3.0 AVIATION ACTIVITY FORECASTS

Aviation forecasts are essential for airport master plans; they provide future demand activity levels, and are a basis for long-range development plans. Per FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans, aviation forecasts should be realistic, based upon latest available data, reflect current airport conditions, and provide adequate justification for airport planning and development. Furthermore, forecasts must be prepared for short- (0-5 year), medium- (6-10 year), and long-term (10-20 year) periods, and specify the existing and future critical aircraft. Through the aviation activity forecasts, RIL may plan for future development and expansion of the airside and landside facilities, as well as general development at the Airport.

While forecasting is essential for a successful master plan, it only serves as an approximation of future activity based on historical data and present conditions. There are many unforeseen factors that can influence forecasts, both positively and negatively. For this reason, forecasts and the projects that they justify should be revisited periodically.

3.1 DATA SOURCES

The following sources of data and guidance were used in the development of the aviation activity forecasts.

3.1.1 FAA Terminal Area Forecast (TAF)

The Terminal Area Forecast (TAF) is updated annually and is used by the FAA to determine budget and staffing needs of the FAA, as well as being a resource for airport operators, the general public, and other interested parties. Due to limited staff resources, the FAA cannot forecast in as great of detail at small airports as they can at large airports.

3.1.2 FAA Advisory Circular 150/5070-7

This document was consulted to ensure that the methodology employed and forecasts produced were in compliance with FAA requirements for development of airport master plans.

3.1.3 FAA Form 5010-1

This document provided historical operational and based aircraft data for RIL, as filed with/by the FAA, and was utilized primarily to cross-reference other data sources in 2012.

3.1.4 Airport Cooperative Research Program Report: Counting Aircraft Operations at Non-Towered Airports[12]

This 2007 report was prepared for the Airport Cooperative Research Program (ACRP), a research division of the Transportation Research Board of the National Academies. Methodologies used across the country to estimate operations at airports without an ATCT are detailed in this report.

[12] http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_004.pdf

3.1.5 ACRP Report: Airport Aviation Activity Forecasting[13]

This 2007 report was also prepared by the ACRP. It discusses methods and practices for aviation activity forecasting.

3.1.6 Forecasting Aviation Activity by Airport[14]

Written by GRA, Inc. under contract to the FAA, this 2001 document provides guidance to individuals who prepare airport activity forecasts as well as those who review the forecasts.

3.1.7 FAA Aerospace Forecasts, Fiscal Years 2012-2032[15]

The FAA annually prepares this document to explain the current economic and aviation outlook, as well as macro level forecasts of aviation activity and the U.S. aircraft fleet.

3.1.8 FAA Advisory Circular 150/5070-7B, *Airport Master Plans*[16]

This Advisory Circular (AC) explains the steps required for the development of a master plan, including the preparation of aviation activity forecasts and what elements should be forecasted.

3.1.9 Woods & Poole Economics[17]

Historical and forecast socioeconomic data for Garfield County was obtained from Woods & Poole Economics of Washington, DC. Use of this data source is recommended by the FAA in the document "Forecasting Aviation Activity by Airports".

3.2 FORECASTING GENERAL AVIATION ACTIVITY MEASURES AND METRICS

The forecasting parameters are determined by the level and type of aviation activity expected at RIL. As a general aviation service airport, the forecast focus for RIL is on aircraft operations and based aircraft activity levels. The forecasts take into account demographic and economic activity, as demand for aviation is primarily a function of these. The data sources for these metrics are from the FAA TAF and Woods & Poole socioeconomic data.

3.2.1 Aircraft Operations

Generally, the most important activity forecast for airfield planning is the level and type of aviation demand generated at an airport, which is measured by aircraft operations. An aircraft operation is defined as either a take-off or a landing of an aircraft. This activity identifies critical aircraft and how adequately the airfield serves critical and similar aircraft. It is by this demand that the runway and taxiway requirements are defined.

[13] http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_002.pdf
[14] http://www.faa.gov/data_research/aviation_data_statistics/index.cfm?print=go
[15] http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2012-2032
[16] http://www.faa.gov/documentLibrary/media/advisory_circular/150-5070-6B/150_5070_6b_chg1.pdf
[17] http://www.woodsandpoole.com/

Since RIL is a non-controlled airport, meaning not serviced by an ATCT, it is more difficult to obtain an exact count of the Airport's current and historical aircraft operations. The existing baseline used for this study was derived from Atlantic Aviation's operations records, which include itinerant, local, air taxi, and military operations. These records are discussed further in **Section 3.4.2**.

3.2.2 Based Aircraft

Based aircraft forecasts identify the amount of aircraft that are stored at RIL. This data is used to calculate the need for specific types of hangars and aircraft parking aprons. Information from the FAA's National Based Aircraft Inventory Program was used as the baseline for this forecasting effort; it indicates that a total of 69 aircraft are currently based at RIL, as shown in **Table 3-1**[18].

TABLE 3-1 – 2012 BASED AIRCRAFT

Aircraft Type	Amount
Single-Engine	45
Multi-Engine	6
Turboprop	9
Jet	7
Other	2
Total	**69**

Note: The total is adjusted for accuracy, as the total based aircraft count is confirmed by RIL airport management.
Source: FAA's National Based Aircraft Inventory Program for RIL

3.2.3 Demographic and Economic Factors

Rifle is a town rich with western heritage and history; founded in 1882. A large portion of Rifle's downtown residences and businesses are located in historical buildings dating back to the early 1900's.[19] The town is a destination for outdoor activities and parks throughout the year. Rifle Gap State Park and Rifle Falls are both large tourism draws. The warmer months also offer fishing, golf, boating hiking, mountain biking. And rock climbing. Skiing, ice fishing, ice climbing and hunting are also popular tourist activities.[20]

The demand for aviation is largely a function of demographic and economic activity, given there is a causal relationship. When preparing forecasts, planners should consider socioeconomic data, demographics, disposable income, and geographic attributes. Socioeconomic data was collected from Woods & Poole Economics, an independent firm that specializes in long-term economic and demographic projections. Woods & Poole has a database for every county in the United States, with forecasts through 2040, using more than 900 variables.

[18] The National Based Aircraft Inventory indicated a total of 70 based aircraft at RIL in 2012. However, at the time of this report's published date, the current based aircraft is 69, which was confirmed by RIL airport management in March 2014.
[19] Rifle Area Chamber of Commerce, www.riflechamber.com, accessed May 14, 2014.
[20] Rifle Area Chamber of Commerce, www.riflechamber.com, accessed May 14, 2014.

According to Woods & Poole, the Western region, consisting of the Southwest, Rocky Mountains (including Colorado), and Far West regions, will experience the most growth of any region in the nation for the next 30 years. The population in the Western region is forecast to increase by 44.2 million people between 2010 and 2040. By the year 2040, 36% of all Americans are expected to reside in the West; this is up from 24% in 1970 and 33% in 2008. It is also expected to generate 31.0 million jobs from 2010 to 2040, with a projected total U.S. job gain of 38%. Moreover, Woods & Poole predicts that the population of Garfield County, Colorado, specifically, will grow between 0.60% and 0.63% annually through 2040[21].

3.3 NATIONAL AVIATION OUTLOOK

When preparing aviation forecasts, it is essential to have an understanding of what is occurring at a national level, so as to better understand what trends are taking place locally. To further examine national trends, the FAA Aerospace Forecast Fiscal Years 2012-2032 and General Aviation Manufactures Association's 2011 General Aviation Statistical Databook & Industry Outlook were used.

3.3.1 FAA AEROSPACE FORECAST[22]

The FAA prepares a national aviation forecast each year. This forecast attempts to project GA activity levels so the FAA can use the data to determine funding needs for various sectors of the FAA, such as Air Traffic Control. The current forecast document at the time of this Master Plan is for Fiscal Years 2012-2032. The forecast only addresses GA activity levels as that is what RIL currently serves.

For GA activity, the FAA believes that demand for business jet-aircraft is recovering from the recent recession. The FAA forecasts large growth for business aviation demand over the long-term, due to higher corporate profits and the growth in the worldwide Gross Domestic Product (GDP). The FAA predicts that GA aircraft used for business purposes will increase faster than those used for personal or recreational use. The active GA fleet is projected to grow by an average of 0.6% each year through 2032. The more expensive and sophisticated turbine-powered fleet is projected to grow by 2.9%, with the turbine jet fleet growing at 4.0% annually through 2032. However, the number of GA piston-powered aircraft is forecasted to decrease from 159,007 in 2010 to 151,685 in 2023, and to increase to 155,395 in 2032. This results in an annual average decline rate of 0.1% for piston-powered aircraft from 2010 to 2032, with single-engine aircraft to decline at an annual rate of 0.1% and multi-engine aircraft declining at 0.5% each year. The number of GA hours flown is anticipated to increase by 1.7% yearly through 2032, mostly as a result of the increase in turbine-powered and jet fleet.

3.3.2 GENERAL AVIATION MANUFACTURERS ASSOCIATION (GAMA)[23]

The General Aviation Manufacturers Association (GAMA) is an international trade association representing over 80 of the world's leading manufacturers of GA airplanes and rotorcraft, engines, avionics, components

[21] Woods & Poole Economics. Sweetwater County, Wyoming: 2012 Data Pamphlet.
[22] FAA Aerospace Forecast Fiscal Years 2012-2032.
http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2012-2032
[23] 2011 General Aviation Statistical Databook & Industry Outlook
http://www.gama.aero/files/GAMA_DATABOOK_2011_web_0.pdf

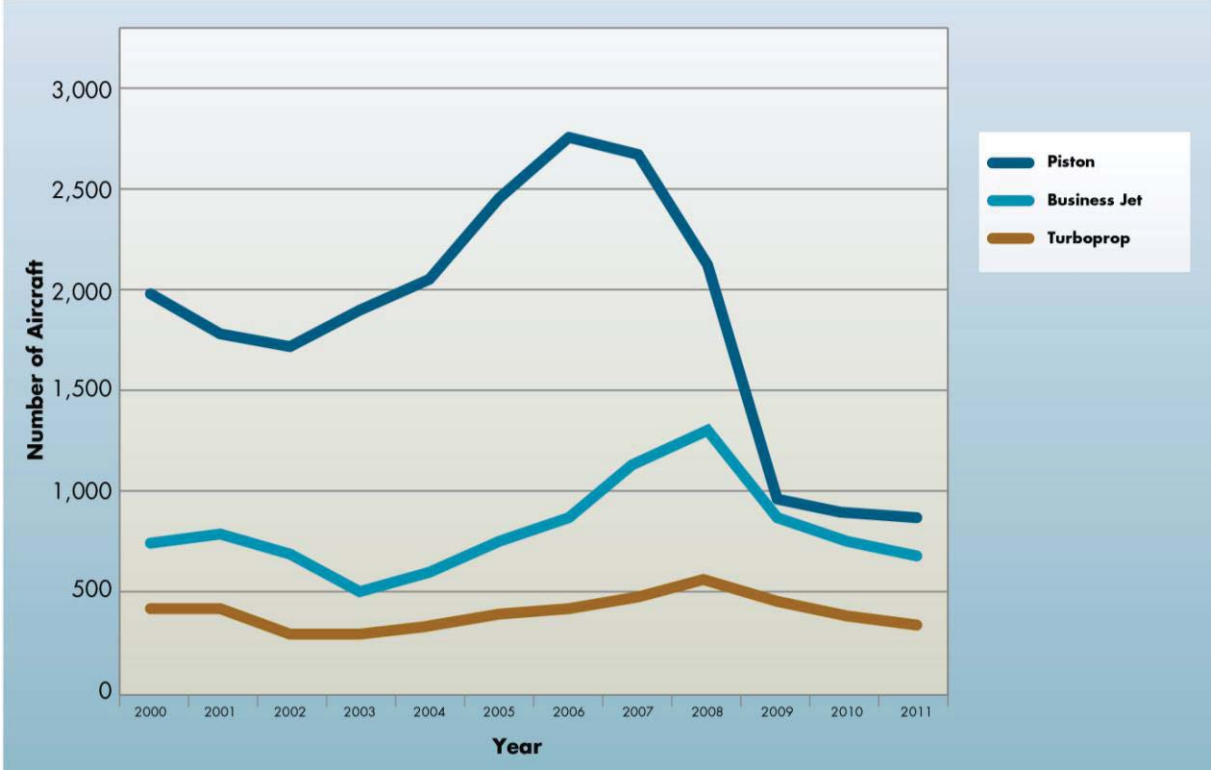
and related services, as well as repair stations, fixed based operations, and training facilities. Annually, GAMA publishes the General Aviation Statistical Databook & Industry Outlook, which provides information about the trends within the GA market.

3.3.2.1 Aircraft Shipped

As shown in **Figure 3-1**, GA airplane deliveries worldwide have been decreasing since 2006. In 2011, 324 turboprop airplanes were delivered, a 2.4% decrease from 2010. Piston aircraft deliveries fell from 873 airplanes in 2010 to 860 in 2011, having fared best for unit deliveries among the three segments in the past year. However, piston aircraft have had the greatest decrease (56.6%) in deliveries since 2000.

GA manufacturers delivered 681 business jets in 2011, 6.3% less than in 2010 (727 jets). Additionally, a relatively high number of airplanes on the "used market" over the past two years continue to decrease demand on business jet shipments. This has demonstrated just how direct of an impact the used GA airplane market has upon the health of the new airplane market. Though the inventory for used aircraft is slowly declining, the percentage of aircraft for sale is still high, suppressing demand for new business jets, resulting in weaker pricing power. As a result of the decreasing demand for GA aircraft in the United States, many GA manufacturers have turned their focus onto the international marketplace.

FIGURE 3-1 – GA AIRPLANE DELIVERIES



Sources: GAMA 2011 General Aviation Statistical Databook & Industry Outlook; Jviation, Inc.

3.3.2.2 Aviation Operations at Towers

According to GAMA, GA operations at towered airports in the United States have decreased by an average annual rate of 3.5% since 2000, with the greatest decrease in local operations, as shown in **Table 3-2**.

TABLE 3-2 – GENERAL AVIATION OPERATIONS (IN THOUSANDS) AT TOWERED AIRPORTS

Year	Itinerant & Overflights	Local	Grand Total
2000	22,844	17,035	39,879
2001	21,433	16,194	37,627
2002	21,451	16,173	37,624
2003	20,231	15,293	35,524
2004	20,007	14,960	34,967
2005	19,315	14,846	34,161
2006	18,741	14,379	33,120
2007	18,577	14,558	33,135
2008	17,368	13,922	31,290
2009	17,355	12,230	29,585
2010	16,947	11,629	28,576
2011	16,580	11,481	28,061
CAGR* ('00-'11)	**-3.2%**	**-3.9%**	**-3.5%**

**Compound Annual Growth Rate (CAGR)*
Sources: GAMA 2011 General Aviation Statistical Databook & Industry Outlook; Jviation, Inc.

3.4 HISTORICAL AVIATION ACTIVITY

A review of historical aviation activity is essential in determining how an airport is traditionally used; it forms the basis of aviation activity forecasts.

3.4.1 FAA TERMINAL AREA FORECASTS (TAFS)

Each year, the FAA prepares a TAF for each airport in the National Plan of Integrated Airport Systems (NPIAS). These TAFs identify all airports in the United States that are considered significant to the national aviation infrastructure network.

3.4.1.1 TAF Operations

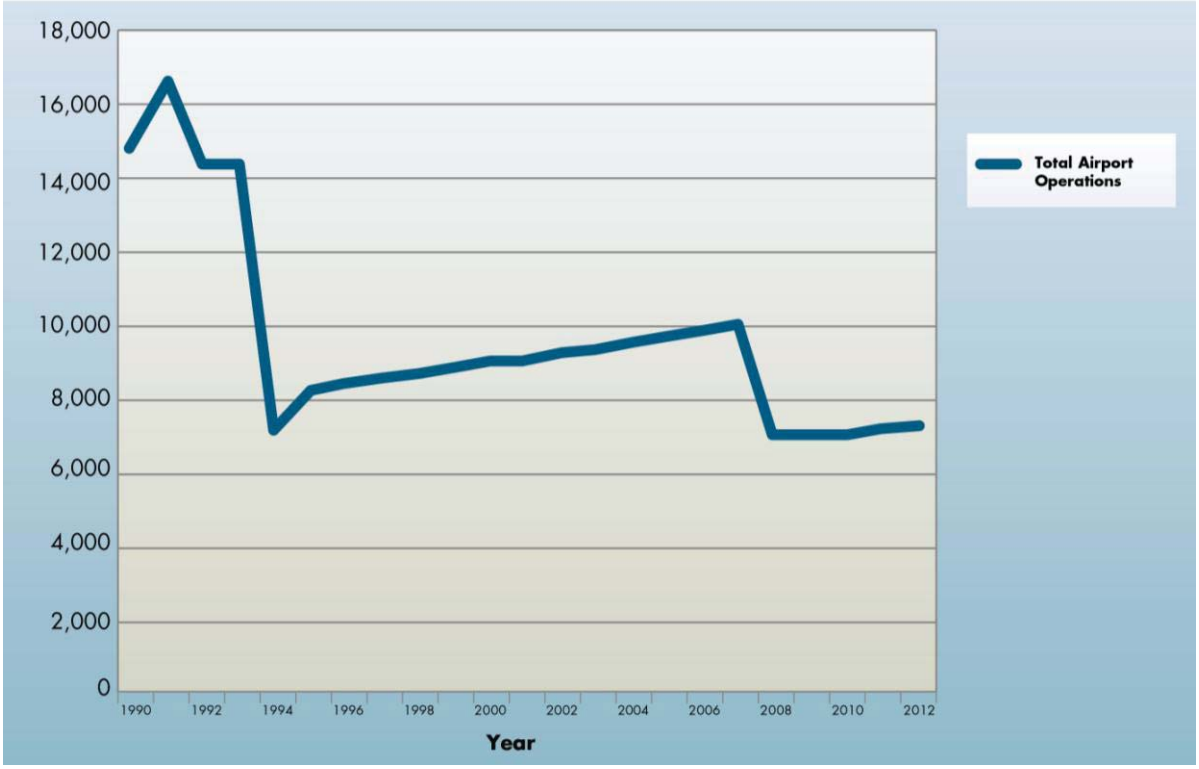
Figure 3-2 depicts the historical operations for RIL from 1990 to 2012, as shown in the FAA TAF. A large decrease in total operations occurred between 1993 and 1994, as a result of the local downturn in the oil and gas industry. The downturn began 11 years prior with closing of an Exxon facility in Rifle in 1982, which resulted in the loss of 2,000 jobs. The effect of this downturn had a ripple effect on all of Garfield County, as citizens were left without work and eventually were required to relocate. The County experienced a rebound beginning in 1996, with the passing of the ¾ cent sales tax.[24] From 1996 through 2007, operations at RIL steadily increased until peaking in 2008, when the national economic downturn and subsequent

[24] Rifle Chamber of Commerce. History of Rifle. http://www.riflechamber.com/rifle-history.htm

recession resulted in another decline in operations. Since 2008, operations have remained at current levels with only a slight increase from 2011 to 2012.

As a GA airport, RIL experiences greater operation fluctuations, which coincide with both local and national economic conditions. During periods of stable or growing economies, the trend will be for an increase in total operations, and conversely, a decrease in operations during periods of economic downturn. Traditionally, economic downturns are followed by periods of economic growth, which result in improved economic conditions beyond that prior to the previous downturn. It is expected that as the national and local economy improve and grow, so will operations at RIL.

FIGURE 3-2 – RIL TAF HISTORICAL OPERATIONS



Sources: FAA TAF; Jviation, Inc.

3.4.1.2 FAA TAF Based Aircraft

Table 3-3 shows the TAF's historical based aircraft counts at RIL. From 2000 to 2011, RIL has had between 50 and 60 based aircraft, with the exception of 2006, when RIL had 78 based aircraft. TAF based aircraft counts typically are taken from 5010, which are not always accurate. As can be seen, the TAF currently shows fewer based aircraft than the National Based Aircraft Inventory. The National Based Aircraft Inventory will be used as the base for this analysis.

TABLE 3-3 – TAF: HISTORICAL BASED AICRAFT

Year	Based Aircraft Count
2000	51
2001	51
2002	58
2003	59
2004	65
2005	66
2006	78
2007	66
2008	60
2009	60
2010	58
2011	59
2012	60

Source: FAA TAF

3.4.2 ATLANTIC AVIATION RECORDS

Atlantic Aviation keeps records of the daily aircraft operations at RIL, which is used by airport management to update RIL's 5010 data. Atlantic Aviation's operations data is sorted into four categories: Itinerant, Local, Air Taxi, and Military. However, Atlantic does not keep track of the local training operations (touch-and-go landings) that take place at RIL. The flight school on the airfield, Colorado Flight Center, was contacted to help estimate the number of local training operations that occur in an average month. This count was then added to the Local operations counts received from Atlantic Aviation. Additionally, data was collected by Airport Management from the airfield security camera and Voice Tracker. From this information, the Local and Itinerant operation counts were adjusted to account for errors. The ***adjusted*** operations data received from Atlantic Aviation are shown in **Table 3-4**. Due to the accuracy reflected from Atlantic Aviation records, this data was used as a baseline for forecasting operations at RIL[25]. Additionally, it is important to note the decrease in the total operations for 2010. This was a result of the Airport being closed from April to November for upgrades to the airfield, which included a realignment of the runway, an increase in ADG, the construction of a full parallel taxiway, and the installation of a new ILS approach.

[25] At the time this report was originally written, the 2012 adjusted operations were used as the baseline for the forecasts, which were approved by the FAA in 2014. During the document revisions for the Final Report in March 2014, data for the 2013 actual operations at RIL was provided by Atlantic Aviation and added to this chapter for supplementary information. The baseline operations data shown in this report uses 2012, as approved by the FAA.

TABLE 3-4 – ADJUSTED HISTORICAL OPERATIONS COUNTS

Operations	2006	2007	2008	2009	2010*	2011	2012	2013 (Actual)[1]
Itinerant	10,531	14,192	11,917	12,326	4,673	8,914	7,599	7,227
Local	3,532	4,446	3,841	3,855	1,196	3,039	2,766	2,641
Air Taxi	880	1,269	897	727	254	575	667	816
Military	22	6	2	22	0	12	25	32
Total	**14,965**	**19,913**	**16,657**	**16,931**	**6,123**	**12,540**	**11,057**	**10,716**

**Airport closed from April to November for airfield upgrade*

[1]Supplementary 2013 actual operations data was provided by Atlantic Aviation in March 2014. The 2012 adjusted operations were used as the baseline for the forecast, as approved by the FAA.

Sources: Atlantic Aviation; RIL; Jviation, Inc.

3.5 REVIEW OF EXISTING FORECASTS

Several existing forecasts for RIL were examined. Each of the existing forecasts that were examined is discussed in the following text.

3.5.1 PREVIOUS MASTER PLAN FORECAST

RIL's 2003 Airport Master Plan Update forecasted operations and based aircraft forecasts are shown in **Table 3-5**.

TABLE 3-5 – 2003 AIRPORT MASTER PLAN FORECAST

	2001	2006	2011	2016	2021	CAGR
Operations	21,013	24,801	29,271	34,547	40,744	3.37%
Based Aircraft	58	68	80	92	108	3.16%

Source: RIL Airport Master Plan Updated - July 2003

3.5.2 CDOT SYSTEM PLAN FORECAST

In 2012, the Colorado Department of Transportation's (CDOT) Division of Aeronautics completed the 2011 Colorado Aviation System Plan. The State Aviation System Plan is a planning tool that helps CDOT Aeronautics evaluate the overall airport system's performance by identifying airports and projects that will provide a system of airports which will meet the State's air transportation needs. As part of the Aviation System Plan, forecasts were developed to determine if the system's airports have adequate capacity to accommodate current and projected aircraft operational levels. **Table 3-6** shows the 2011 Colorado Aviation System Plan's forecasted operations and based aircraft for RIL.

TABLE 3-6 – 2011 COLORADO AVIATION SYSTEM PLAN FORECAST FOR RIL

	2010	2015	2020	2030	CAGR
Operations	7,090	7,260	7,450	7,950	1.2%
Based Aircraft	60	61	63	67	0.6%

Source: CDOT Aeronautics, 2011 Colorado Aviation System Plan.

3.5.3 FAA TAF

The latest TAF for RIL was published in 2012, and is presented in **Table 3-7**.

TABLE 3-7 – FAA TAF FORECAST FOR RIL

	2013	2018	2023	2028	2033
ENPLANEMENTS					
Air Taxi/Commuter	4	4	4	4	4
ITINERANT OPERATIONS					
Air Taxi	1,188	1,278	1,375	1,481	1,597
GA	3,775	4,164	4,586	5,048	5,559
Military	15	15	15	15	15
TOTAL ITINERANT	**4,978**	**5,457**	**5,976**	**6,544**	**7,171**
LOCAL OPERATIONS					
GA	2,350	2,350	2,350	2,350	2,350
Military	0	0	0	0	0
TOTAL LOCAL	**2,350**	**2,350**	**2,350**	**2,350**	**2,350**
TOTAL OPERATIONS	**7,328**	**7,807**	**8,326**	**8,894**	**9,521**
BASED AIRCRAFT	**61**	**68**	**75**	**80**	**85**

Source: FAA Terminal Area Forecast, published January 2012

3.6 FORECASTING METHODOLOGIES

There are several types of methodologies that can be used when developing GA forecasts. Each forecast methodology must show short- (5 year), medium- (10 year), and long- (beyond 10 years) term periods, and, through the use of mathematical relationships, must ultimately withstand the test of rationality and judgment. The different methodologies used are briefly described below.

3.6.1 TIMES SERIES ANALYSIS

Time Series Analysis, also known as a Trend or Linear Analysis, uses historic patterns of activity and projects this trend into the future. The Time Series Analysis is a regression analysis with time as the independent variable. The linear extrapolation uses the least squares method to fit a straight line between the historical points and projects that line into the future. This type of forecasting is widely used and is highly valuable because it is relatively simple to apply. However, it is limited because it only uses historical data; current variables, such as changes in fuel prices or the economic recession, are not used in the calculation.

3.6.2 REGRESSION ANALYSIS

Regression Analysis is a statistical technique that ties aviation demand (dependent variable), such as aircraft operations, to economic measures (independent variables), such as population or income. The independent variable is considered the explanatory variable because it "explains" the projected estimated value. The explanatory power of this approach is measured by the R^2 statistic (known as the correlation coefficient or the coefficient of determination). The R^2 helps determine if there is a correlation between the dependent and the independent variables. An R^2 of "0" means there is no strong statistical relationship, whereas an R^2

of "1" or "-1" means there ***is*** a statistical relationship. Regression Analysis should be restricted to relatively simple models with impudent variable for which reliable forecasts are available. Most regression models for aviation use gross economic measures like income, population, and employment to forecast activity levels.

3.6.3 Market Share Analysis

Market Share Analysis assumes a top-down model, and uses a relationship between national, regional, and local forecasts to predict the trend at an airport. This approach uses the forecast of large aggregates, such as the entire nation, to derive the forecasts for a smaller area (e.g. airport). However, the Market Share Analysis approach has its weaknesses. The national forecasts are composed of airports that are growing fast, that are growing slow, and those that are not growing at all. Since this analysis is based off a larger aggregate, one must take into account historical trends, as well as local airport judgment, to better estimate the forecasts.

3.7 AIRCRAFT OPERATIONS FORECAST

3.7.1 Air Taxi/Commuter Operations

Air Taxi/Commuter operations are defined as landings and takeoffs of aircraft with 60 or fewer seats, or a maximum payload capacity of 18,000 pounds or less, for hire or compensation. The historic Air Taxi/Commuter operations counts used for this forecast were derived from Atlantic Aviation's records, found in **Section 3.4.2**. The forecasting methodologies used for the Air Taxi/Commuter operations were Regression Analysis, Time Series Analysis, and Market Share Analysis. The independent variables used in the socioeconomic regression analyses were all obtained from Woods & Poole Economics' data for Garfield County.

Each independent variable's correlation with the 2006 to 2012 Air Taxi/Commuter Operations count was evaluated (R^2). As shown in **Table 3-8**, four of the socioeconomic variables have a correlation coefficient great than 0.5 (or -0.5). Meaning that the Population, Employment, Total Earning, and Retail Sales independent variables have a statistical relationship with Air Taxi/Commuter Operations (one helps "explain" the other). Whereas, the Personal Income socioeconomic variable has a correlation coefficient of less 0.5, meaning it has little or no statistical relationship. As a result, the Personal Income regression analysis was not used going forward.

TABLE 3-8 – AIR TAXI/COMMUTER OPERATIONS SOCIOECONOMIC VARIABLES' CORRELATION COEFFICIENTS

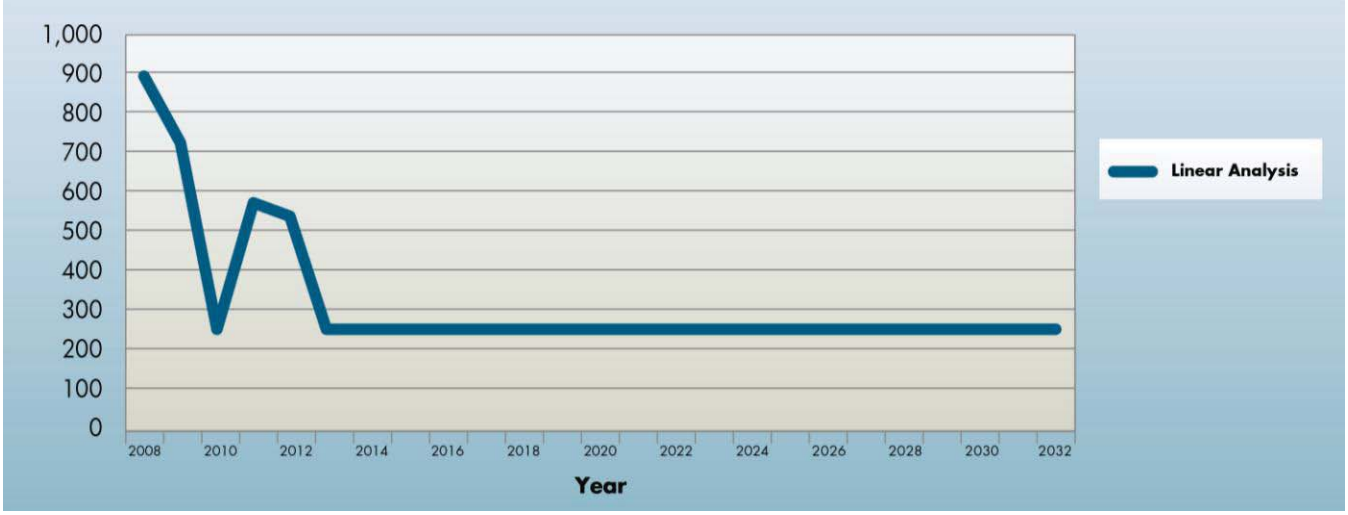
	Population	Employment	Total Earnings	Personal Income	Retail Sales
Correlation Coefficient (R^2)	-0.5642	0.8028	0.7153	0.4845	0.7357

Source: Woods & Poole; Jviation, Inc.

Additionally, as a result of the declining activity levels at RIL in the last five years, the Linear (Trend) Analysis shows a continual decrease until reaching the historical low, continuing with flat growth in Air Taxi/Commuter Operations over the 20-year forecasting period, as shown in **Figure 3-3**. Flat growth in the

long-term is not considered to be a reasonable forecast and will not be used as part of this forecasting analysis.

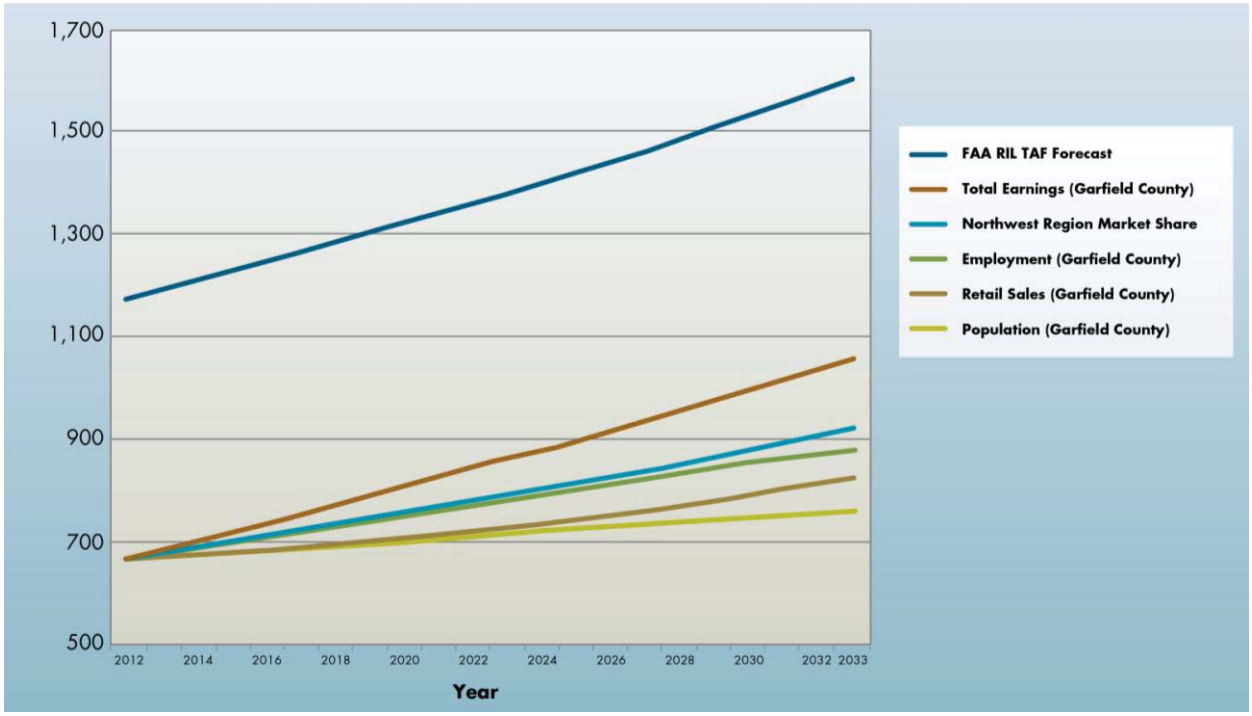
FIGURE 3-3 – AIR TAXI/COMMUTER OPERATIONS LINEAR ANALYSIS



Source: Jviation, Inc.

Outputs from the methodologies used for forecasting Air Taxi/Commuter operations, Regression Analysis, Market Share Analysis, and FAA TAF, are shown in **Figure 3-4**. A new air taxi entrant will likely drive the growth in Air Taxi/Commuter operations at RIL; however, as illustrated in **Figure 3-4**, the forecasts are well below the FAA TAF forecasts in this segment.

FIGURE 3-4 – AIR TAXI/COMMUTER OPERATIONS FORECAST



Source: Jviation, Inc.

Table 3-17 shows the most probable high, medium, and low Air Taxi/Commuter operations forecasts used in this forecasting analysis. The highest forecast is the FAA TAF, the medium is the Employment regression analysis, and the lowest is the Population regression analysis. The forecasting scenarios represent a range of 618 to 1,597 operations in 2033. This represents a range in Compound Annual Growth Rate (CAGR) of between 0.64% and 1.49%. The medium forecast, Employment Regression Analysis, is a conservative estimate, and will be carried forward for planning purposes.

TABLE 3-9 – AIR TAXI/COMMUTER OPERATIONS FORECAST

Year	Low	Medium	High
2013	544	549	1,188
2018	561	591	1,278
2023	579	633	1,375
2028	599	675	1,481
2033	618	715	1,597
CAGR	**0.64%**	**1.33%**	**1.49%**

Source: Jviation, Inc.

3.7.2 General Aviation Operations

GA operations include all aviation activity other than military and commercial service. The historical, 2006 to 2012, GA operations counts were derived from Atlantic Aviation records and adjusted to better reflect the current GA activity levels at the Airport, as previously discussed in **Section 3.4.2**. The forecasting methodologies used for the GA operations were Regression Analysis, Time Series Analysis, and Market Share Analyses. The independent variables used in the socioeconomic regression analyses were all obtained from Woods & Poole Economics' data for Garfield County.

Each independent variable's correlation with the 2006 to 2012 GA operations counts was evaluated using the Correlation Coefficient (R^2). As shown in **Table 3-8**10, three of the socioeconomic variables have correlation coefficient close to 1.0 (or -1.0), meaning that the Employment, Total Earning, and Personal Income independent variables have a statistical relationship with GA operations (one helps "explain" the other). Whereas, the Population and Retails Sales socioeconomic variable has a correlation coefficient of less 0.5, having little to no statistical relationship. As a result, only the Employment, Total Earning, and Personal Income regression analyses were used going forward.

TABLE 3-10 – GA OPERATIONS SOCIOECONOMIC VARIABLES' CORRELATION COEFFICIENTS

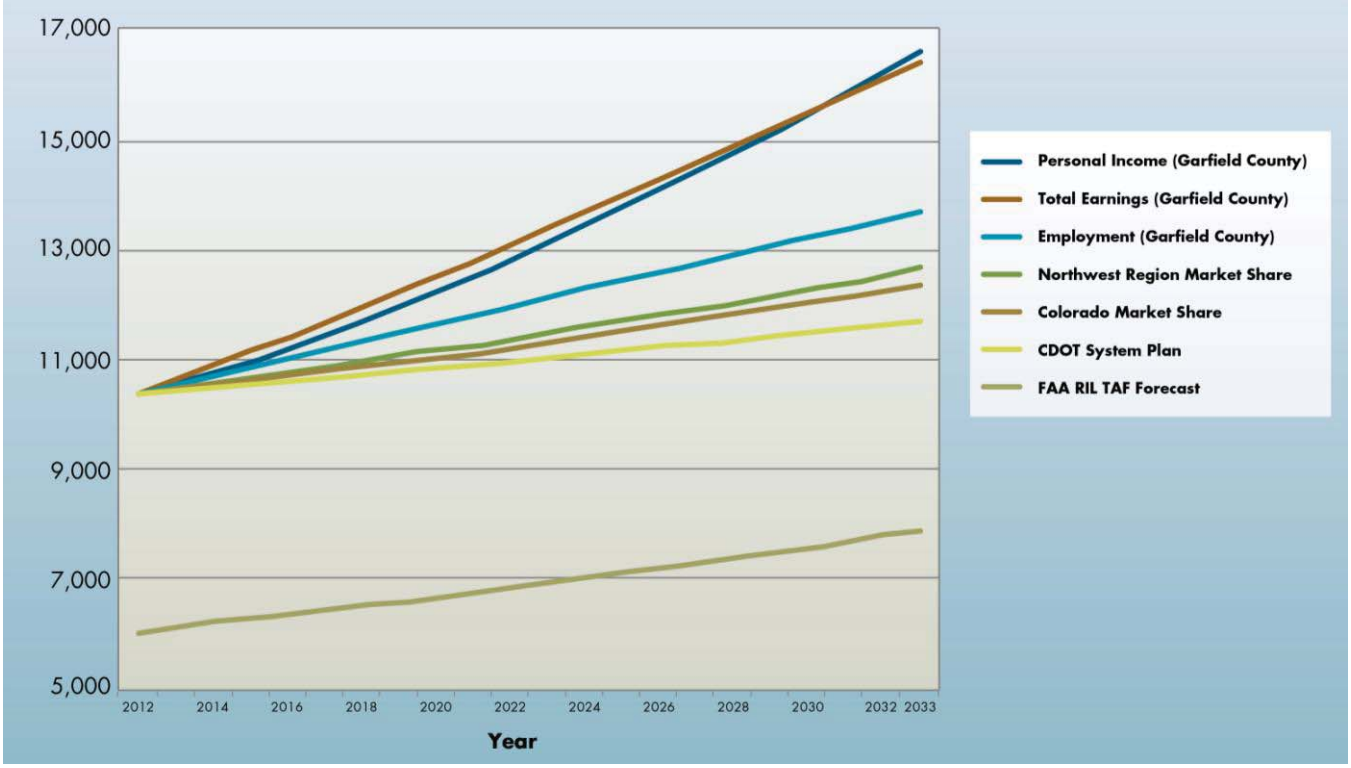
	Population	Employment	Total Earnings	Personal Income	Retail Sales
Correlation Coefficient (R2)	-0.2969	0.8090	0.6998	0.5213	0.4704

Source: Woods & Poole; Jviation, Inc.

Similar to the Air Taxi/Commuter operations, as a result of the declining activity levels at RIL since 2008, the Linear (Time Series) Analysis shows a continually decrease in GA operations over the 20-year forecasting period. Again, this is scenario is considered unlikely and will not be used as part of the forecasting analysis.

Outputs from the methodologies used for forecasting GA operations, Regression Analysis, Market Share Analysis, the FAA TAF, as well as the CDOT 2011 System Plan forecast, are shown in **Figure 3-5**.

FIGURE 3-5 – GA OPERATIONS FORECAST



Source: Jviation, Inc.

Table 3-11 shows the probable high, medium, and low GA operations forecasts used in this forecasting analysis. The highest forecast is the Personal Income regression analysis, the medium is the Employment Regression Analysis, and the lowest is the 2011 CDOT System Plan forecast. The forecasting scenarios represent a range of 12,361 to 16,596 operations in the final year of the forecast period (2033). This represents a range in CAGR of between 0.85% and 2.31%. The medium forecast, Employment Regression Analysis, a conservative estimate, is close to the growth rate predicted by the FAA (1.29%), and will be carried forward for planning purposes.

TABLE 3-11 – GA OPERATIONS FORECAST

Year	Low	Medium	High
2013	10,445	10,524	10,515
2018	10,864	11,326	11,690
2023	11,316	12,131	13,143
2028	11,814	12,925	14,785
2033	12,361	13,696	16,596
CAGR	**0.85%**	**1.33%**	**2.31%**

Source: Jviation, Inc.

3.7.3 Local/Itinerant Operations

Local operations are operations performed by aircraft that are based at RIL and operate in the local traffic pattern and/or within sight of the Airport. These operations are known to be flights departing for or arriving from local practice areas within a prescribed distance from RIL, or that execute simulated instrument approaches at the Airport. Itinerant or transient aircraft operations are operations by aircraft that leave the local airspace. The FAA TAF for RIL shows the itinerant GA operations decreasing by 1.95%, and no growth for local GA operations for the next 20 years.

Table 3-12 shows the GA operations distribution for the planning period (2013-2033). The GA itinerant and local operations were forecasted to be similar to the FAA's national projected growth rates for local and itinerant operations.

TABLE 3-12 – GA OPERATIONS FORECAST DISTRIBUTION SUMMARY

Year	GA Itinerant	GA Local	Total GA
2013	7,725	2,799	10,524
2018	8,394	2,932	11,326
2023	9,106	3,025	12,131
2028	9,844	3,081	12,925
2033	10,587	3,109	13,696

Source: Jviation, Inc.

3.7.4 Military Operations

Military operations are not dependent on the same stimuli as GA. The FAA TAF shows a consistent 15 itinerant military operations in the 20 year forecast at RIL; this number will be used for planning purposes going forward.

3.7.5 Preferred Aircraft Operations Forecast Summary

The data presented in **Table 3-13** reflects the forecast summary for each type of operation for the 20-year planning period, as discussed in previous sections.

TABLE 3-13 – AIRCRAFT OPERATIONS FORECAST SUMMARY

	2013	2018	2023	2028	2033
	ITINERANT OPERATIONS				
Air Taxi/Commuter	549	591	633	675	715
GA	7,725	8,394	9,106	9,844	10,587
Military	15	15	15	15	15
TOTAL ITINERANT	**8,289**	**9,000**	**9,754**	**10,534**	**11,317**
	LOCAL OPERATIONS				
GA	2,799	2,932	3,025	3,081	3,109
Military	0	0	0	0	0
TOTAL LOCAL	**2,799**	**2,932**	**3,025**	**3,081**	**3,109**
TOTAL OPERATIONS	**11,088**	**11,932**	**12,779**	**13,615**	**14,426**

Source: Jviation, Inc.

3.8 DESIGN HOUR OPERATIONS

An additional measure of airport activity is design hour operations. The design hour is an estimate of the peak hour of the average day in the busiest month for an airport. Since RIL does not have an ATCT, its design hour is estimated.

- Peak Month Operations is the month that has the most operations. The Peak Month for the average airport is normally in either July or August, at 11% of annual operations. Given the nature of the winter ski season and increase in mountain storms during early spring, the peak month for RIL in 2012 was December, with approximately 1,220 operations.

- Design Day is the Peak Month Operations divided by 30 days. The Design Day for RIL in 2012 was 41 operations.

- Design Hour is the average highest amount of operations within the most active hour of the day. Typically, these operations will range between 10% and 15% of the design day operations. For planning purposes, 12.5% was used to determine the Design Hour. The estimated Design Hour at RIL in 2012 was five operations.

Table 3-14 shows the forecasted Design Hour for the planning period of this report.

TABLE 3-14 – DESIGN HOUR OPERATIONS FORECAST

Operations	2013	2018	2023	2028	2033
Annual	11,088	11,932	12,779	13,615	14,426
Peak Month	1,224	1,317	1,410	1,502	1,592
Design Day	41	44	47	50	53
Design Hour	5	5	6	6	7
Absolute Peak Day	128[1]	141	152	162	173
Absolute Peak Hour	16	18	19	20	22

Sources: RIL Airport Management records; Jviation, Inc.; [1] AVA, Inc. Garfield County Airport Operations, January 2014.

3.9 ANNUAL INSTRUMENT OPERATIONS

The ILS at RIL plays an integral role in day to day operations. Given its location in the mountains and its role as a diversion airport during inclement weather, RIL sees nearly a quarter of its operations utilize the ILS. The majority of this, 22.5% of traffic, is jet aircraft operating under an IFR flight plan. As the majority of jet operators typically operate under an IFR fight plan, this percentage will be used to estimate IFR operations at RIL. When applying this percentage to the current number of operations, it resulted in 2,332 instrument operations for 2012. This figure is potentially over simplified since no precise count exists for the number of instrument operations. Nonetheless, it accounts for a reasonable percentage of current operations. **Table 3-15** details the estimated instrument operations based on the chosen operations forecast.

TABLE 3-15 – INSTRUMENT OPERATIONS FORECAST

	2013	2018	2023	2028	2033
Instrument Operations	2,332	2,504	2,635	2,885	3,073

Source: Atlantic Aviation; Jviation, Inc.

3.10 BASED AIRCRAFT FORECAST

The based aircraft forecast is a valuable indicator in determining future activity levels and the potential requirement for expanded or improved airport facilities. The FAA's National Based Aircraft Inventory Program for RIL provides the most accurate information for based aircraft. In 2012, the National Based Aircraft Inventory Program reported 70 based aircraft at RIL; however, 69 is used as the baseline for the forecasts as it is adjusted to reflect the most current based aircraft count indicated by airport management records. [26]

The methodologies used for forecasting the based aircraft were Regression Analysis, Time Series Analysis, and Market Share Analysis. The independent variables used in the socioeconomic regression analyses were all obtained from Woods & Poole Economics' data for Garfield County. Each independent variable's correlation with the TAF's 2006 to 2012 based aircraft counts was evaluated. Only two of the socioeconomic variables have a correlation coefficient close to 1.0 (or -1.0), as shown in **Table 3-16**. This means that the Population and Retail Sales independent variables have a strong statistical relationship with based aircraft at RIL (one helps "explain" the other). The other three socioeconomic variables have less than a 0.5 correlation coefficient, meaning they have little or no statistical relationship. As a result, only the Population and Retail Sales regression analyses were used going forward.

[26] Due to recent events as indicated by airport management records, only 69 aircraft are currently based at RIL, which is used as the base year for the forecast analysis.

TABLE 3-16 – BASED AIRCRAFT SOCIOECONOMIC VARIABLES' CORRELATION COEFFICEINTS

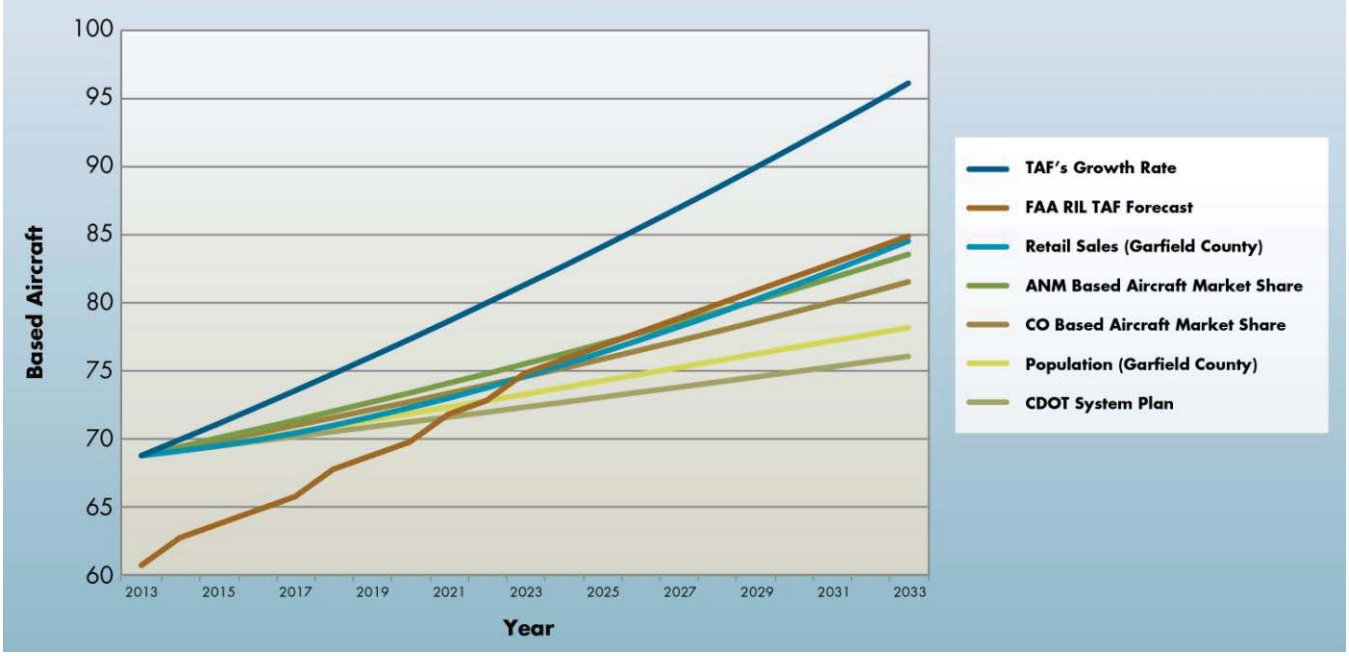
	Population	Employment	Total Earnings	Personal Income	Retail Sales
Correlation Coefficient (R^2)	-0.9395	0.1779	0.0540	-0.3631	0.7376

Source: Woods & Poole; Jviation, Inc.

An additional high growth forecasting scenario was prepared for the Based Aircraft segment. The TAF's Growth Rate scenario uses the existing number of aircraft (69) and the TAF's predicted annual growth rate of 1.67%. This scenario shows what the TAF forecast would be during the planning period, if it used the existing number of based aircraft at RIL.

The Linear (Time Series) Analysis was not used in this forecasting analysis because there was not sufficient historical data available to "trend" the forecast into the future, since the ***adjusted*** based aircraft count[27] was used as the baseline. Forecast outputs from Population and Retail Sales regression analyses, market share analyses, FAA TAF, TAF's Growth Rate scenario, and the 2011 CDOT System Plan forecasts are shown in **Figure 3-6**.

FIGURE 3-6 – BASED AIRCRAFT FORECAST



Sources: Jviation, Inc.; FAA Terminal Area Forecast, published January 2012.

3.10.1 Selected Based Aircraft Forecast

Table 3-17 shows the probable high, medium, and low based aircraft forecasts used in this forecasting analysis. The highest forecast is the TAF Growth Rate scenario, the medium is the Retail Sales regression analysis, and the lowest is the 2011 CDOT System Plan forecast. The forecasting scenarios represent a range

[27] The baseline for the based aircraft forecast is derived from the 2012 based aircraft total from the FAA's National Based Aircraft Inventory Program for RIL, adjusted for accuracy from airport management records.

in the total based aircraft of 76 to 96 in the final year of the forecast period (2033). This represents a range in CAGR of between 0.50% and 1.67%. The medium forecast, Retail Sales Regression Analysis, is a conservative estimate, and will be carried forward for planning purposes.

TABLE 3-17 – BASED AIRCRAFT FORECAST

Year	Low	Medium	High
2013	69	69	69
2018	71	71	75
2023	73	75	81
2028	74	79	88
2033	76	85	96
CAGR	**0.50%**	**1.03%**	**1.67%**

Source: Jviation, Inc.

Table 3-18 shows the aircraft distribution for the planning period (2013-2033). The ***adjusted*** base year for the based aircraft forecast was derived from the FAA's National Based Aircraft Inventory Program for RIL (2012) and adjusted to reflect the existing based aircraft count according to airport management records. The Airport currently has 45 single-engine, six multi-engine, nine turboprops, seven jets, and two "other" aircraft based at RIL. It is anticipated that the total based aircraft will grow at the rate of 1.03% (Retail Sales Regression Analysis), as previously discussed. The growth rates for each type of aircraft (single-engine, multi-engine jet, etc.) were forecasted to mimic the FAA's national projected growth rate for each aircraft type.[28] Nationally, the FAA projects strong growth in the business market, including jets and turboprops, with less growth expected for single-engine and multi-engine piston powered aircraft. The based aircraft are expected to grow to a total of 85 over the 20-year planning period.

TABLE 3-18 – BASED AIRCRAFT FORECAST DISTRIBUTION SUMMARY

	2013	2018	2023	2028	2033
Single-Engine	45	46	47	48	50
Multi-Engine	6	6	6	6	6
Turboprop	9	10	10	11	12
Jet	7	8	10	13	15
Other	2	2	2	2	2
Total	**69**	**72**	**75**	**80**	**85**

Source: Jviation, Inc.

3.11 CRITICAL AIRCRAFT

The Critical Aircraft is used to identify the design criteria for an airport, which is determined by the most demanding airplane, or family of airplanes, that accounts for at least 500 annual operations within the planning period. Formerly designated as the Airport Reference Code (ARC), the Runway Design Code (RDC) is a classification given to aircraft based on the maximum approach speed and wingspan of the

[28] Table 28: Active General Aviation and Air Taxi Aircraft.
http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2012-2032/

aircraft. This classification applies design criteria appropriate to operational and physical characteristics of the aircraft types operating at the Airport. The RDC is applied to each separate airfield facility, and may be different if different Critical Aircraft are identified for each runway or airfield element.

Table 3-19 shows the approximate ratio of aircraft operations in 2011, according to data collected the FAA's Traffic Flow Management System Counts (TFMSC), and is broken down by RDC aircraft type.

TABLE 3-19 – AIRCRAFT OPERATIONS BY RDC TYPE IN 2011

RDC	Percent Usage
AI, AII	7.0%
BI	26.0%
BI, BII	40.0%
BIII	4.5%
CI, CII	8.0%
CIII	0.5%
DI	4.0%
DII	7.5%
DIII	2.5%
Total	**100%**

Sources: FAA Traffic Flow Management System Counts; Jviation, Inc.

Using the operation forecasts and data obtained from the FAA's TFMSC, **Table 3-20** shows the forecasted operations at RIL, broken down by RDC operation type.

TABLE 3-20 – RDC AIRCRAFT FORECAST

RDC	2013	2018	2023	2028	2033
A-I, A-II	779	838	898	956	1,013
B-I	2,894	3,054	3,206	3,415	3,545
Subtotal A & B	**3,673**	**3,892**	**4,104**	**4,371**	**4,558**
B-I, B-II	4,397	4,730	5,065	5,395	5,643
B-III	501	539	577	615	651
Subtotal B	**4,898**	**5,269**	**5,642**	**6,010**	**6,294**
C-I, C-II	890	958	1,026	1,093	1,158
C-III	56	60	63	68	72
D-I	445	479	512	546	578
D-II	835	898	962	956	1,013
D-III	291	376	470	571	753
Subtotal C & D	**2,517**	**2,771**	**3,033**	**3,234**	**3,574**
Total Operations	**11,088**	**11,932**	**12,779**	**13,615**	**14,426**

Source: Jviation, Inc.

RIL's Runway 8/26 is designed to accommodate an RDC D-II airplane, with the critical aircraft being the Gulfstream IV. As shown in **Table 3-20**, RIL's Critical Aircraft will become the Gulfstream 550, with an RDC of D-III, by 2028.

3.12 COMPARISON TO EXISTING FAA TAF

The FAA requires that study-related forecasts be consistent with the TAF or include sufficient documentation to explain the difference. **Table 3-21** summarizes the forecast comparison to the TAF as recommended in Appendix C of the FAA document, Forecasting Aviation Activity by Airport. A forecast is considered to be consistent with the FAA TAF if it:

a) Differs by less than 10% in the 5-year forecast, and 15% in the 10-year forecast, or

b) Does not affect the timing or scale of an airport project, or

c) Does 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.

TABLE 3-21 – FAA TEMPLATE FOR COMPARING AIRPORT PLANNING AND TAF FORECASTS

Airport Name: Rifle Garfield County Airport					
		Year	Airport Forecast	TAF	AF/TAF (% Difference)
Commercial Operations					
	Base yr.	2013	549	1,231	-46.2%
	Base yr. + 5yrs.	2018	591	1,321	-46.2%
	Base yr. + 10yrs.	2023	633	1,418	-46.0%
	Base yr. + 15yrs.	2028	675	1,524	-45.6%
	Base yr. + 20yrs.	2033	715	1,640	-44.8%
Total Operations					
	Base yr.	2013	11,088	7,371	66.5%
	Base yr. + 5yrs.	2018	11,932	7,850	65.8%
	Base yr. + 10yrs.	2023	12,779	8,366	65.5%
	Base yr. + 15yrs.	2028	13,615	8,937	65.6%
	Base yr. + 20yrs.	2033	14,426	9,564	66.3%

Source: FAA; Jviation, Inc.

3.12.1 AIRCRAFT OPERATIONS FORECAST

The FAA's operations forecasts predict CAGR of 1.31% for a total of 9,564 operations in 2033. The preferred 20-year operations forecast results in 13,658 operations in 2033, with a CAGR of 1.03%. The preferred operations forecast differs from the TAF in the 5-year forecast by 52.5%, the 10-year forecast by 53.3%, and the 20-year forecast by 42.8%. The large difference between the TAF and the preferred operations forecast is a result of the baseline data used, which was derived from Atlantic Aviation's operations records and information received from airport management.

3.12.2 BASED AIRCRAFT FORECAST

The FAA predicts 85 based aircraft at RIL by 2033, which is equivalent to the preferred based aircraft forecast (85) by the end of the planning period.

3.13 FACTORS THAT MAY CREATE CHANGES IN THE FORECAST

A forecast of aviation activity attempts to predict the future based on known factors and conditions. Numerous factors, on a local and/or national scale, can greatly affect the future of an airport and are unknown at this time for RIL. Oil prices, local economic activity, disposable income, costs of aircraft owner's insurance, and the potential for national GA user fees are just a few items that are beyond RIL's control and which may change future activity dramatically.

For this reason, implementation of development outlined in this report must be validated with the current conditions prior to the commencement of any further action.

3.14 SUMMARY OF PREFERRED FORECASTS

Appendix B of the FAA document, *Forecasting Aviation Activity by Airport*, recommends formatting the preferred forecast data into a particular tabular format for ease of readability. This format is shown in **Table 3-21.**

TABLE 3-22 – SUMMARIZING AND DOCUMENTATION AIRPORT PLANNING FORECAST

Summarizing and Documenting Airport Planning Forecasts

A. Forecast Levels and Growth Rates

AIRPORT NAME: Rifle Garfield County Airport **Specify base year:** 2013

						Average Annual Compound Growth Rates			
	2013	2018	2023	2028	2033	2013-2018	2013-2023	2013-2028	2013-2033
Passenger Enplanements									
Commuter	16	16	16	16	16	0.00%	0.00%	0.00%	0.00%
TOTAL	**16**	**16**	**16**	**16**	**16**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Operations									
Itinerant									
Commuter/air taxi	549	591	633	675	715	1.5%	1.4%	1.4%	1.3%
General aviation	7,725	8,394	9,106	9,844	10,587	1.67%	1.66%	1.63%	1.59%
Military	15	15	15	15	15	0.0%	0.0%	0.0%	0.0%
TOTAL ITINERANT	**8,289**	**9,000**	**9,754**	**10,534**	**11,317**	**N/A**	**N/A**	**N/A**	**N/A**
Local									
General aviation	2,504	2,635	2,885	3,073	3,256	1.02%	1.42%	1.37%	1.32%
Military	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	**10,793**	**11,635**	**12,639**	**13,607**	**14,573**	**1.51%**	**1.59%**	**1.56%**	**1.51%**
Instrument Operations	2,504	2,635	2,885	3,073	3,256	1.02%	1.42%	1.37%	1.32%
Peak Hour Operations	5	5	6	6	7	0.00%	1.84%	1.22%	1.70%
Cargo/mail (enplaned+deplaned ton	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Based Aircraft									
Single Engine (Nonjet)	45	46	47	48	50	0.44%	0.44%	0.43%	0.53%
Multi Engine (Nonjet)	6	6	6	6	6	0.00%	0.00%	0.00%	0.00%
Jet Engine/Turboprop	16	18	20	24	27	2.38%	2.26%	2.74%	2.65%
Helicopter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other	2	2	2	2	2	0.00%	0.00%	0.00%	0.00%
TOTAL	**69**	**72**	**75**	**80**	**85**	**0.85%**	**0.84%**	**0.99%**	**1.05%**

B. Operational Factors

	2013	2018	2023	2028	2033
Average aircraft size (seats)					
Air carrier	60.0	60.0	60.0	60.0	60.0
Commuter	30.0	30.0	30.0	30.0	30.0
Average enplaning load factor					
Commuter	0.2%	0.2%	0.2%	0.2%	0.1%
GA operations per based aircraft	148	153	160	161	163

Source: FAA; Jviation, Inc.