CHAPTER 3: AVIATION FORECASTS

Introduction

The Aviation Activity Forecasts chapter of the Airport Master Plan analyzes current and future airport activity at the Ronan Airport (7S0). Forecasting provides an airport with a general idea of the magnitude of growth, as well as fluctuations in activity anticipated over the forecast period. Forecasts help the Airport in determining existing and planned future facility needs based on airport activity level estimates and projections. Forecasts attempt to develop a realistic estimate of future changes if/when conditions dramatically change, forecasts should be reviewed and updated.

Aircraft Parked on the main Ramp

The forecasts developed for the Airport will be important to adequately plan, size, and sequence development of future facilities to meet future projected growth. Development at airports, however, is based on demand from actual numbers rather than forecasts.

To thoroughly analyze and develop a probable aviation forecast, a technical review has been completed using several methods to help quantify the potential aviation activity over the next 20 years.

This chapter includes aviation activity forecasts for the following primary elements:

- Commercial Aviation
- Based Aircraft
- General Aviation
- Military
- Critical Design Aircraft
- Annual Instrument Approaches
- Peak Activity

Forecast Rationale

Forecasting the demand for airport use is a critical step in airport development. It allows an airport to examine its ability to satisfy the needs of the aircraft and people it serves, and to determine the approximate timing of necessary improvements by projecting airport user activity levels.

Forecasts developed for airport master plans must be approved by the Federal Aviation Administration (FAA). It is the FAA's policy, listed in FAA AC 150/5070-6B, *Airport Master Plans*, that FAA approval of forecasts should be consistent with the Terminal Area Forecasts (TAF). Master plan forecasts for operations and based aircraft are considered to be consistent with the TAF if they meet the following criteria:

1. Forecasts differ by less than 10 percent in the five-year forecast and 15 percent in the 10-year or 20-year period, or
2. Forecasts do not affect the timing or scale of an airport project, or
3. Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems*.

Forecasts that are considered to be inconsistent with the TAF require additional FAA review to confirm the planning assumptions and appropriate methodologies are used. A headquarters review is not required for forecasts at general aviation airports that do not exceed 200 based aircraft or 200,000 annual operations. Approval can occur at the FAA local (Helena) or regional (Seattle) level.

Furthermore, FAA Order 5090.3C states forecasts should be:

1. *Realistic*
2. *Based on the latest available data*
3. *Reflect the current conditions at the airport*
4. *Supported by information in the study*
5. *Provide an adequate justification for the airport planning and development*

The TAF model used for this report is from the 2015 FAA TAF published in January 2016. This is latest data available when the forecasting effort began for this airport master plan.

Factors Affecting Forecasts

FAA provides general guidance in evaluating factors that affect aviation activity. FAA AC 150-5070-6B states:

> *Planners preparing forecasts of demand or updating existing forecasts should consider socioeconomic data, demographics, disposable income, geographic attributes, and external factors such as fuel costs and local attitudes towards aviation.*

For purposes of this forecast, the following defining factors have been used to develop the forecast:

1. Fiscal year 2015 has been used as the baseline for existing data and applied to most of the aviation forecast projections.
2. The most recent 2015 estimates and future projections of population, employment and income trends have been utilized.
3. The forecast period is 20 years encompassing year 2015 through 2035.
4. The Airport Service Area for 7S0 has been developed using data from Lake County.

The forecasts prepared for the airport assume an unconstrained scenario where facilities are available for use to meet demand. Any constrained forecasts prepared will be noted throughout the document. Time periods include short-term (5-year), mid-term (10-year) and long-term (20-year) resulting in forecasts for year 2020, 2025 and 2035. Forecasts may be developed using a composite of methodologies over the planning period.

Because aviation activity fluctuates due to unforeseen changes to demand and the industry, the forecasts developed in this section will be developed into Planning Activity Levels (PALs) in future chapters to identify activity demand triggers for future facility improvements.

Forecasting Methods

Various methodologies are used to develop aviation forecasts. Forecasts should not be considered predictions of the future but rather an educated projection of future activity. Some of the following forecasting methods were applied for this analysis, including trend extensions, market share analysis, socioeconomic methodologies and professional judgment.

TREND EXTENSIONS

A trend extension forecast identifies historical growth patterns and projects those patterns into the future. Often, a trend line can be drawn through a graph of the historical data to reveal an overall trend, which can then be extended into the immediate future to develop a forecast.

MARKET SHARE ANALYSIS

Market share analysis assumes a relationship between local and national/regional forecasts. The market share approach to forecasting is a top-down method where activity at an airport is assumed to be tied to growth in some external measure (typically a regional, state, or national forecast).

SOCIOECONOMIC METHODOLOGIES

Though trend line extrapolation and market share analysis may provide mathematical and formulaic justification for demand projections, many factors beyond historical levels of activity may identify trends in aviation and impact on aviation demand locally. Socioeconomic or correlation analysis examines the direct relationship between two or more sets of historical data. Based upon the observed and projected correlation between historical aviation activity and the socioeconomic data sets, future aviation activity projections are developed.

PROFESSIONAL JUDGMENT

Judgmental methods are educated estimations of future events based on the industry knowledge, experience and intuition of the forecaster. This method permits the inclusion of a broad range of relevant information into the forecasting process, and is usually used to refine the results of the other methods.

Socioeconomic Forecasts

Socioeconomic information within the airport service area can provide insight into factors that affect aviation activity at an airport. Commonly evaluated metrics include population, employment and income. Historic trends, current data and forecast estimates are evaluated in this section to identify socioeconomic trends that may affect aviation activity forecasts at 7S0. Growth rates are used as a method to compare the airport service area to other regional, statewide and national trends.

Population

Population is a basic indicator of the number of people who may utilize the airport. The City of Ronan is located in Northwest Montana in Lake County on the Flathead Indian Reservation, about 12 miles south of Flathead Lake on US 93 and about 65 miles north of Missoula.

Lake County encompasses an area of 1,654 square miles of which 1,490 square miles is land and 164 square miles is water. The population reported in the 2010 US Census was 28,746, growing approximately 2,200 from the 2000 US Census (26,507). Community centers include Polson (the county seat), Ronan, and St. Ignatius. Lake County is also home to the Confederated Salish and Kootenai Tribes of the Flathead Nation. Future population growth data predicts an increased growth rate of roughly 0.59 percent for Lake County and 1.32 percent for the City of Ronan. These numbers are consistent with historical and forecasted growth rates of the State of Montana as a whole.

Table 3-1 – Population Projections

Metric	2015	2020	2025	2035	CAGR
Population					
City of Ronan	1,981	2,108	2,248	2,575	1.32%
Lake County*	29,781	30,819	31,808	33,530	0.59%
Montana**	694,750	734,249	762,595	816,911	0.81%
United States*	317,779,000	340,554,000	357,751,000	390,162,000	1.03%

Source: KLJ Analysis, Woods & Poole Economics, Montana Department of Commerce**. CAGR = Compounded Annual Growth Rate*

It should be noted that the population data for the projections for the City of Ronan were based on extrapolated data from the growth trends in Lake County based off of the Montana Department of Commerce.

Employment

As noted in the Inventory, Lake County has struggled to find manufacturing as a major component of the work force, instead relying on light manufacturing, farming and tourism for jobs. The top five industries providing jobs in Lake County include:

1. State & Local Government → 2,982 Jobs
2. Retail Trade → 1,500 Jobs
3. Health Care and Social Assistance → 1,428 Jobs
4. Farming→ 1,296 Jobs
5. Construction → 999 Jobs

Total employment projections are below.

Table 3-2 – Total Employment Projections

Metric	2015	2020	2025	2035	CAGR
Total Employment					
Lake County	14,085	14,802	15,521	16,961	*0.93%*
Montana	662,375	705,963	751,847	851,274	*1.26%*
United States	185,554,000	198,343,000	212,071,000	242,442,000	*1.48%*

Source: Woods & Poole Economics. CAGR = Compounded Annual Growth Rate

According to Woods & Poole data, it is forecast total employment will continue to grow in Lake County at less than one percent annually this is slightly lower than the State of Montana and the Unites States.

Income

Per Capital Income (PCI) was also considered as a factor affecting aviation activity. Those who have more disposable income may have a higher propensity to utilize the time savings of aviation, or simply more disposable income for leisure. Growth in PCI for Lake County has outpaced the United States average over the past 10 years. From 2004 to 2014, the average annual growth rates were the same for the United States and Lake County at 4.90 percent. Projected PCI figures in Lake County are lower than the state and national numbers, although the growth rate for the county is growing faster than the state.

Table 3-3 – Per Capita Income Projections

Metric	2015	2020	2025	2035	CAGR
Per Capita Income (Current dollars)					
Lake County	30,694	$37,565	$47,887	$79,909	*4.90%*
Montana	$40,037	$48,769	$61,864	$102,370	*4.81%*
United States	$46,411	$56,808	$72,344	$120,708	*4.90%*

Source: Woods & Poole Economics. CAGR = Compounded Annual Growth Rate.

Retail Sales

Similar to PCI, increased retail sales are usually an economic indicator that people are able and willing to spend their money. It also is an indication that disposable income is higher and people have higher confidence in job outlook in their area. Compared to PCI, retail sales have averaged an annual increase of 2.67% between 1990 and 2014. Projections of retail sales are promising, and include compound annual growth rates exceeding one percent and are closer to one and a half percent through the planning period. This would indicate increased spending, and the potential for increased spending on aviation activities.

Table 3-4 – Retail Sales Projections

Metric	2015	2020	2025	2035	CAGR
Retail Sales (2005 Dollars; in millions)					
Lake County	$315.393	339.807	$365.693	$422.11	*1.48%*
Montana	$17,486.13	$19,251.71	$21,194.15	$25,680.63	*1.94%*
United States	$4,707,800	$5,187,469	$5,716,009	$6,940,133	*1.96%*

Source: Woods & Poole Economics. CAGR = Compounded Annual Growth Rate

Commercial Aviation Forecasts

Background

Commercial aviation consists of civil aviation that involves operating an aircraft for hire to transport passengers or cargo. The forecast elements evaluated in this report applicable to 7S0 include Passenger Enplanement and Air Taxi & Commuter operation forecasts.

Passenger Enplanements

Enplanements at an airport represent the number of revenue passengers boarding of commercial service aircraft that depart an airport. An operation is a takeoff or a landing of an aircraft conducting a passenger carrying operation on a scheduled or unscheduled basis.

In calendar year 2015, there were zero (0) recorded passenger enplanements at 7S0. This compares to no enplanements for each of the previous five years. The 2015 passenger enplanements is an indication of unscheduled air charter activity. With no enplanements at a general aviation airport this figure is nearly impossible to forecast. Therefore the proposed forecast is for no passenger enplanements.

Air Taxi & Commuter

An air taxi operation operates airplanes with no more than 60 passenger seats or 18,000 pounds of cargo payload. A commuter operation is a scheduled operation on a published flight schedule in other-than-turbojet airplanes up to nine passenger seats and up to 7,500 pounds of payload.

Transporting materials and goods can be accomplished by air, truck, rail, water or a combination of modes. Products that are high value, light weight and time sensitive typically drive air cargo demand.

The need for point-to-point on-demand commercial air service, such as aircraft charter operator at general aviation airports is a primary driver for air taxi & commuter passenger operations. This demand can be driven by many factors including the presence of local businesses with travel needs in aircraft owned by a commercial for-profit operator.

AIRPORT ACTIVITY & TRENDS

National

The FAA issues nationwide "Aerospace Forecasts" on an annual basis covering the next 20 years. As a whole, total aviation operations declined in 2015 by 0.9 percent. This decline includes the air taxi and commuter sector. Although slight, this downward trend has been noticed on a national level for the seventh consecutive year. Much of this is driven by the commercial airline industry. General aviation and air taxi hours flown however is forecast to increase and average of 1.40 percent annually through 2035.

Regional

Periodically, states will go through planning efforts to evaluate airport activity and plan for future needs. This plan, known as a State Aviation System Plan (SASP), assists in the development of a long-term plan that collects local needs of each community and aligns them into one collective vision for the state's aviation program. Montana's last SASP was recently completed and published in 2015 and covered topics such as inventory, forecasting, and facility requirements.

The SASP indicates between the years of 2010 and 2013 aviation operations increased at an estimated 1.40 percent.

The SASP indicated an annual growth pattern of 1.40 percent between 2013 and 2033 could be anticipated. The report also anticipated total operations for fighting wildfires to increase at a rate of 1.27 percent

Local

On a local level, activity at airports is analyzed through FAA, statewide or individual airport studies. If an airport is included in the National Plan of Integrated Airports System (NPIAS) as is 7S0, the FAA will publish historical and forecasted operational data. Historical data from the FAA usually has some validity to it, as it is typically reported by airports as to how many operations have been conducted.

Based on the FAA's Terminal Area Forecast (TAF) last updated in January 2016, 7S0's historical annual commercial operations are indicated below.

Table 3-5 – FAA TAF Historical Air Taxi & Commuter Operations

Type	1990	1995	2000	2005	2010	2015*
Air Carrier	0	0	0	0	0	0
Air Taxi/Commuter	0	0	0	0	0	250
TOTAL	**0**	**0**	**0**	**0**	**0**	**250**

Source: FAA Terminal Area Forecast (January 2016)

Through the planning period the FAA TAF forecast indicates no increase in operations and remains at 250 operations annually for Air Taxi & Commuter operations through 2035 and beyond.

Another source of airport information can come at the state level through the SASP. Although these system plans provide a macro-level of information for aviation in the entire state, they also look at airports individually. Like the FAA data, SASPs typically contain historical and forecasted data for both operations and based aircraft at individual airports. Unfortunately the SASP did not provide a breakout of air taxi/commuter operations for 7S0, so no comparison can be made.

Summary

There are several commercial air charter flights that occur in turboprop and even turbojet aircraft at the Airport. Please note this does not include flights operated under FAR Part 91 for individuals or corporations that fly their own employees.

Available FAA flight plan data indicates that the total number of commercial operations at 7S0 is less than 50 operations each of the past three (3) years. Commercial operations have been completed in larger and faster aircraft with the vast majority falling into FAA Design Group II category with turboprop or turbojet equipment. This data is considered to be a large sample of actual activity as many of the operations did not include corresponding departure segment data. Commercial operations at 7S0 account to a small amount of operations ranging over the past three years from 42 to 32.

Table 3-6 – FAA Recorded Commercial/Other IFR Operations

Types	2013	2014	2015
Comm. /Other	42	22	32

Source: FAA Traffic Flow Management System (TFMS)

PROPOSED FORECAST

Operations

Commercial flights occur at general aviation airports because companies find it more time or cost effective to charter an aircraft and fly to and from Ronan rather than use alternative transportation methods.

Based on the information provided by the FAA, discussions with the airport management, and airport users, it was determined that using the TAF numbers (250 throughout the planning period) provided a safe estimate of commercial operations. There are an estimated 32 annual commercial operations at 7S0 in 2015, which differs from the FAA TAF estimate of 250 annual operations.

Table 3-7 – Air Taxi & Commuter Operations Forecast

Metric	2015	2020	2025	2030	2035	CAGR
Air Carrier Operations	0	0	0	0	0	*0.00%*
Air Taxi & Commuter Operations	250	250	250	250	250	*0.00%*

Source: KLJ Analysis. CAGR = Compounded Annual Growth Rate

Based Aircraft Forecasts

A based aircraft is an operational and airworthy aircraft claiming an airport as its home for a majority of the year.

Airport Activity & Trends

National

Based on the 2015 FAA Aerospace Forecast, it was noted general aviation aircraft deliveries increased. Deliveries of turbojet aircraft had its first increase since 2008. Single engine piston deliveries had its third consecutive year up-tick of deliveries. The FAA TAF anticipates an annual growth rate of roughly 0.84 percent through 2035. It can be assumed that additional aircraft deliveries yield a constant increase in overall based aircraft in the United States. The highest growth sectors in total aircraft are turboprop, turbojet, rotorcraft, experimental and sport aircraft. Overall single-engine and multi-engine piston aircraft are forecast to decline.

Regional

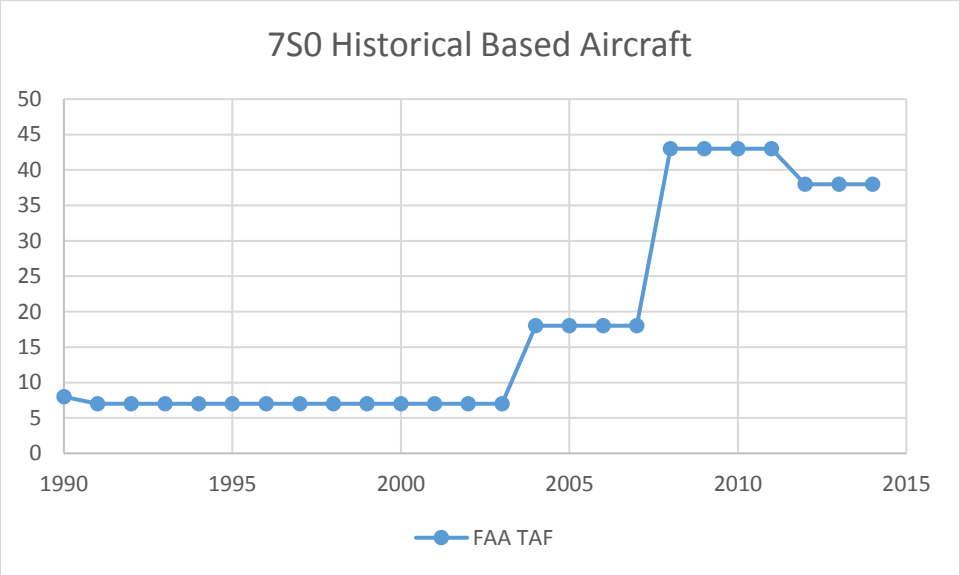
Historically, based aircraft in Montana has increased 1.89 percent annually from 1998-2013 according to the FAA TAF. The latest SASP update concluded that based aircraft in the Montana airport system should increase on average of 0.64 percent annually through 2033. FAA forecasts (2015-2035) based aircraft in Montana will increase 0.55 percent annually through 2035.

Local

Work was completed in this Master Plan study to verify the number of actual based aircraft at 7S0 using FAA, State and local data. Additional aircraft utilize 7S0 as a base on a regular transient or seasonal basis, which are not claimed as official based aircraft.

According to the FAA's TAF records, historical based aircraft numbers at 7S0 has been increasing over the years. A table reflecting this historical data is displayed below. Between the years of 1990 and 2014, FAA based aircraft numbers at 7S0 have increased from 8 to 38.

Exhibit 3-1 – Historical FAA TAF Based Aircraft



Source: FAA Terminal Area Forecast, FAA Form 5010-1 Airport Master Record, KLJ Analysis

The SASP report for 7S0 forecasts based aircraft increasing from a baseline of 38 to 50 in the next 20 years equating to an annual growth rate of 1.40 percent.

According to the Airport there are 28 based aircraft at the airport and this is verified in the National Based Aircraft system as on January 2016. This is the number (28) will we use for the forecast.

Table 3-8 – Based Aircraft Fleet Mix

Aircraft Type	Based Aircraft	Percent of Total
Single-Engine	27	97%
Multi-Engine	0	0%
Jet	0	0%
Helicopter	1	3%
Ultralight/Other	0	0%
Total Based Aircraft	**28**	**100%**

Source: KLJ Analysis

The airport is currently capacity constrained for new public aircraft storage hangars; there is limited space available on the airport to develop new hangar spaces.

Proposed Forecast

The proposed based aircraft forecast involves a few key elements, with the first one being the FAA's TAF projections through 2035. The FAA's projections indicate a total of 38 based aircraft through the planning period indicating no growth. This is a typical FAA "no-growth" forecast for a general aviation airport the size of 7S0; however the total number of aircraft should be changed to reflect current conditions of 28 based aircraft.

With the relatively small number of based aircraft at an airport like 7S0, an increase in one or two aircraft makes a significant increase in annual growth rates for this reason annual growth rates are not used as the sole basis for forecasts.

Local industry trends were evaluated when preparing this forecast of based aircraft at 7S0. It is estimated that based aircraft will grow at 7S0 for several reasons:

- The basic forecast increase in the employment and population within the airport service area supports additional aviation growth. This is seen from the historical data which shows the growth of based aircraft since 1990 (8) to today (28).
- The airport currently does not have a fixed-based operator (FBO). It is forecasted that sometime in the forecast period an FBO may base their business at 7S0 and bring an additional one or two based aircraft if space is available.
- There is no room to grow at the Polson Airport. As more and more people and businesses locate to the area the extra growth will need to be absorbed by Ronan. Aircraft that are larger may come to Ronan and the smaller aircraft/less demanding aircraft may go to Polson.
- Ultralight, home-built and light-sport aircraft are becoming more and more common for recreational pilots. This trend suggests additional aircraft of these types could be based at 7S0 sometime in the near or distant future if public space is available. These aircraft however are not counted as based aircraft for FAA purposes.
- The airport has a runway length (4,800 feet) that generally can accommodate regular use of most twin-engine piston and turboprop aircraft eliminating most limitations for these aircraft types.

It is forecasted the airport's based aircraft numbers will increase to less than the FAA TAF projected level of 38 based aircraft through the next 20 years as the TAF based aircraft number for 2015 is not correct. This master plan recommends that the currently validated number of (28) based aircraft be incorporated into the TAF and that the growth rates based on employment/population be accepted as the forecast. As stated earlier in the chapter both employment and population are anticipated to continue to grow in the Lake County. Local, regional, and national perspectives on aviation and economic growth suggest a positive outlook on the future. In addition, airports do not typically stay stagnant for 20 years.

Growth at 7S0 is based on a constant share of the employment for Lake County (similar based aircraft projections were determined from using constant share of population in Lake County which helps bolster the use of the numbers). This projection assumes based aircraft will grow at the same rate as the county population. Ultralight/other aircraft are expected to be based on 7S0, but do not count in the official FAA based aircraft total.

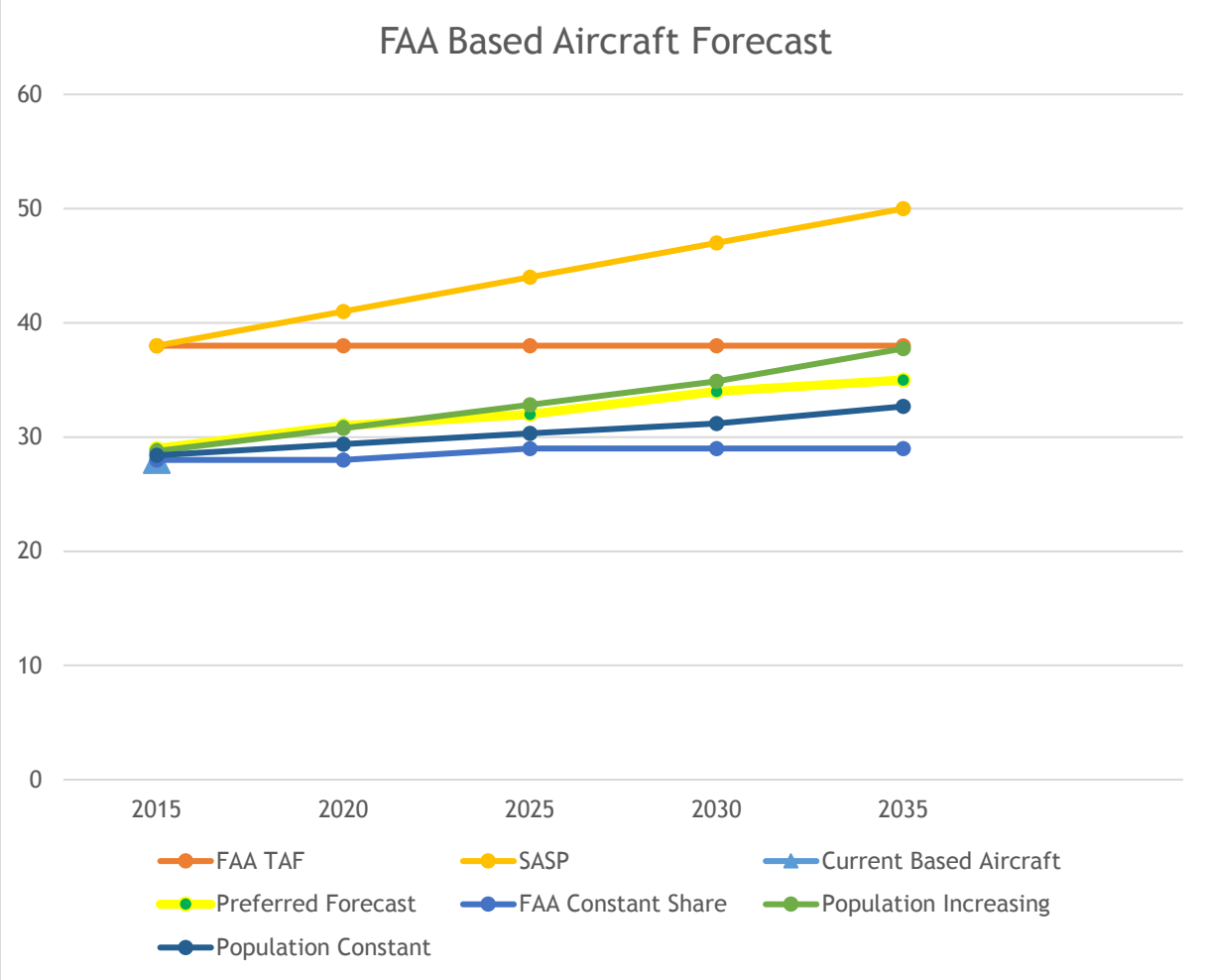
Table 3-9 – Based Aircraft Forecast

Metric	2015	2020	2025	2030	2035	*CAGR*
Single-Engine*	27	28	28	30	31	*0.69%*
Multi-Engine*	0	1	1	1	1	*3.53*

Jet	0	0	1	1	1	*3.53*
Helicopter	1	1	1	1	1	-
FAA Based Aircraft**	**28**	**30**	**31**	**33**	**34**	***0.98%***
Ultralight/Other	1	1	1	1	1	-
Total Based Aircraft	**29**	**31**	**32**	**34**	**35**	***0.95%***

Source: KLJ Analysis. CAGR = Compounded Annual Growth Rate
**Includes both piston and turboprop driven aircraft for FAA reporting purposes.*
***FAA Based Aircraft does not include ultralight/other.*

Exhibit 3-2– FAA Based Aircraft Forecast



Source: KLJ Analysis, FAA Terminal Area Forecast (January 2016), Montana State Aviation System Plan (2015)

The overall based aircraft growth rate at 7S0 is forecast to be 0.61 percent annually through the planning period. This growth rate is slightly lower than the statewide based aircraft growth rate in the SASP of 1.4 percent annually.

General Aviation Forecasts

An operation is an aircraft landing or a takeoff. Aircraft operations are split into two categories: local and itinerant.

Local operations are performed by aircraft that remain in the local traffic pattern and stay within a 20−mile radius. These operations typically include practice landings, touch-and-go operations, practice approaches and maneuvering within the local area in non-military aircraft. Local operations are usually performed by recreational and flight training aircraft, as well as agricultural spray aircraft in rural settings.

Itinerant operations are performed by a landing aircraft arriving from outside the airport area (20 miles) or a departing aircraft that leaves the airport area. Itinerant operations are conducted in all types of aircraft.

At non-towered airports like 7S0, FAA estimates operations and classifies them as civil local and general aviation itinerant. Combined these include all types of general aviation operations.

Airport Activity & Trends

National

The 2015 FAA Aerospace Forecasts reported total aviation operations at towered airports declined in 2014 by 0.9 percent from the previous year. More specifically, there was roughly a 0.6 percent decrease in local operations and a 1.1 percent decrease in itinerant operations.

Since 2001, total general aviation hours flown have declined by 14 percent. The FAA TAF estimates total civil local and itinerant operations will increase nationally by 0.41 percent annually through the 20-year planning period. The FAA Aerospace Forecasts predicts total general aviation hours flown increasing by 1.4 percent, mostly in turboprop, turbojet, rotorcraft, experimental and sport aircraft types.

Regional

General aviation operations were evaluated as a part of the SASP completed in 2015.

The analysis of the SASP concluded general aviation operations would grow at a rate of 1.5 percent annually between through 2033.

FAA data shows Montana civil local operations increased by 4 percent since 2001. General aviation itinerant operations declined by 3 percent statewide in the same time period. Montana civil local operations according to FAA data is forecast to increase by 0.30 percent annually while general aviation itinerant activity is forecast to increase by 0.10 percent annually.

Local

Civil local and itinerant operations at 7S0 have been reported by the FAA using data from the Airport Master Record. Operations at 7S0 are shown from the January 2016 FAA TAF the following table. There has been a significant change in operations in 2013, likely in part because of a change in the FAA reporting methodology or a change in reporting methods by the airport 5010 inspector.

Forecasted civil local operations are included and begin in 2015. Please note the numbers in the table represent *annual operations*. Years were combined in the table because there was no annual change indicated between these years.

Table 3-10 – FAA TAF General Aviation Operations History and Forecast

Year	Civil Local	GA Itinerant	Total
2000-2004	2,300	650	2,950
2005-2012	1,000	2,800	3,800
2013-2035	4,000	5,600	9,600

Source: FAA Terminal Area Forecast (January 2016)

The SASP forecast for 7S0 forecasts a total of 12,996 operations by 2033.

The table below identifies total FAA recorded operations conducted under IFR classified as general aviation. This activity has fluctuated over the past three years, but generally has stayed below 200 and above 150 operations.

Table 3-11 – FAA Recorded General Aviation IFR Operations

Types	2013	2014	2015
General Aviation	186	161	194

Source: FAA Traffic Flow Management System (TFMS)

Sources of updated local data also came from discussions with the airport manager and input from various stakeholders/airport users. This information is gathered from project meetings, making phone calls or through airport user surveys. A user survey was placed at the Ronan Airport pilots lounge as well as the Polson Airport pilots lounge; these surveys captured vital airport user information. The questions in the survey directly related to who is using the airport, what type(s) of aircraft are using the airport, identifying insufficient areas of the airport, and most importantly allowing airport users an opportunity to weigh-in on the airport's master plan process. As a part of the survey, questions were asked of the airport users to get a feel for who and what types of operations are being conducted; full responses are included in Appendix X.

There were four respondents to the survey. Key findings included:

- FAA certified weather reporting station is needed
- FBO would be nice to have
- 5,000 foot long runway would be nice to have

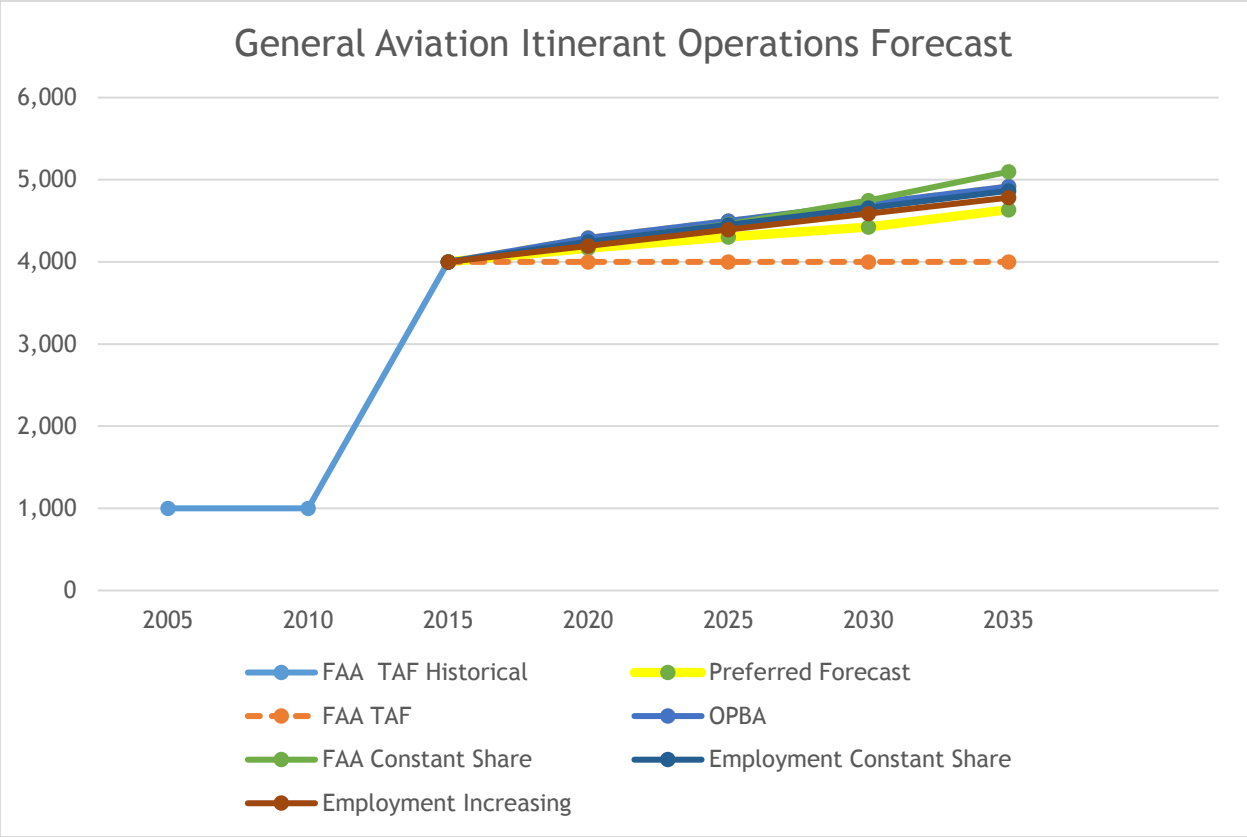
Itinerant Operations Forecast

The baseline total general aviation operations used at 7S0 is based in part off of the 2015 reported numbers per the FAA 2016 TAF report. In 2011 the TAF was corrected to reflect an increase in itinerant operations. Since 7S0 is a non-towered airport with an airport manager/FBO not available full time, operations (whether total or by specific aircraft type) are at best estimates. Through discussions with the airport manager it was determined that the current TAF itinerant operation number per year (4,000) is supportable.

Future growth in overall aviation activity at 7S0 is supported with local data. Based on the historical data provided by the TAF general aviation aircraft has increased, and fuel sales have increased as well over the past several years. As based aircraft grows into the future, so will the number of itinerant operations for business and personal flying. Additionally, itinerant activity is driven by operators that have a need to fly to 7S0 for business activity.

Increase in transient aircraft flying to and from Ronan is expected to increase slightly over the forecasted period. This growth can be attributed to a slight increase in activity per user on average as compared to today.

Exhibit 3-3 – General Aviation Itinerant Operations Forecast Methods



Source: FAA Terminal Area Forecast (January 2016),KLJ Analysis

Table 3-12 – General Aviation Itinerant Operations Forecast

Metric	2015	2020	2025	2030	2035	*CAGR*
Total GA Itinerant Operations	4,000	4,169	4,303	4,425	4,636	*0.83%*

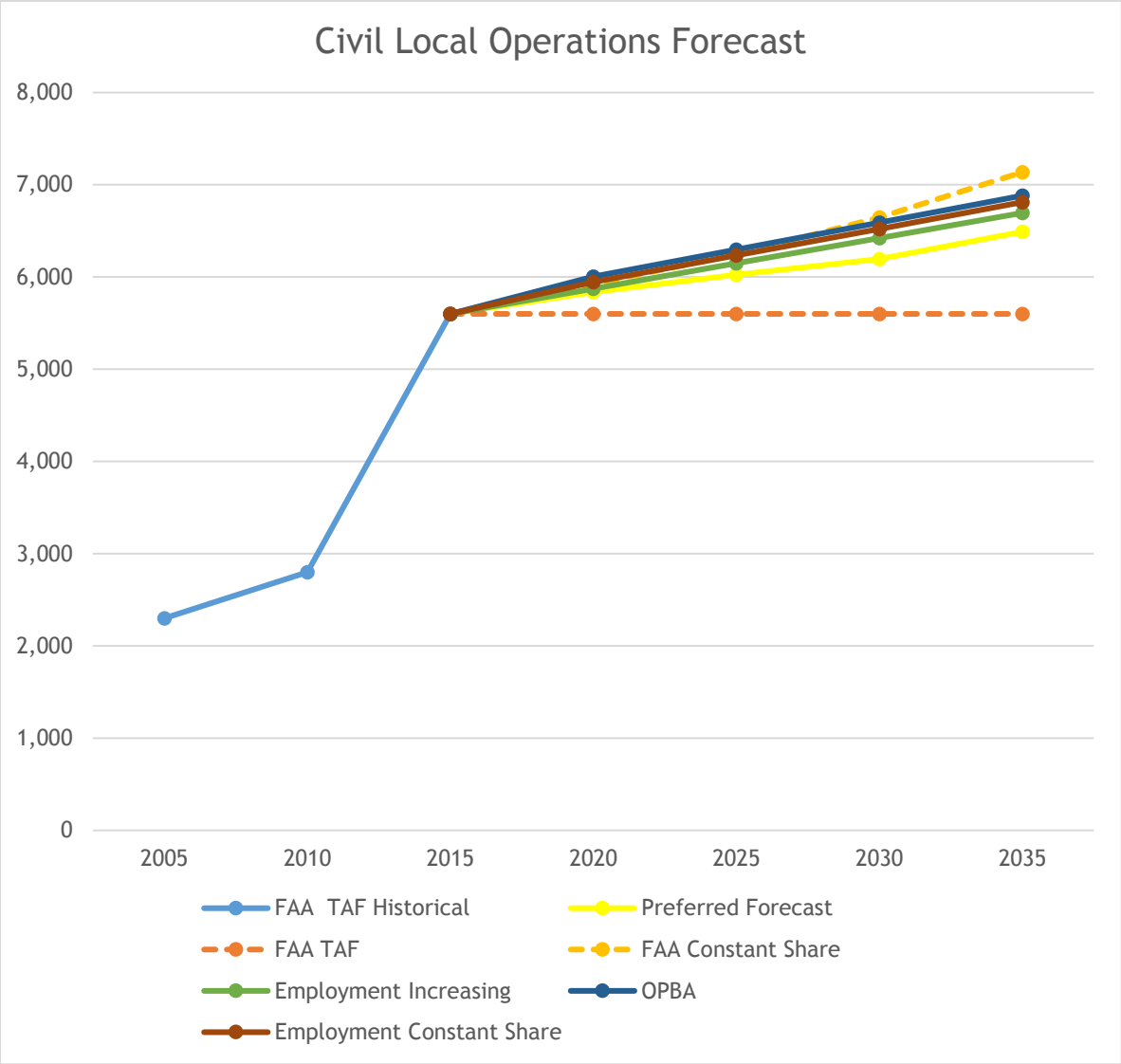
Source: KLJ Analysis. CAGR = Compounded Annual Growth Rate

Local Operations Forecast

The baseline total general aviation operations used at 7S0 is based in part off of the 2015 reported numbers per the FAA 2015 TAF report. It is estimated local operations make up 56 percent of the total general aviation airport operations. Again these are estimates, since the airport is non-towered. The TAF provides a baseline of approximately 5,600 annual civil local operations; like the Itinerant operations the TAF was updated in 2011 to reflect more current trends at the airport. The number is validated by the number of by FAA Order 5090.3C as this order states that rural airports should anticipate having operations by based aircraft no greater than 250 operations per based aircraft; at 7S0, based on the forecasts the operations per based aircraft is around 200 for the planning period.

As the number of based aircraft grows into the future so will the number of civil local operations. This can be attributed to overall increased activity in aviation per user on average as compared to today. The civil local operations growth rate at 7S0 is not estimated to match the statewide SASP rate of 1.40 percent annually through the planning period.

Exhibit 3-4 – Civil Local Operations Forecast Methods



Source: KLJ Analysis, FAA Terminal Area Forecast (January 2016)

Table 3-13 – Civil Local Operations Forecast

Metric	2015	2020	2025	2030	2035	*CAGR*
Total Civil Local Operations	5,600	5,836	6,024	6,195	6,491	*0.74%*

Source: KLJ Analysis. CAGR = Compounded Annual Growth Rate

Military Operations

There has historically been no local or itinerant military operations at 7S0 observed by local airport management or noted in the FAA TAF. There is no indication of any new military activity in the local or surrounding area. From time to time a military aircraft may operate from 7S0 however it is very likely it will not be significant enough to affect airport development or design standards. As a result, the forecast is for no military local or itinerant operations through the 20-year planning period at 7S0.

Table 3-14 – Military Operations Forecast Summary

Metric	2015	2020	2025	2030	2035	CAGR
Local Military Operations	0	0	0	0	0	*N/A*
Itinerant Military Operations	0	0	0	0	0	*N/A*
Total Operations	**0**	**0**	**0**	**0**	**0**	***N/A***

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

Operations Summary

The total annual operations forecast for 7S0 is summarized in the table below, including a breakdown between local and itinerant operations.

Table 3-15 – Total Operations Forecast Summary

Metric	2015	2020	2025	2030	2035	CAGR
Commercial Operations	250	250	250	250	250	*0.00%*
GA Itinerant Operations	4,000	4,169	4,303	4,425	4,636	*0.83*
Civil Local Operations	5,600	5,836	6,024	6,195	6,491	*0.74%*
Military Operations	0	0	0	0	0	*N/A*
Total Operations	**9,850**	**10,255**	**10,576**	**10,870**	**11,377**	***0.74***
Total Itinerant	4,250	4,419	4,553	4,675	4,886	*0.71%*
Total Local	5,600	5,836	6,024	6,195	6,491	*0.74%*
Itinerant Share	43.1%	43.1	43.0%	43.0	42.9	*-0.02%*
Local Share	56.9%	56.9%	57.0%	57.0%	57.1%	*0.02%*

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

Fleet Mix

The overall airport operations fleet mix combines commercial and general aviation operations using estimated percentages.

When determining a fleet mix of aircraft at a general aviation airport, information is typically limited to what the sponsor sees or who is based on the airfield. However, most operations conducted under IFR are tracked by the FAA at airports have Instrument procedures. The drawback of this data is it does *not* cover those aircraft operating under VFR or outside of a radar environment. For VFR flights, interpolation and estimating is required. Most corporate general aviation aircraft and commercial aircraft operate under IFR. Data for 7S0 was collected through a Freedom of Information Act (FOIA) request of the FAA's Traffic Flow Management System (TFMS) database.

TFMS data was used to determine help develop an overall estimated fleet mix. Specifically, this data was used to determine proration percentages of aircraft types using the airport under IFR. This proration was then applied to existing and future airport operations at 7S0.

TFMS data was gathered from years 2009-2015. There were 566 operations depicted in this data with aircraft mostly ranging in the single engine, small twin, to turboprop and light jet as shown below. The vast majority of VFR operations are conducted in single-engine piston aircraft. Estimated fleet mix percentages are then identified for all commercial, local and itinerant airport operations conducted under IFR and VFR. Modifications have been made based on available local data, local user projections, broader industry trends and professional judgement to account for anticipated future user fleet mix changes. The overall estimated fleet mix share breakdown is identified in the table below.

Table 3-16 – Fleet Mix Share Breakdown

Metric	2015	2020	2025	2030	2035	CAGR
Single-Engine Piston	83.19%	82.14%	81.05%	79.96%	80.04%	-0.19%
Multi-Engine Piston	4.62%	4.32%	4.03%	4.03%	4.02%	-0.68%
Turboprop	6.23%	7.30%	7.24%	8.06%	7.98%	1.24%
Turbojet	0.32%	0.31%	1.74%	1.73%	1.73%	8.76%
Helicopter	2.76%	2.76%	2.76%	2.76%	2.77%	0.02%
Ultralight/Other	2.88%	3.17%	3.17%	3.46%	3.46%	0.93%

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

The estimated fleet mix share percentages are then prorated by the total annual operations forecasted for 7S0 to yield a fleet mix operational forecast.

Table 3-17 – Total Operations Fleet Mix Forecast

Metric	2015	2020	2025	2030	2035	CAGR
Single-Engine Piston	8,148	8,375	8,523	8,642	9,054	0.53%
Multi-Engine Piston	452	441	424	435	455	0.03%
Turboprop	611	744	762	871	903	1.97%
Turbojet	32	32	183	187	195	9.55%
Helicopter	270	281	290	299	313	0.74%
Ultralight/Other	282	323	333	374	392	1.66%
Total Operations	**9,794**	**10,197**	**10,516**	**10,808**	**11,312**	**0.72%**

Source: KLJ Analysis

Forecast Comparison with FAA TAF

Proposed aviation activity forecasts must be reviewed and approved by FAA. A forecast is consistent with the FAA TAF if the proposed activity is within a certain tolerance of the official forecast. If the proposed forecast is inconsistent with the TAF, then differences must be resolved for the forecast to be adopted by the FAA. Key activity measures that are reviewed include passenger enplanements, based aircraft and total operations.

PASSENGER ENPLANEMENTS

7S0 has a very low number of commercial passenger enplanements. Since the airport's proposed forecast for passenger enplanements is the TAF it is considered **consistent** with the 250 FAA TAF and requires no change to the published TAF.

Table 3-18 – Passenger Enplanements vs. FAA TAF

Metric	2015	2020	2025	2030	2035	CAGR
Enplanement Forecast	0	0	0	0	0	*N/A*
FAA TAF (January 2016)	0	0	0	0	0	*N/A*
Difference	0.0%	0.0%	0.0%	0.0%	0.0%	-
Allowable Difference	10.0%	10.0%	15.0%	15.0%	15.0%	-
Consistent with FAA TAF?	**YES**	**YES**	**YES**	**YES**	**YES**	-

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

BASED AIRCRAFT

Existing 7S0 based aircraft was determined to be 28 based on local analysis. Based aircraft is projected to increase at a steady pace throughout the planning period based on national, state and local trends. The FAA TAF projects no based aircraft growth into the future. The table below compares the proposed aviation forecast with the FAA's TAF forecast.

Table 3-19 – Based Aircraft vs. FAA TAF

Metric	2015	2020	2025	2030	2035	CAGR
Based Aircraft Forecast*	28	30	31	33	34	*0.98%*
FAA TAF (January 2015)	38	38	38	38	38	*N/A*
Difference	-26.32%	-22.03	-18.57	-12.37	-10.44	-
Allowable Difference	10.0%	10.0%	15.0%	15.0%	15.0%	-
Consistent with FAA TAF?	**NO**	**NO**	**NO**	**YES**	**YES**	-

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate
**Does not include ultralight/other aircraft*

The airport's proposed forecast of based aircraft is **not consistent** with the FAA's TAF. The actual baseline number of based aircraft needs to be corrected. It should be noted that TAF projections of based aircraft, when considering smaller general aviation airports, typically do not show any growth rate in forecasted numbers. Based on local, regional, and national aviation and economic outlooks, it does not appear aviation demand at 7S0 will remain completely flat-lined for the planning period.

Any expected growth from an independent analysis usually does not meet near-term or long-term tolerance requirements of 10 percent and 15 percent, respectively. Recommendations as a result of this master plan includes FAA review and approval of the proposed forecast, and submission of the forecast to update the airport's TAF in 2016 and beyond.

TOTAL OPERATIONS

Total airport operations at 7S0 is primarily made up of general aviation traffic, with occasional commercial/air taxi traffic. Baseline forecasts assume the existing FAA TAF traffic estimates. Commercial operations are projected to remain relatively the same through the planning period. General aviation operations are projected to increase at a steady rate through the planning period based on SASP forecasts supported by local trends. The table below compares the proposed aviation forecast with the FAA's TAF forecast.

Table 3-20 – Total Operations vs. FAA TAF

Metric	2015	2020	2025	2030	2035	CAGR
Total Operations Forecast	9,850	10,255	10,576	10,870	11,377	*0.72*
FAA TAF (January 2015)	9,850	9,850	9,850	9,850	9,850	*0.00%*
Difference	0.00%	4.11%	7.37%	10.36%	15.50%	-
Allowable Difference	10.0%	10.0%	15.0%	15.0%	15.0%	-
Consistent with FAA TAF?	**YES**	**YES**	**YES**	**YES**	**NO**	-

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

The airport's proposed total operations forecast is **not consistent** with the FAA's TAF in the long-term. Once again, the TAF projections of annual operations at smaller general aviation airports typically do not show any forecasted growth. It is not expected aviation demand at 7S0 will remain completely flat-lined for the planning period based on local, regional, and national projections of economic growth and the aviation industry outlooks.

The expected growth from this independent analysis does not meet the long-term or tolerance requirements. Recommendations as a result of this master plan includes FAA review and approval of the proposed forecast, and submission of the forecast to update the airport's TAF in 2016 and beyond.

Critical Design Aircraft

The critical design aircraft is identified as the most demanding aircraft or family of aircraft to regularly use the airport. A critical design aircraft type or family must operate at least 500 annual operations at the airport to be considered "regular" use by FAA for improvements to be justified for funding.

EXISTING AND FUTURE AIRCRAFT

The overall single existing critical design airplane is a Beechcraft King Air B200 twin-turboprop airplane. This airplane has an FAA Airport Reference Code (ARC) of B-II made of up FAA Aircraft Approach Category (AAC) B and Airplane Design Group (ADG) II. This airplane has an FAA Taxiway Design Group (TDG) classification of 2. The aircraft has a maximum takeoff weight of up to 12,500 pounds and is considered a "small" airplane.

There are other airplanes of FAA Approach Category B or Design Group II that makeup this family of critical design aircraft include a Beechcraft King Air 90 twin-turboprop (ARC B-II, Small), Pilatus PC-12 single-turboprop (ARC A-II, Small), Cessna Caravan single-turboprop (ARC A-II, Small), and Beechcraft Baron twin-piston airplane (ARC B-I, Small).

There are also documented operations in aircraft exceeding the current critical design aircraft family criteria. Large aircraft such as the Beechcraft King Air B350 (ARC B-II, TDG-2, Large), Cessna Citation CJ2 twin-turbojet (ARC B-II, Small) and Swearingen Metroliner III twin-turboprop (ARC B-II, Large).

Figure 3-5 – Existing and Future Critical Design Aircraft Family

Beechcraft King Air B200 (ARC B-II, Small)

Cessna 402 (ARC A-I, Small)

Beechcraft King Air 90 (ARC B-II, Small)

Pilatus PC-12 (ARC A-II, Small)

Photography Source: Airliners.net

Polson's Effect on Ronan

Based on the TFMS data for Polson the majority of itinerant operations from larger and/or higher performance aircraft are occurring at Polson Airport. The top aircraft usage from 2015 at the Polson Airport included the following:

Beechcraft Super KingAir 350 (150 ops)

Cessna Citation V (200 ops)

Pilatus PC-12 (230 ops)

The Polson Airport, however, is limited to a single 4,200 foot runway with no ability for future expansion (future runway length or hangars) and future declared distances may drop the available length by 500 feet (3,700 feet). As a result, it is anticipated that Ronan Airport will eventually become the predominant airport servicing larger, higher performance aircraft in Lake County.

Recommended Critical Aircraft

Based on reports and expectations that the recreational draw to Flathead Lake and surrounding areas will continue to increase and the likelihood that Ronan Airport will eventually become the predominant airport in Lake County, planning efforts should consider larger and/or higher performance airplanes as the "critical aircraft" for all future/ultimate development. It is recommended that the Beechcraft King Air B200 (B-II, Small) aircraft be projected for the "critical" aircraft at the Ronan Airport during the 20-year planning period.

However, all critical aircraft operations should be monitored very closely as changes in business operations may change airport use, aircraft type and operational frequency. It is recommended 7S0 construct airport improvements around the future aircraft of B-II large to ensure that the airport has the ability to grow if/when larger aircraft continue to operate at Ronan and Polson Airports.

The design aircraft identified is the most critical family of aircraft to utilize the airport, however particular portions of the airport may be limited to smaller design aircraft. These aircraft-specific standards will be evaluated in **Chapter 4: Facility Requirements**.

Annual Instrument Approaches

Annual instrument approaches (AIAs) are defined as an approach to an airport conducted in actual instrument meteorological conditions. For purposes of this definition, an approach initiated when the observed visibility is less than 3 miles or the cloud ceiling is less than the final approach fix. At 7S0 the final approach fix is at an altitude of 5,800 feet above mean sea level, or roughly 2,800 feet above ground level. AIA figures for 7S0 are no longer tracked by Air Traffic Control, but are required element to an FAA forecast.

To determine AIAs, the number of itinerant operations are totaled from the estimates and forecasts and compared to annual operations. The number of instrument flights are determined. It is generally assumed 15 percent of flights are operating on an IFR flight plan at 7S0, with all fixed-wing commercial

operations operating under IFR. FAA data captures approximately 1.97[1] percent of flights operating IFR to and from 7S0 with the remaining are assumed to not be in radar contact. The number of AIA's in the future is expected to grow as itinerant traffic increases and more instrument-rated pilots equip aircraft to utilize approaches with new GPS technology. Local weather conditions are then reviewed. A total of 5.81 percent of the hourly weather observations are in conditions that require an instrument approach to be performed.

Table 3-21 – Annual Instrument Approach Forecast

Metric	2015	2020	2025	2030	2035	CAGR
Annual Operations	9,850	10,255	10,576	10,870	11,127	*0.61%*
GA Itinerant Operations	4,000	4,169	4,303	4,425	4,636	*0.74%*
% IFR Itinerant Operations	15.00%	15.50%	16.00%	16.50%	17.00%	*0.63%*
Commercial Itinerant Operations	250	250	250	250	250	*0.00%*
IFR Itinerant Operations	850	896	938	980	1,038	*1.00%*
IFR Approaches	425	448	469	490	519	*1.00%*
Instrument Approach Weather			5.81%			*N/A*
Annual Instrument Approaches	25	26	27	28	30	1.00%
AIA as Percent of Itinerant	0.58%	0.59%	0.60%	0.61%	0.62%	0.30%

Source: National Climatic Data Center, KLJ Analysis. CAGR = Compounded Annual Growth Rate

Total AIAs for 7S0 are forecast to increase from 25 currently estimated to 30 at the end of the planning period for an average annual growth rate of 1.00 percent annually. Here is a break out of how this was developed:

(GA Itinerant Ops * IFR Itinerant Ops) + (IFR Approaches * Instrument Approach Weather) = Annual Instrument Approaches

Peak Activity

Peak demand periods help quantify aviation activity during busy periods. Time periods evaluated include the peak month, design day and design hour characteristics for airport operations. Peak periods are defined in FAA AC 150/5060-5, *Airport Capacity and Delay*. Peak activity is important when planning the size of facilities with fixed capacities.

- **Peak Month:** The calendar month when peak operations occur
- **Design Day**: The average day in a peak month (peak month / 30)
- **Busy Day**: The busy day of a typical week in a peak month (Design Day + 15 percent)
- **Design Hour**: The peak hour within the design day (1/16 of Design Day + 15 percent)

At northern-tier airports such as 7S0, much of the aviation activity is based on seasonal weather conditions. Airport activity is typically concentrated during the summer or early fall months. Peak period activity allows the airport to plan for facilities to meet peak period activity demands.

Typically at towered airports, activity is easily measured because personnel are constantly monitoring aviation traffic. However, at non-towered airports like 7S0, planners have to find other ways to gather aviation activity information. As such, fuel sales were used at 7S0 to estimate peak operation periods.

[1] 194 annual IFR operations divided by 9,850 total operations in 2015.

Airport Operations

PEAK MONTH

The peak month of general aviation operations was determined by reviewing the prior three years of monthly fuel sales records from the airport sponsor. In the absence of operations counts, this method provides historic patterns of airport operations activity to aid in identifying the peak month.

August was the peak month for Jet A fuel sales, with an average of over 50 percent of Jet A sales occurring during this month. 100LL is sold more evenly throughout the year, but the peak months occurred in July/August over the past three years, with over 20 percent sold during these months.

Table 3-22 – Historic Peak Monthly Fuel Sales

Year	Peak Month	Fuel Type	Gallons Sold (Peak Month)	Total Gallons (Annual)	% of Total
2013	August	Jet-A	14,954.09	30,518.86	49.00%
2013	July	100LL	2,641.63	11,752.73	22.48%
2014	August	Jet-A	17,130.79	27,690.28	61.87%
2014	August	100LL	3,136.2	13,660.32	22.97%
2015	August	Jet-A	14,857.85	30,787.16	48.21%
2015	July	100LL	3,097.68	15,037.90	20.60%

Source: KLJ Analysis

In general, peak fuel sales have historically occurred in summer months. Jet-A fuel sales in the last three years have exceeded 100LL sales by a 2:1 ratio. This information supports the logic behind a fleet mix slowly increasing itinerant turbine-aircraft operations.

It should be noted that fuel sales can be a good indicator of peak operational periods at an airport, but is not perfect. Aircraft fueling at an airport typically have or will be traveling long distances. It does not guarantee capture of local operations, or aircraft that already have the necessary fuel to complete their flights/missions.

Table 3-23 – Peak Month Operations Forecast

Metric	2015	2020	2025	2030	2035	CAGR
Annual Operations	9,850	10,189	10,565	10,815	11,199	0.64%
Peak Month (25%)	2,463	2,547	2,641	2,704	2,800	0.64%

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

DESIGN/BUSY DAY

The design day represents the average day in the peak month. The busy day accounts for a peaking activity during a time of concentrated activity such as early evening or weekends for airports with recreational traffic. The busy day is consists of an average day with an added 15 percent factor.

For a non-towered general aviation airport, there are no airport operation counts to fully quantify airport activity. To determine the busy day general FAA criteria is used. The table below identifies the forecast design day and busy day operations at 7S0.

Table 3-24 – Design Day Operations Forecast

Metric	2015	2020	2025	2030	2035	CAGR
Peak Month	2,463	2,547	2,641	2,704	2,800	0.64%
Design Day	82.1	84.9	88.0	90.1	93.3	0.64%

Busy Day (Design Day + 15%)	94.4	97.6	101.2	103.6	107.3	0.64%

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

DESIGN HOUR

The design hour is based on the average hourly operations during a design day with an additional factor for concentrated activity. Again, because 7S0 is a non-towered airport there is little data available to quantify actual design hour activity so general FAA criteria is used.

To determine the design hour figure, the design day operations are average over a 16 hour period, then increased by 15 percent. Using this design hour methodology, the design hour operations forecast is then developed and identified in the table below.

Table 3-25– Design Hour Operations Forecast

Metric	2015	2020	2025	2030	2035	CAGR
Design Day	82.1	84.9	88.0	90.1	93.3	*0.64%*
Design Hour	6.8	7.0	7.3	7.4	7.7	*0.64%*

Source: KLJ Analysis, CAGR = Compounded Annual Growth Rate

Forecast Summary

A complete summary of the proposed airport activity forecasts including a detailed comparison to the FAA TAF is included in **Appendix X**. These forecasts were prepared using available FAA, state and local historical and forecast data. The aviation forecasts are consistent with FAA forecasts.

The proposed aviation forecasts identified in this chapter were approved by FAA on xxxxxxx,xx,xxxx for use in this master planning effort.