000 | $9,072,000 |
| Madison Municipal Airport | 14 | 4 | 18 | $451,000 | $110,000 | $562,000 | $2,745,000 | $961,000 | $3,706,000 |
| Parkston Municipal | 1 | 0 | 1 | $24,000 | $6,000 | $30,000 | $72,000 | $25,000 | $98,000 |
| Pierre Regional Airport | 30 | 8 | 38 | $877,000 | $214,000 | $1,091,000 | $2,628,000 | $920,000 | $3,548,000 |
| Redfield Municipal Airport | 1 | 0 | 1 | $34,000 | $8,000 | $42,000 | $101,000 | $35,000 | $136,000 |
| Sturgis Municipal | 2 | 1 | 3 | $51,000 | $13,000 | $64,000 | $154,000 | $54,000 | $208,000 |
| Wall Municipal | 4 | 1 | 5 | $103,000 | $25,000 | $128,000 | $309,000 | $108,000 | $417,000 |
| Watertown Airport | 1 | 0 | 1 | $45,000 | $11,000 | $56,000 | $135,000 | $47,000 | $182,000 |
| Winner Regional Airport (Bob Wiley Field) | 5 | 1 | 6 | $129,000 | $31,000 | $160,000 | $386,000 | $135,000 | $521,000 |
| **Subtotal Profiled Airports** | 161 | 42 | 203 | $5,423,000 | $1,325,000 | $6,748,000 | $18,462,000 | $6,462,000 | $24,924,000 |
| Subtotal Other Airports in SD [1] | 85 | 23 | 108 | $3,044,000 | $744,000 | $3,788,000 | $3,872,000 | $3,189,000 | $7,060,000 |
| **Total** | 246 | 65 | 311 | $8,467,000 | $2,069,000 | $10,536,000 | $22,334,000 | $9,651,000 | $31,984,000 |

[1] Other airports which are used by agricultural sprayers that are not included in the list of core airports include: Belle Fourche, Clark, Faulkton, Flandreau, Gregory, Hayes Airstrip, Hoven, Howard, Milbank, MJ Aviation Airport (private), Mobridge, Onida, Philip, Presho, Webster, Timber Lake, Thompson (private), Wessington Springs, and Wagner.

Source: Survey of agricultural sprayers and Off Airport Business Survey responses analyzed by EDR Group. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc.).

## 6.8 Airport-Related Construction Impact

Airport related construction projects provide jobs for individuals in South Dakota and often use materials which are manufactured within the State. Each year millions of dollars are spent statewide on airport development projects to keep the aviation system in working condition so that it may serve users. Aggregate annual construction expenditures were tabulated by the South Dakota DOT. The economic impact analysis reflects annualized averages that cover 2008-2010. The annual impact of airport-related construction projects on business sales and resulting jobs and personal income are summarized in **Table 10**.

**Construction Projects**

- New airport development
- Runway extensions/ rehabilitation
- Taxiway construction
- Installation of navigational aids
- Airport lighting

**Table 10 – Statewide Impact of Airport-Related Construction**

| | Jobs | Personal Income | Construction Expenditures/ Business Sales |
|---|---|---|---|
| Direct | 260 | $11,731,000 | $38,759,000 |
| Spin-off | 170 | $6,228,000 | $19,037,000 |
| **Total** | **430** | **$17,958,000** | **$57,796,000** |

Notes: Construction impacts were calculated on the basis of an input/output model developed by EDR Group using the IMPLAN Modeling System (MIG, Inc.) for South Dakota. Direct Impacts of construction expenditures & business sales reflect the initial spending of the construction budget in South Dakota. The assessment of in-state economic impacts is based on presumed in-state purchases of supplies and services from the initial construction budget and subsequent multipliers.
Source: Annual expenditures for construction and engineering services provided by the South Dakota DOT and analyzed by EDR Group using the IMPLAN model package for South Dakota

## 6.9 Off-Airport Dependency

Aviation contributes to the productivity of businesses throughout South Dakota for receiving delivery of goods, shipping products to markets, and enabling South Dakota executives to travel nationally and worldwide to conduct business. While these businesses may not be directly part of the cluster of aviation industries, their productivity would be impeded if they had no access or limited access to air transportation, which in turn would negatively impact economic development in South Dakota. As noted previously, the analysis of off-airport dependency is conservative because it was limited to companies that either base aircraft at one of South Dakota's public use airports or were identified by airport managers. A general survey of businesses in the State would have likely yielded a much larger impact. Even with this limited approach, aviation accounts for approximately 8,200 jobs and $1.1 billion in business activity statewide for businesses off-airport that rely on aviation services. **Table 11** identifies both the direct and spinoff effects of business sales and associated jobs and personal income which are dependent upon the air transportation system in South Dakota, represented by businesses with based aircraft and those identified by airport managers.

**Table 11 – Statewide Impact of Off-Airport Business Dependency**

| Impact Type | Employment | Labor Income | Business Sales |
|---|---|---|---|
| Direct Effect | 4,800 | $216,868,000 | $734,315,000 |
| Spinoff | 3,400 | $128,133,000 | $410,766,000 |
| **Total** | **8,200** | **$345,001,000** | **$1,145,081,000** |

Source: Business Survey responses analyzed by EDR Group. Additional calculations by EDR Group using the IMPLAN modeling system (MIG, Inc.)

## 6.10 Summary

The aviation system within South Dakota supports multiple industries and businesses which provide jobs to residents in the State. The impact of aviation can be felt not only in a direct manner through sales and on-airport jobs, but also in an indirect manner through spinoff effects. This spinoff supports additional employment in various industry sectors that most likely are not aviation related. Special events such as the Sturgis Motorcycle Rally and the pheasant hunting season rely on air transportation, and in turn, generate millions in additional revenues which are cycled throughout the local, regional, and State economies. At the statewide level, over 7,000 jobs are supported, over $250 million is earned in personal income, and nearly $800 million in business sales are accounted for as a result of the air transportation

system within the State, not counting the contribution of aviation to the economic development of local areas, regions, and states due to business reliance on airport services.

# Chapter 7 – Trends & Technology

## Introduction

There are several trends and technologies within the aviation industry that may impact operations in South Dakota over the course of the planning period. Changes to aircraft types, fueling options, navigational equipment, and a national effort to implement sustainable practices are among the trends that could change the aviation system over time. The aviation industry within South Dakota supports local communities as well as the State as a whole; therefore it is important to look ahead and prepare the system for any changes that may arise. This Chapter is organized in the following manner:

- Aircraft Trends
- Fueling Trends
- General Aviation Trends
- Commercial Aviation Trends
- Sustainability Practices

## 7.1 Aircraft Trends

The following section highlights trends and technologies related to aircraft which may contribute to the types of aircraft operating in South Dakota's aviation system. Three types of aircraft are considered including Light Sport Aircraft (LSA), Very Light Jets (VLJ), and Unmanned Aerial Vehicles (UAVs).

### 7.1.a Light Sport Aircraft (LSA)

LSA are a recently created aircraft classification targeted towards recreational flyers. These aircraft are designed to reduce the costs

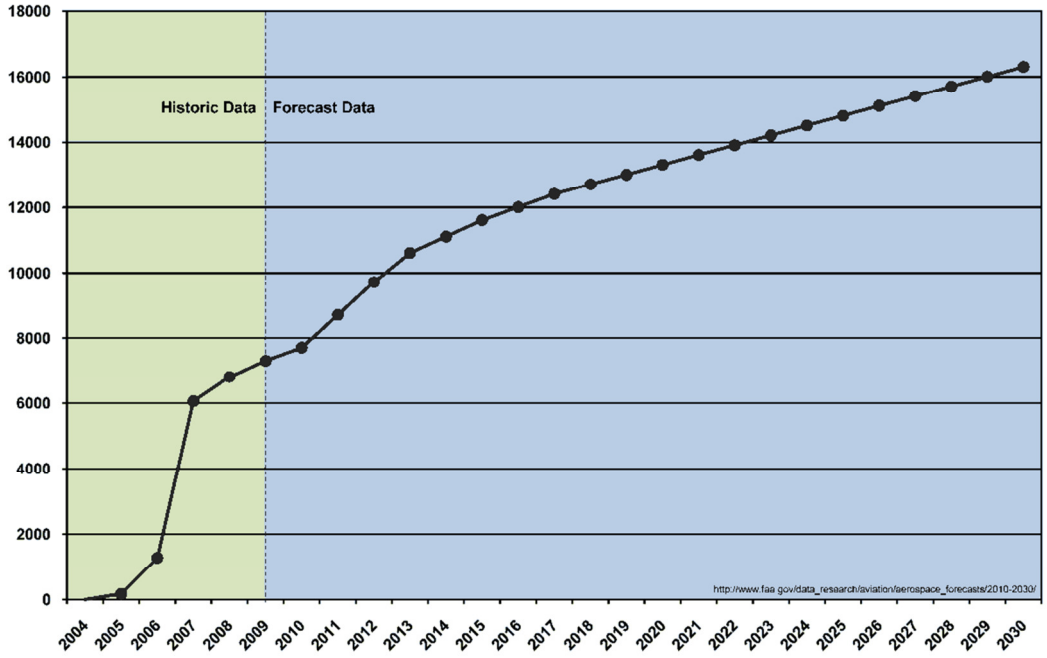
associated with maintaining and operating a traditional recreational airplane. In July of 2004, the Federal Aviation Administration (FAA) issued the light sport aircraft/sport pilot (LSA/SP) rule that opened the door for growth in the general aviation market. The FAA defines LSA as having a maximum gross takeoff weight of not more than 1,320 pounds. LSA have a maximum airspeed of 120 knots in level flight at maximum continuous power, a maximum stall speed of 45 knots, no more than two seats, and a single reciprocating engine. Simply stated, LSA are small, easy to operate, low performance aircraft.

Numerous aircraft can be certified as LSA as long as they fall within the weight specifications and other guidelines defined by the FAA. Such aircraft include powered and glider airplanes, gyroplanes, powered parachutes, weight-shift control trikes, free balloons, and airships. In addition, a number of designers and manufacturers of experimental aircraft kits are developing models that will be compliant with the LSA rules, creating an even larger pool of aircraft for the sport pilot to choose from.

Coupled with the development of LSA is a new license class that supports the operations of these aircraft. A sport pilot certificate is required in order to operate any certified LSA and can be obtained with 20 hours of successful training. An FAA medical certificate is not required for a sport pilot applicant (as opposed to a traditional pilot's license), which lessens the certification costs significantly. A sport pilot certification permits daytime operation and one passenger, which fulfills the needs of a large segment of recreational flyers.

Since the inception of the FAA light sport aircraft/sport pilot (LSA/SP) rule in July of 2004, the demand for sport aircraft has experienced steady growth, as shown in **Figure 7.1**. The FAA has projected a total of 7,711 active sport aircraft in 2010 and an annual average growth rate of approximately 5.6 percent (5.6%) nationally until 2020, for a total of 13,311 aircraft. The FAA forecasts suggest the average annual growth rate will decrease to approximately 2.1 percent (2.1%) from 2020 until 2030, resulting in a total of 16,311 active sport aircraft in 2030.

**Figure 7.1 – FAA Forecast for Active Sport Aircraft from 2010 to 2030**




Source: http://www.faa.gov/data_research/aviation/aerospace_forecasts/2010-2030

Growth forecasted in this segment of general aviation has the potential to increase aviation activity levels throughout South Dakota. As forecasted by the FAA as part of the 2010-2030 aerospace forecasts, active sport pilots are projected to grow at an annual average rate of 7.2 percent (7.2%) from 4,060 pilots in 2010 to 14,100 pilots in 2030. LSA are already being used in the State, especially by flight instructors which are training new pilots. New development undertaken by airports may be necessary to successfully meet an increased demand in LSA such as runway/taxiway rehabilitation and new hangar construction. Increased runway length is not needed in this instance however, as these aircraft can operate on shorter runways. This group of aircraft may contribute to the operations and based aircraft within the State since they fill a niche that supports operation by less expensive aircraft.

### 7.1.b Very Light Jets (VLJs)

VLJs such as the one seen in **Figure 7.2** are light-weight, jet aircraft with a maximum certified take-off weight below 10,000 pounds. VLJs are operated by a single pilot typically in a glass cockpit using advanced flight management systems that allow the pilot to operate safely in all weather conditions. VLJs typically carry four to eight passengers and travel a relatively short distance at speeds between 250 to 350 knots.

**Figure 7.2 – Very Light Jet**

Prior to 2008, forecasting for VLJs indicated exponential growth with several thousands of aircraft anticipated to enter the National Airspace System in the next two decades according to the Aircraft Owners and Pilots Association (AOPA). Unfortunately, with the recent economic downturn, two major manufacturers of VLJs entered bankruptcy in 2008 which consequently led to dampened projection expectations. In 2009, the FAA revised the VLJ forecast to reflect an increase of 200 per year until 2012 and a rate of 300 per subsequent year over the planning period. VLJs are designed to have lower operating costs and shorter runway requirements than larger business jets, allowing the aircraft to operate at numerous airports across the country and to avoid larger, more congested airports that offer commercial service. VLJs can provide business users with on-demand service and the opportunity to visit a number of destinations and various clients in a short amount of time.

Forecasted growth in the number of active VLJs has the potential to increase the level of operations found at airports throughout South Dakota. Aircraft traveling in the Midwest may require a stop at an airport in the State for refueling, repair/maintenance, or they may land in South Dakota if they are unable to reach their intended destination as a result of weather or air traffic control delay, as well as have a specific South Dakota destination. Providing a network of airports with adequate facilities and services to accommodate the demands of this rising segment of aviation will be important in the future.

### 7.1.c Unmanned Aerial Vehicles (UAVs)

Figure 7.3 – UAV

UAVs, such as the one seen in **Figure 7.3**, are aircraft that are operated remotely. UAV technology has been advanced by the military since the early 1960's. Initial UAVs were generally used by the military for surveillance purposes with combat value realized in the 1970's during Vietnam War.

Beyond use in the military, UAVs have a variety of uses in civilian environments including remote sensing, scientific research, and search and rescue operations. UAVs can also be used to transport medicine and food to locations that cannot be reached by land after a catastrophic event. Furthermore, they can be used to monitor waterways, pipelines, engineering sites, areas of high crime, crowded settings, traffic levels, pollution levels, forest fire movement, crop surveillance, among a variety of other applications.

Future applications of UAVs are limitless; however the FAA must address how such vehicles fit into the national airspace. The FAA developed the Unmanned Aircraft Systems (UAS) office to "review proposed applications and ensure that approvals to fly unmanned aircraft, regardless of size, do not compromise the high level of safety for other aviation, the public, and property on the ground." The ability of an unmanned aerial vehicle to identify and avoid manned aircraft is critical to their successful deployment in national airspace. Current FAA policies prevent a number of UAVs from flying in national airspace because regulations have yet to be written for such aircraft.

Until more defined policies, procedures, uses, and federal regulations are established, the level of impact UAVs may have on aviation in South Dakota is unknown. Given the increased interest in utilizing these aircraft for civilian purposes, it is anticipated that UAV use may become more prevalent. The ability of these aircraft to stay aloft for several hours at a time has practicality for surveillance uses such as law enforcement or in monitoring the progress of crop growth. Agricultural spraying could also benefit as a result of lower operational costs and elimination of the human element, increasing safety, efficiency, and the effectiveness of the product application. UAVs are currently being used in North Dakota to monitor the United States – Canada border by the United States Border Patrol. Monitoring advances in UAV technology and accommodating their use at airports in the system will be important as this segment of aviation becomes prevalent.

## 7.2 Fueling Trends

As the aviation industry continues to grow, so does its need for fuel and the size of its carbon footprint. Since aviation greenhouse gas emissions and their impact on climate change are a concern for the industry, organizations such as the International Air Transport Association (IATA) support the research, development, and use of sustainable fuels. Also known as biofuels, these are derived from any renewable biological carbon resource (biomass), such as animal waste, food crops, wood, or plant material.

First-generation biofuels are derived from sugar-rich or starch-rich food crops, but are not suitable for use in the aviation industry because they do not meet the performance or safety standards required for modern jet engine use. Second-generation biofuels, or bio-derived oils, can be chemically converted or used directly for use as jet fuel. Third-generation biofuels are derived from algae and are currently being researched by the Defense Advanced Research Projects Agency (DARPA) in an effort to develop an affordable and highly efficient alternative process fuel for US military aircraft.

Biofuels are currently used within the aviation industry in a testing capacity only. Boeing and other industry studies show that biofuel blends meet or exceed all technical parameters for commercial jet fuel and present no adverse effects on engines or their components. Blended fuels have greater energy content by mass than Jet A fuel, which could lower fuel consumption per mile of flight.

The aviation industry is motivated to develop fuels that can be mass-produced at a low cost and high yield with minimal environmental impact. Second and third-generation biofuel sources can be cultivated in a sustainable manner and their use can significantly reduce the aviation industry's environmental footprint. The IATA set a goal for its members to use ten percent biofuels by 2017, with a 25 percent (25%) emissions reduction per passenger by 2020 and 30 percent (30%) by 2025.

As technology continues to advance in the development of biofuels, airports in the system should consider the possibility of changing fuel types and be prepared to supply and store biofuels should they be approved for use in aircraft.

## 7.3 General Aviation Trends

**Figure 7.4 – Turboprop Aircraft**

The general aviation sector has taken a significant hit during recent years as a result of economic uncertainty. According to the General Aviation Manufacturers Association (GAMA), U.S. manufacturers of general aviation aircraft delivered 1,587 aircraft in 2009, which is 48.5 percent (48.5%) less than in 2008. This translates into a second consecutive year of decline in shipments that was preceded by four years of sustained growth. Turbine aircraft, including turbojets and turboprops (seen in **Figure 7.4**), were down 46.2 percent (46.2%) and 19.2 percent (19.2%), respectively. Piston deliveries declined 55.1 percent (55.1%), single-engine deliveries were down 54.6 percent (54.6%), and the multi-engine category was down by 64.8 percent (64.8%). Billings in 2009 totaled $9.1 billion, down 32.1 percent (32.1 percent) compared with 2008 and the first reported decline since 2003.

Between the years 2000 and 2009, the number of general aviation aircraft operations in the U.S. declined from 39,878,500 to 27,974,400. This trend is attributed to several factors, primarily the increasing cost of owning and operating an aircraft and the fluctuations in the economy over the decade. However, the FAA anticipates that demand in the general aviation market will increase over the next 20 years. The number

of general aviation hours flown is projected to increase by 2.5 percent (2.5%) yearly over the forecast period. A large portion of this growth will occur in the short term post-recession period, where record low utilization rates experienced in 2009 will return to normal trends, particularly in the turbine jet category. The AOPA notes that in the first quarter of 2010, the number of general aviation operations reported at airport traffic control towers was up 26 percent (26%) from the previous year.

South Dakota can benefit in many ways from an increase in GA operations. As activity levels rise, demand increases as well, resulting in the potential for airports to improve existing facilities and offer additional services. Aviation related businesses such as Fixed Base Operators (FBOs) and flight schools will benefit as well from increased profits collected through landing fees, fueling fees, and instruction fees. Since such a large portion of the State's overall operations are GA related, and every airport in the system supports GA operations, this forecasted increase has the potential to impact the system in its entirety.

## 7.4 Commercial Aviation Trends

Commercial service includes operations that provide the public transport of people and goods on a schedule that is provided in advance. Federal regulations define operating procedures, safety standards, and licensing requirements that must be met by both airlines and airports for this type of operation to be conducted. In South Dakota, commercial service is an important, but small segment of the overall system as operations are conducted at only six airports across the State.

**Figure 7.5 – Saab 340 Aircraft**

A trend in commercial aviation that is forecasted to impact operations in South Dakota is the phasing out of the Saab 340 aircraft seen in **Figure 7.5** which are being used by Delta Airlines to reach the majority of commercial service airports across the State. In substitution of these smaller turboprop aircraft, 50, 70, and 90 seat regional jets are anticipated to increasingly serve airports in South Dakota, seen in **Figure 7.6**.

**Figure 7.6 – Regional Jet**

This level of usage may result in necessary infrastructure improvements to support these types of aircraft and retain commercial airline operations. Runway length, retention of service funded by the Essential Air Service (EAS) program, and improvements to boarding gates and jet bridges are just a few of the issues commercial airports will be faced with throughout the planning period to support these aircraft types.

## 7.5 Sustainability Practices

In recent years, a national focus on addressing sustainability has been adapted by many airports in the United States. Although the definition and ideas of sustainability varies from one person to another, the FAA's Sustainable Master Plan Pilot Program identifies sustainable actions as those that:

- Reduce environmental impacts
- Help maintain high and stable levels of economic growth
- Help achieve social progress through a broad set of actions that ensure organizational goals are achieved in a way that is consistent with the needs and values of the local community

Sustainability is anticipated to also be an important topic affecting the operation of airports in South Dakota throughout the next twenty years. The following paragraphs identify some initiatives that airports may choose implement to increase sustainability at their locations.

### 7.5.a Construction Material Recycling

Airfield construction and improvement projects have the potential to generate a significant stream of solid waste. Recycling airfield construction materials such as concrete and asphalt provide a method to reduce the volume of waste deposited by airports into landfills. These materials can be grounded and reused as a base layer prior to the application of new pavement or in the creation of new pavement itself.

In addition to recycling airfield construction materials, conversion of existing runways into taxiways when new runways are constructed can minimize solid waste. Although pavement still needs to be properly maintained throughout its useful life, reuse reduces the total amount of required material, excavation, and construction vehicles needed for a given project. If airports in South Dakota were to consider reuse of pavements, as well as ways to recycle construction materials, a considerable amount of money and resources could be saved and used to develop additional infrastructure or update existing facilities as needed.

**Figure 7.7 – Airfield Lighting**

### 7.5.b Airfield Lighting

Airfield lighting, seen in **Figure 7.7** is responsible for a significant portion of an airport's energy consumption. In recent years, implementation of Light Emitting Diodes (LEDs) has occurred at a number of airports both in the U.S. and worldwide. According to Hella, a producer of airfield lights, LEDs typically deliver a service life of up to 50,000 hours, which is significantly longer than traditional halogen bulbs. This can reduce energy consumption considerably at airports across the State.

According to a sustainability study conducted by the Hawaii Department of Transportation after the installation of LED taxiway light fixtures and guidance signs at the Honolulu International Airport in 2007, an annual reduction of 600,000 kilowatt-hours (kWh) of electricity was achieved. Although the initial cost of LED lighting is higher than that of traditional lighting types, LED lighting could be cost-effective for

several airports in South Dakota, particularly those with higher levels of aircraft operations which necessitate longer periods of lighting use.

### 7.5.c Green Building Construction

An additional component of airport sustainability is construction of 'green' infrastructure. Sustainable design standards, such as those identified by the Leadership in Energy and Environmental Design (LEED), provide the framework for efficient, more environmentally mindful practices used in building construction techniques.

According to the Environmental Information Administration, buildings account for approximately 40 percent (40%) of the primary energy use in the United States. In an effort to reduce the amount of energy consumed by buildings, some trends in recent years that have garnered interest include:

- Certification and audit of sustainable building design through guidelines established by such programs as LEED, Green Globes, and Energy Star
- Reduction of waste generated through recycling programs
- Zero Energy Buildings (ZEB) that are energy self-sufficient and produce no carbon emissions

Airport improvement projects are increasingly calling for construction that incorporates green building design. Several upgrades that can be made to existing infrastructure include:

- **Automated building controls –** Controls reducing the level of heating, ventilating, and air conditioning (HVAC) during periods when a building is unoccupied can contribute to lower energy consumption.
- **Electric powered ground support equipment –** Ground support equipment powered by electricity instead of gasoline can reduce or eliminate carbon emissions produced from these devices.
- **Energy audit –** Performing an energy audit can help identify areas where energy conservation can be realized through improvements to utilities, building design, and insulation.
- **Geothermal heating and cooling –** Utilization of geothermal processes to heat and cool a building can reduce dependence from outside energy sources.
- **Landfill diversion program –** Recycling programs can reduce or eliminate the solid waste stream generated as a result of day-to-day airport activities.
- **Lighting/lamp replacement –** Use of LED lighting to replace traditional forms of building lighting filaments can reduce energy consumption.
- **Occupancy/daylighting sensors –** Devices such as timers and sensors can reduce or shut off power to areas during periods of inactivity.
- **Photovoltaic solar panels –** Harnessing the sun's renewable energy to power various building utilities can reduce dependence on outside energy sources
- **Solar thermal –** Energy gained from sunlight can be converted to thermal energy to heat water or air for commercial use.
- **Thermal storage –** Storing thermal energy obtained through renewable resources can provide a method to utilize renewable energy at a later time.

Many of these green building design principals can be applied to existing and future airport buildings across South Dakota. Incorporating sustainable building design will allow buildings throughout the aviation system to become more energy efficient, benefiting both airports and the environment.

### 7.5.d Alternative Energy Sources

An alternative energy source that has gained some attention from airports recently is wind energy. Some airports have installed small wind turbines to generate power for their facilities. For example, in 2008, Boston Logan International Airport had 20 small wind turbines installed atop the Logan Center that generate approximately 100,000 kilowatt-hours annually. Other energy sources such as solar, wind, and geothermal energy, are expected to become increasingly important in the future as utility costs increase and governments push incentives to reduce emissions. South Dakota's geographic location in the central United States is favorable to the use of wind energy; however placement of wind turbines (seen in **Figure 7.8**) and hazard lighting must be compatible with aircraft operations.

**Figure 7.8 – Wind Turbines**

## 7.6 Summary

As aviation technology continues to advance, it is important for the system to have the ability to adapt to and support change. While some of the technologies considered in this Chapter are not expected to impact airports in South Dakota at the time of the plan development, several of them are already having an effect, especially the emergence of LSA which are being used at several airports across the State.

Trends in both GA and commercial operations are expected to impact the majority of airports within the system over the planning period. It is likely that airports serving general aviation will see an increase in total operations over the next 20 years, as projected by the FAA. The six commercial service airports in the State may face challenges as Delta Airlines, the predominate carrier in the State, begin to phase out their use of turboprop aircraft and replace them with regional jet aircraft which often require additional runway length to operate and have larger passenger loads which may be difficult for some of the smaller markets to fill.

General planning to predict the effects of changing trends and technologies places South Dakota's aviation system in a favorable position to adapt and support such change. Effort placed on meeting system goals and objectives, as well as meeting the suggested facility and service targets, will likely increase an airports ability to support these changes in the industry.

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# Chapter 8 - Recommendations

## Introduction

The final step in the system planning process is the development of recommendations to be considered for system improvement. These recommendations have been created as a result of the system inventory and system analysis efforts. By providing a list of possible improvements which support the goals and objectives of the SDSASP, decision makers and airport sponsors can determine how to allocate the available resources to best support the function of the system and to meet the varying needs of its diverse user group.

The following sections identify areas for improvement which would enhance the system as a whole and satisfy the goals and objectives that have been established for the SDSASP. These recommendations are categorized by facility improvements and service improvements. General cost estimates have been developed for the recommended improvements and are discussed in the following pages. A breakdown of each cost estimate can be found in **Appendix B**.

## 8.1. Facility Improvements

### 8.1.a Primary Runway Width

FAA AC 150/5300-13 *Airport Design* outlines the criteria for runway design including the length and width of runway pavement which best suits the critical aircraft at an individual airport. Airports within South Dakota's aviation system have varying runway widths based upon the users they serve, however through the recommendation process a few airports were identified as not meeting standard dimensional criteria for runway design based upon their Airport Reference Code (ARC). The

airports and associated runway widths shown in **Table 1** should be considered for possible projects to address runway width criteria.

**Table 1 – Runways Not Meeting Standards**

| Airport | ARC | Associated City | Current Width | Suggested Width |
|---|---|---|---|---|
| • Custer State Park | • A-I | • Fairburn | • 50’ | • 60’ |
| • Graham Field | • A-I | • N.Sioux City | • 36’ | • 60’ |

Source: 2009/10 Survey Data

Engineering estimates to widen Runway 8/26 at the Custer State Park Airport from 50’ to 60’ as recommended is estimated to cost $760,000. The total estimated cost to widen Runway 15/33 at the Graham Field Airport from 36’ to 60’ is $1,383,000. These estimates are for the widening of the runway only and do not include the costs for overlaying or reconstructing the existing pavement. The cost estimates do however include the estimated costs to move and/or replace the runway lighting system as necessary to accommodate the wider pavement. The cost to move/replace the runway lighting at Graham Field is higher than that at Custer State Park since there is no runway lighting at the Airport at this time, and a full Medium Intensity Runway Lighting (MIRL) system would have to be installed including a vault building, regulator, and controls. These items already exist at Custer State Park and therefore only the runway lights and cable would need to be relocated or replaced. The total cost for the recommended runway widening projects is $2,143,000.

### 8.1.b Primary Runway PCI

Maintaining a primary runway pavement condition index of 70 or higher has been established as an objective for the SDSASP to maintain and develop the State’s aviation infrastructure to meet the existing and future needs of its users. As a part of the system analysis in Chapter 5, 17.9 percent (17.9%) of system airports fell under that objective. The airports listed in **Table 2** have been identified as having primary runway PCI’s lower than 70 which should be taken into consideration when evaluating pavement improvement projects in the future.

**Table 2 – Airports Recommended for Pavement Improvement**

| Airport | Associated City | Current PCI |
|---|---|---|
| • Britton Municipal Airport* | • Britton | • 55 |
| • Sturgis Municipal Airport* | • Sturgis | • 46 |
| • Wagner Municipal Airport* | • Wagner | • 68 |
| • Canton Municipal Airport* | • Canton | • 50 |
| • Marv Skie – Lincoln County Airport* | • Tea | • 55 |
| • Redfield Municipal Airport | • Redfield | • 57 |
| • Clark County Airport | • Clark | • 68 |
| • Flandreau Municipal Airport | • Flandreau | • 66 |
| • Hoven Municipal Airport | • Hoven | • 64 |
| • The Sigurd Andersen Airport | • Webster | • 65 |

*These airports have had runway rehabilitation or are scheduled to have runway rehabilitation in 2011

Source: 2009/10 Survey Data

Of these 10 airports, two of them had their primary runways rehabilitated in 2010 – Sturgis Municipal and Wagner Municipal – and three of them are scheduled for runway rehabilitation projects in 2011. These airports include Marv Skie – Lincoln County Airport, Britton Municipal, and Canton Municipal. The total cost for runway rehabilitation projects in 2010 and 2011 is estimated at $11,298,500. The current PCI numbers listed in **Table 2** were identified through the inventory effort completed in early 2010, therefore the PCI numbers do not reflect the rehabilitation projects completed in 2010. The remaining five airports should be considered to receive pavement repair or rehabilitation of their primary runways to restore them to optimal condition for use.

The estimates below reflect the general costs to rehabilitate the existing pavement at these airports at this time:

- Clark County Airport – Runway 13/31 - $920,000
- Flandreau Municipal Airport – Runway 10/28 - $2,168,000
- Hoven Municipal Airport – Runway 13/31 - $920,000
- The Sigurd Andersen Airport – Runway 12/30 - $920,000

These estimates are based upon general construction practices and do not take into account site specific conditions that would be found with field survey or geotechnical investigation. At this time, the Redfield Municipal Airport is in the process of an environmental assessment for the realignment of their current primary Runway 13/31; therefore the cost of constructing the new runway as shown in their Master Plan is estimated at $5,000,000. The total cost for the recommended runway rehabilitation projects with the exception of Redfield Municipal is $4,928,000.

### 8.1.c Taxiway Type

Of the 72 public use airports, only six do not have a taxiway system, the majority of which have gravel or turf primary runways. Ten airports in the system have a full parallel taxiway including all six commercial service airports along with Chan Gurney Municipal, Brookings Regional, Marv Skie – Lincoln County, and Mitchell Municipal. According to FAA standards, a parallel taxiway system should be considered at airports that receive at least 20,000 annual operations. Three airports meet this criteria which do not have an existing parallel taxiway as noted in **Table 3**.

**Table 3 – Airports Recommended for Parallel Taxiway Development**

| Airport | Associated City | Operations | Current Taxiway Type |
|---|---|---|---|
| • Madison Municipal | • Madison | • 25,500 | • Connecting |
| • Black Hills Airport / Clyde Ice Field | • Spearfish | • 30,320 | • Partial |
| • Winner Regional | • Winner | • 21,240 | • Connecting |

Source: Airport 5010 Forms, 2009/10 Survey Data

It is recommended that consideration be given to each of these airports for the future construction of a parallel taxiway system to support their relatively large number of operations. Cost estimates have been developed for the construction of parallel taxiway systems at these airports including:

- Madison Municipal Airport – 5000' x 35' – $2,281,000
- Black Hills Airport/Clyde Ice Field – 4650' x 35' – $1,860,000
- Winner Regional Airport – 4500' x 35' – $2,252,000

These estimates are based upon general construction practices and do not take into account site specific conditions that would be found with field survey or geotechnical investigation. These costs do not include taxiway lighting costs since reflective markers are usually used at the smaller general aviation airports; however, if taxiway lighting were to be installed it would cost an additional $50,000 to $75,000. The estimates for the Madison Municipal Airport and the Winner Regional Airport are for concrete pavement to match their existing runway surface. The total cost for the recommended parallel taxiway development is $6,393,000.

### 8.1.d Taxiway Lighting

Through the inventory process, it was found that 80.6 percent (80.6%) of system airports do not have taxiway lighting at their facilities. While taxiway lighting is not mandatory at these airports, it is recommended that the installation of taxiway lighting be considered in the future to help better identify taxiway locations and provide guidance to pilots operating at night or in times of reduced visibility. **Table 4** lists airports in the system which have taxiway lighting.

**Table 4 – Airports with Taxiway Lighting**

| Airport | Associated City | Type |
|---|---|---|
| Aberdeen Regional | Aberdeen | MITL |
| Brookings Regional | Brookings | MITL |
| Huron Regional | Huron | MITL |
| Mitchell Municipal | Mitchell | MITL |
| Parkston Municipal | Parkston | LITL |
| Pierre Regional | Pierre | MITL |
| Rapid City Regional | Rapid City | MITL |
| Joe Foss Field | Sioux Falls | MITL |
| Sisseton Municipal | Sisseton | MITL |
| Black Hills Airport/Clyde Ice Field | Spearfish | MITL |
| Harold Davidson Field | Vermillion | MITL |
| Watertown Regional | Watertown | MITL |
| Winner Regional | Winner | MITL |
| Chan Gurney Municipal | Yankton | MITL |

Source: 2009/10 Survey Data

The cost for installing taxiway lighting at an airport ranges between $75,000 and $125,000 when bid as a standalone project and depending on the length and the layout of the taxiway. The total cost for the

recommended lighting installation at the 58 airports without taxiway lighting ranges between $4,350,000 and $7,250,000.

### 8.1.e Visual Guidance Slope Indicator

Of the 72 public use airports in South Dakota, 27 airports do not have any type of a visual guidance slope indicator (VGSI). It is suggested that consideration be made to install Precision Approach Path Indicators (PAPIs) at these airports, or that the development of a GPS-LPV approach be considered to assist pilots in determining the correct glide path upon approach for landing. **Table 5** lists the airports that do not have VGSI equipment.

The estimated average cost for installing PAPIs at an individual airport ranges between $30,000 and $60,000 when bid as a standalone project and depending on if they are installed on one or two ends of a runway. The total cost for the recommended PAPI installation at the 27 airports listed in the following table ranges between $810,000 and $1,620,000.

**Table 5 – Airports without VGSI Equipment**

| Airport | Associated City |
|---|---|
| • Arlington Municipal | • Arlington |
| • Bowdle Municipal | • Bowdle |
| • Harding County | • Buffalo |
| • Canton Municipal | • Canton |
| • Clear Lake Municipal | • Clear Lake |
| • Corsica Municipal | • Corsica |
| • Cheyenne Eagle Butte | • Eagle Butte |
| • Edgemont Municipal | • Edgemont |
| • Eureka Municipal | • Eureka |
| • Custer State Park | • Fairburn |
| • Faulkton Municipal | • Faulkton |
| • Herreid Municipal | • Herreid |
| • Highmore Municipal | • Highmore |
| • Howard Municipal | • Howard |
| • Isabel Municipal | • Isabel |
| • Kadoka Municipal | • Kadoka |
| • Kimball Municipal | • Kimball |
| • Lake Andes Municipal | • Lake Andes |
| • Lake Preston Municipal | • Lake Preston |
| • McIntosh Municipal | • McIntosh |
| • McLaughlin Municipal | • McLaughlin |
| • Murdo Municipal | • Murdo |
| • Platte Municipal | • Platte |
| • Timber Lake Municipal | • Timber Lake |
| • The Sigurd Andersen | • Webster |
| • Wessington Springs | • Wessington Springs |
| • White River Municipal | • White River |

Source: 2009/10 Survey Data

### 8.1.f Runway End Identifier Lights

Runway End Identifier Lights (REILS) provide a positive indication of runway thresholds for pilots operating in times of reduced visibility. Through the system inventory effort, 64 airports (88.9%) were found to not have REILS. **Table 6** illustrates the eight airports where REILS are available. It is recommended that consideration be given to those airports for the installation of pilot controlled REILS which can be activated by incoming pilots when needed, and therefore do not need to be running all of the time.

The estimated cost for installing REILS at an individual airport ranges between $20,000 and $35,000 when bid as a standalone project depending on if they are installed on one or two runway ends. The total cost for the recommended REIL installation at the 64 airports ranges between $1,280,000 and $2,240,000.

**Table 6 – Airports with REILS**

| Airport | Associated City |
|---|---|
| • Aberdeen Regional | • Aberdeen |
| • Brookings Regional | • Brookings |
| • Huron Regional | • Huron |
| • Mitchell Municipal | • Mitchell |
| • Pierre Regional | • Pierre |
| • Rapid City Regional | • Rapid City |
| • Watertown Regional | • Watertown |
| • Chan Gurney Municipal | • Yankton |

Source: 2009/10 Survey Data

## 8.2 Service Recommendations

Beyond improvements to airport infrastructure, several recommendations have been made for improvements to services provided by airports. The following sections identify seven areas for enhancement of available services including ground transportation, food and beverage availability, internet access, pilot areas, fueling, land use, and GPS approaches.

### 8.2.a Ground Transportation

Often a passenger's final destination is not the airport itself, therefore a need for ground transportation is prevalent and should be considered at airports across the State. Several options for ground transportation exist, whether it is a rental car agency at larger airports, or an airport courtesy car at smaller general aviation airports, or even an agreement with a local car dealership to provide vehicles on a temporary basis, or the availability of a taxi service. Through the provision of ground transportation services, an airport may appeal to a larger user group. **Table 7** indicates the availability of ground transportation by airport role.

**Table 7 – Ground Transportation by Airport Role**

| Airport Role | Recommended Transportation | % of Airports w/ Ground Transportation |
|---|---|---|
| • Commercial Service | • Rental Car Agency | • 100% |
| • Large General Aviation | • Courtesy Car | • 100% |
| • Medium General Aviation | • Courtesy Car | • 100% |
| • Small General Aviation | • Dealership Agreement | • 19% |
| • Basic Service | • Dealership Agreement | • 0% |

Source: 2009/10 Survey Data

### 8.2.b Food and Beverage

The provision of food and beverage services, whether it be a restaurant, snack shop, or vending machine, is important to the traveling public as indicated through the user survey effort. It is a recommendation that airports that have an on-airport facility or terminal building offer food and beverage options which are appropriate based upon an airport's size. As a result of data collection efforts, 55 of the 72 airports have been identified as having a terminal or administration building on site, whether it be free standing, attached to a hangar, or attached to an on-airport residence. These airports should consider the provision of food and beverages if their facilities can support such options. Currently, 69.4% of system airports do not have food or beverage availability. Those that currently offer some form of food and beverage availability are shown in **Table 8**.

**Table 8 – Airports with Food and Beverage Availability**

| Airport | Associated City |
|---|---|
| • Aberdeen Regional | • Aberdeen |
| • Belle Fourche Municipal | • Belle Fourche |
| • Brookings Regional | • Brookings |
| • Chamberlain Municipal | • Chamberlain |
| • Custer County | • Custer |
| • Hot Springs Municipal | • Hot Springs |
| • Huron Regional | • Huron |
| • Madison Municipal | • Madison |
| • Milbank Municipal | • Milbank |
| • Miller Municipal | • Miller |
| • Mitchell Municipal | • Mitchell |
| • Mobridge Municipal | • Mobridge |
| • Pierre Regional | • Pierre |
| • Rapid City Regional | • Rapid City |
| • Joe Foss Field | • Sioux Falls |
| • Black Hills/Clyde Ice Field | • Spearfish |
| • Marv-Skie Lincoln County | • Tea |
| • Harold Davidson Field | • Vermillion |
| • Wagner Municipal | • Wagner |
| • Watertown Regional | • Watertown |
| • Winner Regional | • Winner |
| • Chan Gurney Municipal | • Yankton |

Source: 2009/10 Survey Data

### 8.2.c Internet Access

The availability of internet access at an airport with terminal/administration facilities is suggested to serve passengers who may be waiting for a flight, and pilots who utilize the internet to get up-to-the-minute weather information and to file flight plans. More than half of South Dakota's airports do not offer internet access either through a dedicated computer or through a wireless connection. As technology continues to advance, wireless internet coverage is expanding and has become a more viable option for areas that once could not access the web. Airports with proper facilities should consider providing internet access to its users. **Table 9** identifies airports with terminal or administration facilities which do not have internet access.

**Table 9 – Airports with Terminal/Administration Facilities without Internet Access**

| Airport | Associated City |
|---|---|
| • Bison Municipal | • Bison |
| • Britton Municipal | • Britton |
| • Canton Municipal | • Canton |
| • Chamberlain Municipal | • Chamberlain |
| • Clark County | • Clark |
| • Wilder | • De Smet |
| • Cheyenne Eagle Butte | • Eagle Butte |
| • Edgemont Municipal | • Edgemont |
| • Faith Municipal | • Faith |
| • Flandreau Municipal | • Flandreau |
| • Hoven Municipal | • Hoven |
| • Lake Preston Municipal | • Lake Preston |
| • Milbank Municipal | • Milbank |
| • Onida Municipal | • Onida |
| • Philip | • Philip |
| • Platte Municipal | • Platte |
| • Rosebud Sioux Tribal Airport | • Rosebud |
| • Wagner Municipal | • Wagner |
| • The Sigurd Andersen | • Webster |
| • Wessington Springs | • Wessington Springs |

Source: 2009/10 Survey Data

### 8.2.d Pilot Areas

Pilot areas can often provide a place for pilots to relax, eat, sleep, check weather conditions, and file flight plans based upon the individual facility. These areas are important for pilots flying to the area who need a place to rest, or to wait for passengers. Half of the system airports have indicated the existence of a pilot area at their individual facilities. Those airports that do not have pilot areas should consider the development of one if their facilities can support such a use, to better facilitate the use of their airport by private and corporate pilots.

### 8.2.e Fuel

Alternate fueling objectives have been developed for each airport role as discussed in Chapter 5. All airports within their respective role are currently meeting their fueling objective; however 41.7 percent

(41.7%) of system airports still offer no fueling options. As such, consideration should be given to airports within the Small General Aviation category (of which fueling is not an objective) to provide 100 LL fueling if their user base is large enough to warrant a fuel facility. Since all 26 airports classified as Small General Aviation are included in the NPIAS, they may choose to use their non-primary entitlements to fund this type of project. **Table 10** lists those airports classified as Small General Aviation that do not already offer fuel.

**Table 10 – Small General Aviation Airports**

| Airport | Associated City |
|---|---|
| • Wilder Airport | • De Smet |
| • Cheyenne Eagle Butte Airport | • Eagle Butte |
| • Edgemont Municipal Airport | • Edgemont |
| • Eureka Municipal Airport | • Eureka |
| • Faulkton Municipal Airport | • Faulkton |
| • Flandreau Municipal Airport | • Flandreau |
| • Highmore Municipal Airport | • Highmore |
| • Martin Municipal Airport | • Martin |
| • McLaughlin Municipal Airport | • McLaughlin |
| • Murdo Municipal Airport | • Murdo |
| • Parkston Municipal Airport | • Parkston |
| • Pine Ridge Airport | • Pine Ridge |
| • Rosebud Sioux Tribal Airport | • Rosebud |
| • Wall Municipal Airport | • Wall |
| • The Sigurd Andersen Airport | • Webster |
| • Wessington Springs Airport | • Wessington Springs |

### 8.2.f Land Use

An important step in preserving the existing system infrastructure is to plan ahead to protect it from the encroachment of incompatible land uses which can hinder aircraft operations and threaten the safety of individuals in proximity, should an incident occur. This can be accomplished through coordinated planning efforts with local communities to include airports in the land use and comprehensive planning process and their associated documents. While inclusion in local planning documents was not identified as an objective of the SDSASP, it is included in the service targets established in Chapter 5 for all five airport classifications. Airport sponsors should work with their local host communities to plan for future compatible development near their airport and ask that the airport be included in local comprehensive and land use planning efforts where applicable. They should also be active in the local planning process to be proactive in the preservation of the airspace and land uses around their airport.

### 8.2.g GPS Approaches

A growing trend in the aviation industry is the development of GPS approaches (which provide both horizontal and vertical guidance) at airports across the country. In order to establish a GPS approach, the property within the runway approaches must be maintained clear of any obstructions which would penetrate the approach surface. Unfortunately, not all airports within the system own or control the land necessary to implement this non-precision approach. As such, airports with the ability to develop and

maintain GPS approaches should consider pursuing such approaches in the future. Those airports that have obstructions which would hinder the development of this non-precision approach should consider clearing those obstructions to increase the safety of aircraft operations at their location. **Table 11** indicates the airports which have existing GPS approaches.

**Table 11 – Airports with GPS Approaches**

| Airport | Associated City |
|---|---|
| • Aberdeen Regional | • Aberdeen |
| • Belle Fourche | • Belle Fourche |
| • Britton Municipal | • Britton |
| • Brookings Municipal | • Brookings |
| • Chamberlain Municipal | • Chamberlain |
| • Cheyenne Eagle Butte | • Eagle Butte |
| • Gettysburg Municipal | • Gettysburg |
| • Gregory Municipal/Flynn Field | • Gregory |
| • Hot Springs Municipal | • Hot Springs |
| • Huron Regional | • Huron |
| • Lemmon Municipal | • Lemmon |
| • Madison Municipal | • Madison |
| • McLaughlin Municipal | • McLaughlin |
| • Milbank Municipal | • Milbank |
| • Mitchell Municipal | • Mitchell |
| • Parkston Municipal | • Parkston |
| • Philip | • Philip |
| • Pierre Regional | • Pierre |
| • Presho Municipal | • Presho |
| • Sisseton Municipal | • Sisseton |
| • Springfield Municipal | • Springfield |
| • Marv-Skie Lincoln County | • Tea |
| • Harold Davidson Field | • Vermillion |
| • Watertown Regional | • Watertown |
| • Winner Regional | • Winner |
| • Chan Gurney Municipal | • Yankton |

Source: 2009/10 Survey Data

## 8.3 Summary

Through a comparison of system objectives, established targets, and facility and service inventories, the recommendations presented in this Chapter were identified for future improvement. The recommendations provided should be taken into consideration by the South Dakota DOT Office of Aeronautics, airport sponsors, and local decision makers when planning future individual airport improvements. By focusing on the elements presented, airports can develop in ways that are beneficial to airport users, the local community, and the aviation system as a whole.