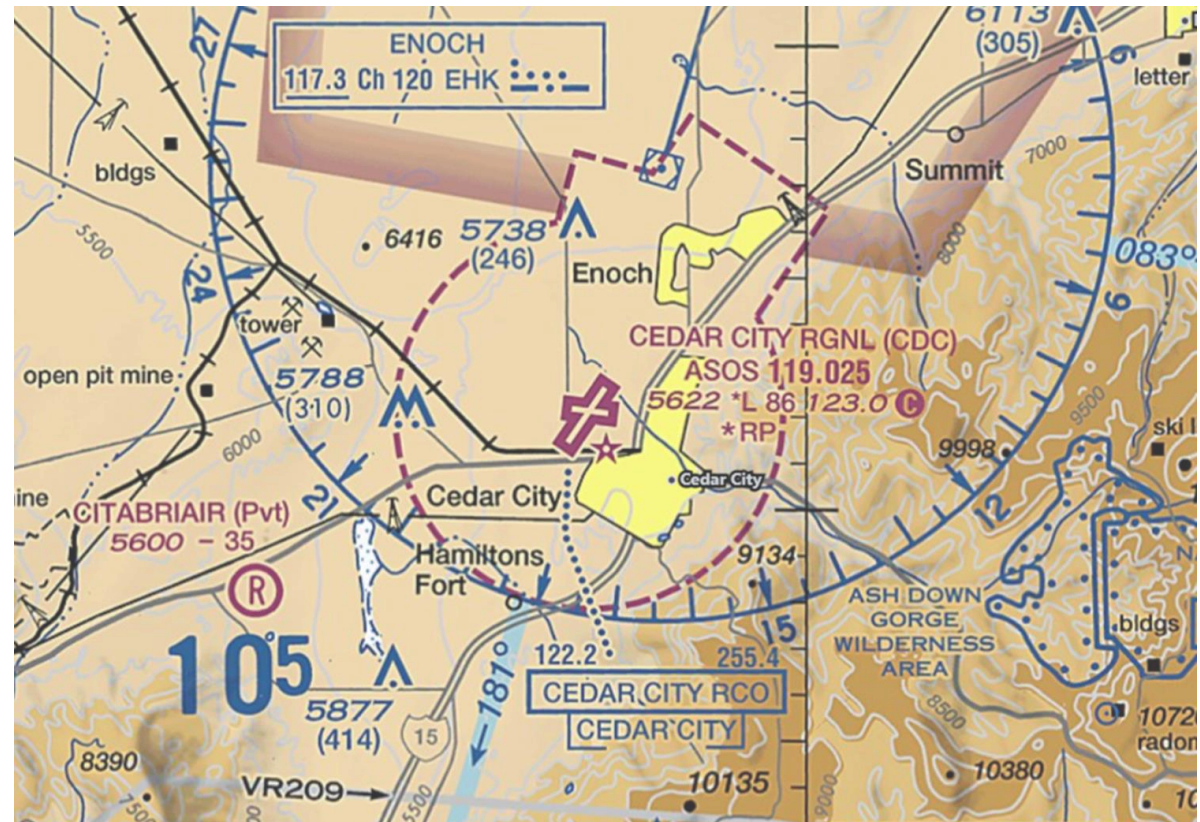


Cedar City Regional Airport

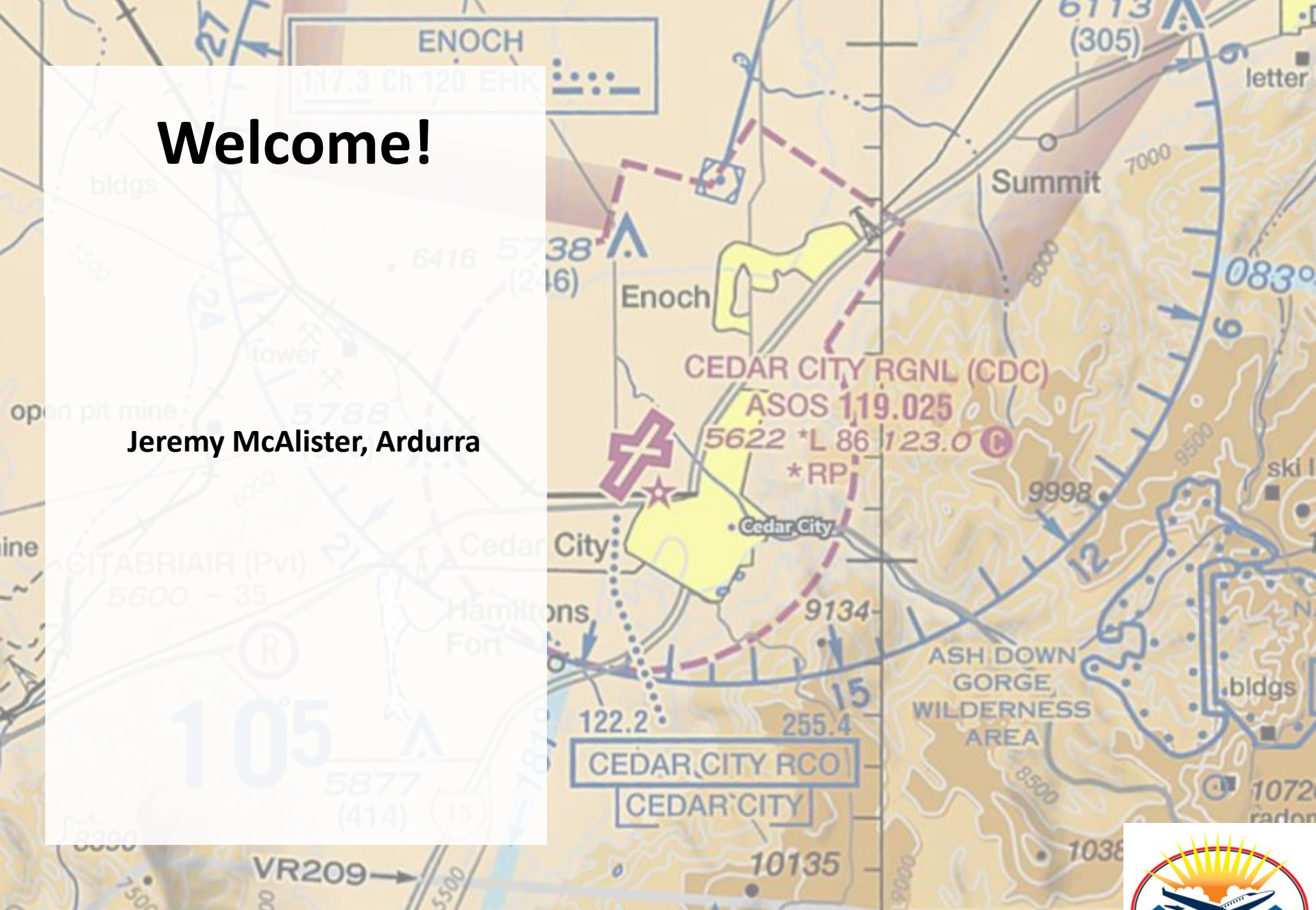
Airport Master Plan Airport Overview, Inventory, and Forecast

March 16, 2023



Welcome!

Jeremy McAlister, Ardurra



Agenda

- Airport Overview
- Airport Inventory
- Aviation Demand Forecast
- Critical Aircraft
- Next Steps



CONTENTS

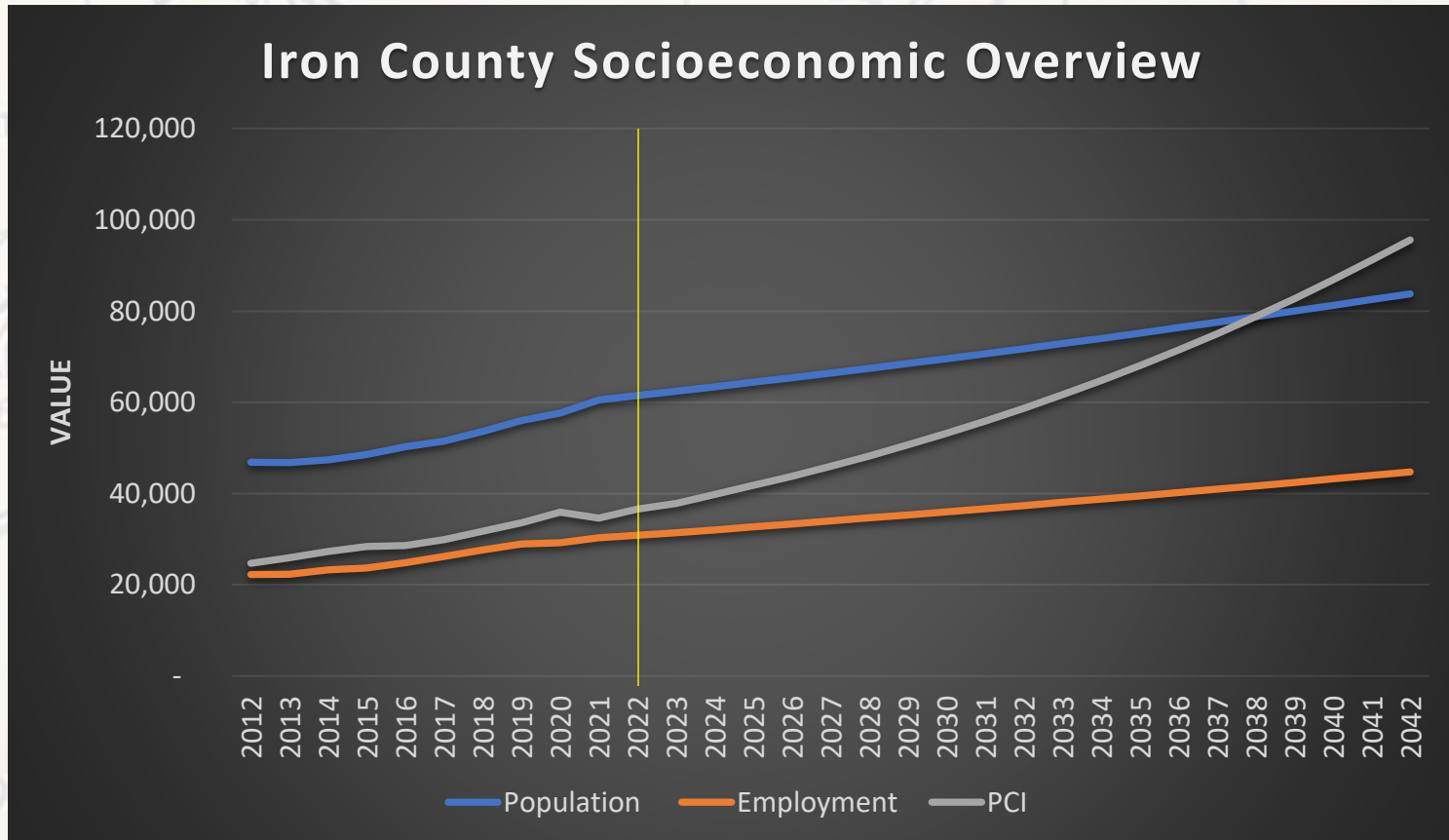
- 1 Executive Summary**
Provides a brief summary of the contents and purpose of this report.
- 2 Introduction**
Outlines each element of the master plan and provides the context necessary to understand its goals and objectives.
- 3 Airport Overview**
Provides an overview of the airport's location and history as well as the economy and demographics of the surrounding area.
- 4 Inventory**
Introduces all of the major airport components, structures, and pavements and includes a detailed wind analysis.
- 5 Forecast**
Provides a forecast of the anticipated aviation demands at the airport for the next two decades.
- 6 Facility Requirements**
Describes FAA design and safety standards relative to the existing condition of the runways, taxiways, and other facilities.
- 7 Development Alternatives**
Identifies and evaluates potential alternatives for meeting the needs of the airport and its users.
- 8 Environmental Overview**
Presents environmental factors the airport will need to take into consideration as part of any proposed development.
- 9 Airport Layout Plan**
The airport layout plan is a set of drawings that depicts the current facilities along with recommended improvements.
- 10 Implementation Plan and Financial Analysis**
Reviews the planned improvement projects in conjunction with the FAA Capital Improvement Plan.
- 11 Planning For Compliance**
Discusses the obligations and grant assurances the airport must comply with when accepting FAA-administered grant assistance.
- 12 Sustainability and Recycling**
Discusses sustainability requirements and recommendations for recycling and solid waste management.
- 13 Glossary**
Explains many of the aviation terms and abbreviations commonly used throughout this airport master plan.

Socioeconomic Overview

Data from Iron County was evaluated to understand the nature of the community and market the airport serves, as well as provide indicators for the future of aviation activity at the airport. Specific indicators analyzed for future activity are Population, Employment, and Per Capita Income (PCI).

The source for data is Woods and Poole Economics, Inc. They are an independent firm that specializes in economic and demographic data projections.

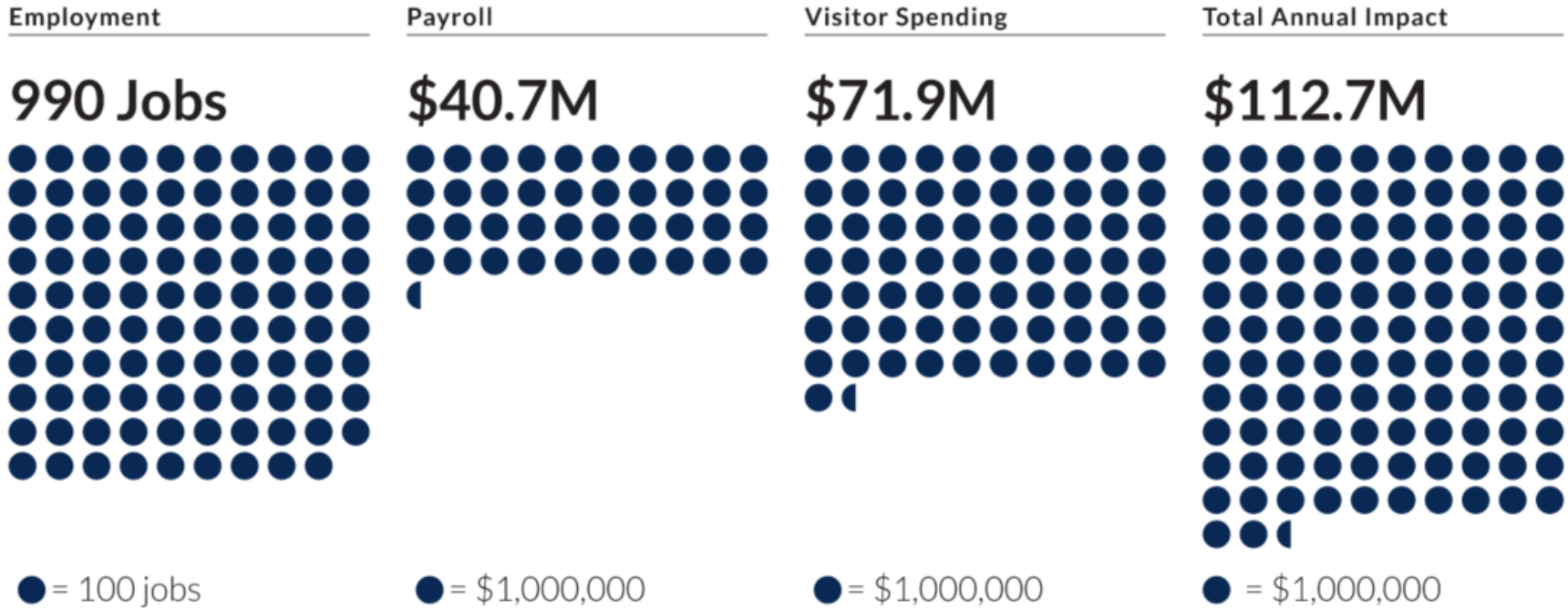
The aviation industry inherently follows socioeconomic trends; therefore, growth can be expected at the airport and will be discussed further in the forecast section.



Airport Overview

2020 UDOT Airport Economic Impact Study

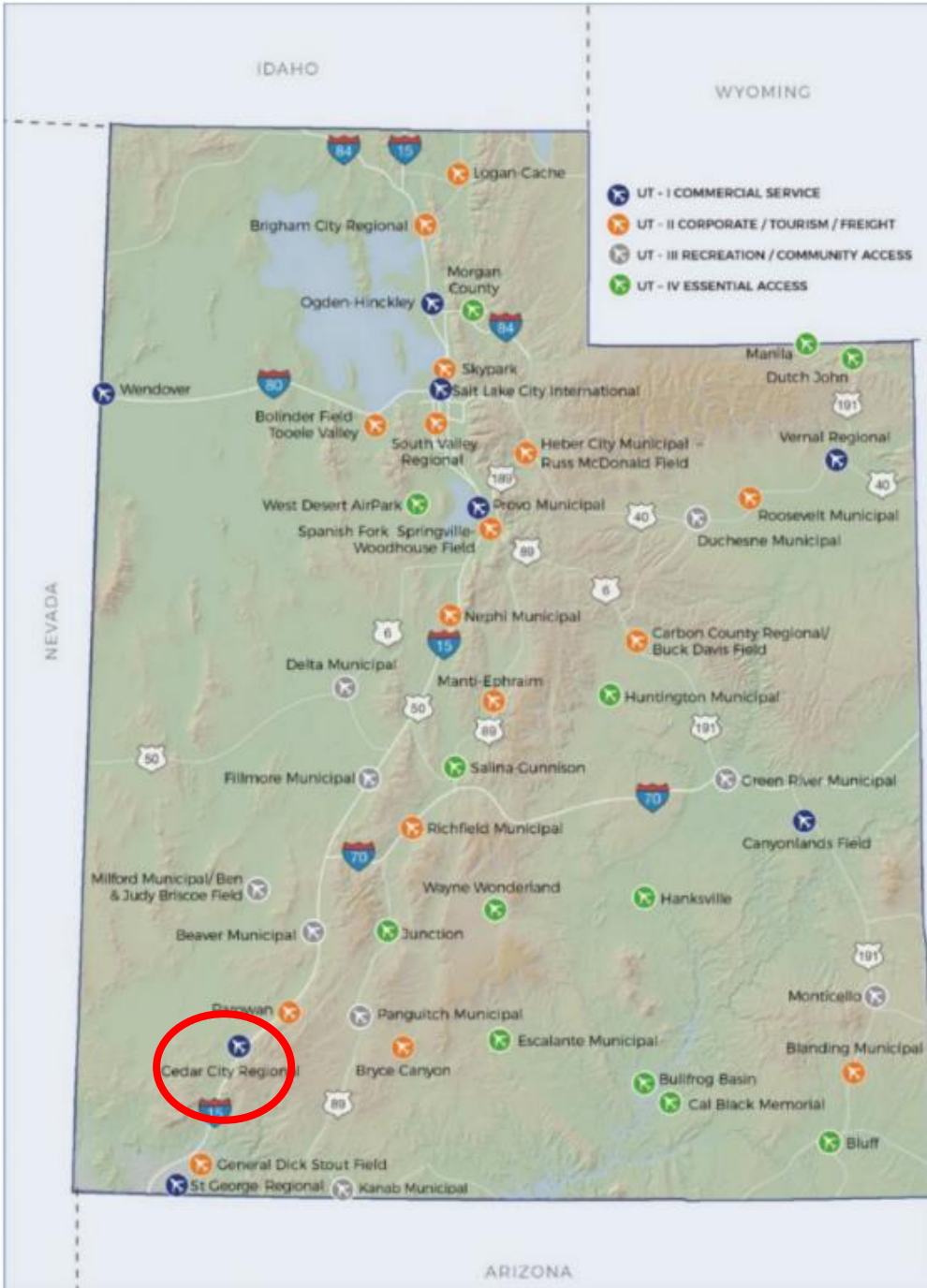
Figure 3.12: Economic Impact of Cedar City Regional Airport



Source: State of Utah, UDOT, Airport Economic Impact Study, 2020, Table 5-1.

Airport Overview

- Cedar City Regional Airport
 - Regional airports serve metropolitan areas with relatively large populations. These airports support limited commercial service operations, with high levels of jet and multiengine aircraft.
- Airport Role
 - National Plan of Integrated Airport System (NPIAS)
 - Primary, Nonhub, Commercial Service



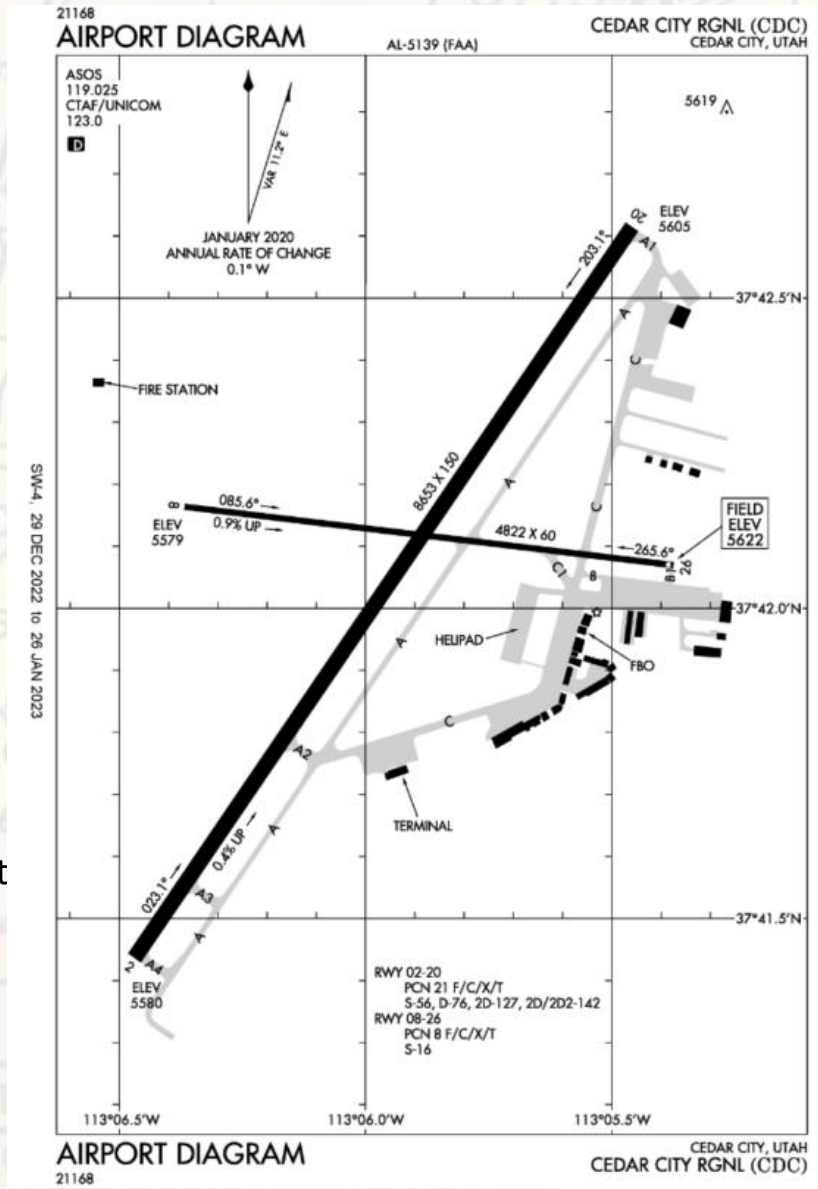
Airport Inventory

- Baseline of current facility conditions at the airport
- Review areas for inventory
 - Natural/physical environment
 - Airport land Use
 - Based aircraft
 - Airport layout and facilities
 - Pavement conditions
 - Navigational aids
 - Lighting
 - Support Facilities
 - Commercial terminal, ramp, and parking areas
 - Car rental facilities
 - Cargo facilities
 - Fixed-Base Operator(s)
 - Non-aeronautical use
 - Utilities



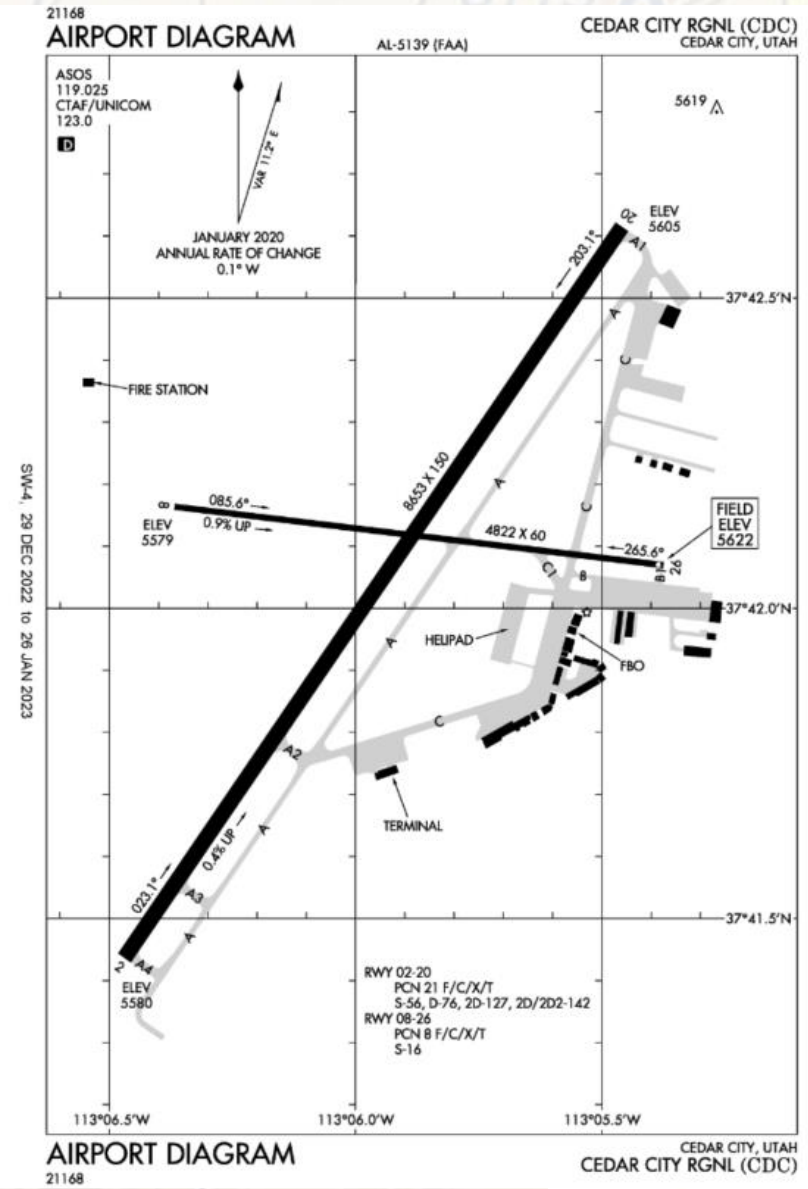
Airport Inventory – Runways

- RWY 2/20
 - 8,653' x 150'
 - HIRL – High Intensity Runway Lighting
- RWY 2
 - REIL – Runway End Identifier Lights
 - PAPI – Precision Approach Path Indicator
- RWY 20
 - MALSR – Medium Intensity Approach Lighting System with Runway Alignment Indicator Light
 - PAPI



Airport Inventory – Runways

- RWY 8/26
 - 4,822' x 60'
 - MIRL – Medium Intensity Runway Lighting
- RWY 8
 - PAPI



Airport Inventory – Instrument Approaches

Table 4.1: Instrument Approach Procedures

Minimum Altitude* and Minimum Visibility** by Aircraft Approach Category***				
Approach	Category A	Category B	Category C	Category D
Runway 2: RNAV (GPS)				
LPV	5,867 ft & 7/8 mile			
LNAV/VNAV	6,394 ft & 2 1/2 mile			
LNAV	6,240 ft & 1 mile		6,240 ft & 1 7/8 mile	
CIRCLING	6,240 ft & 1 mile		6,240 ft & 1 7/8 mile	6,240 ft & 2 miles
Runway 20: RNAV (GPS)				
LPV	5,825 ft & 1/2 mile			
LNAV/VNAV	6,015 ft & 3/4 mile			
LNAV	6,180 ft & 1/2 mile		6,180 ft & 1 1/4 mile	
CIRCLING	6,180 ft & 1 mile		6,180 ft & 1 5/8 mile	6,180 ft & 2 miles
Runway 20: ILS or LOC				
S-ILS (higher gradient)	5,825 ft & 1/2 mile			
S-ILS (std gradient)	5,882 ft & 1/2 mile			
S-LOC 20	6,440 ft & 1/2 mile	6,440 ft & 3/4 mile	6,440 ft & 1 7/8 mile	
S-LOC (XOJPO mins)	6,100 ft & 1/2 mile		6,100 ft & 1 mile	
Runway 20: VOR				
S-20 Missed	6,020 ft & 1/2 mile		6,020 ft & 3/4 mile	
S-20	6,300 ft & 1/2 mile		6,300 ft & 1 1/2 mile	
Circling	6,300 ft & 1 mile		6,300 ft & 2 miles	6,300 ft & 2 1/4 miles

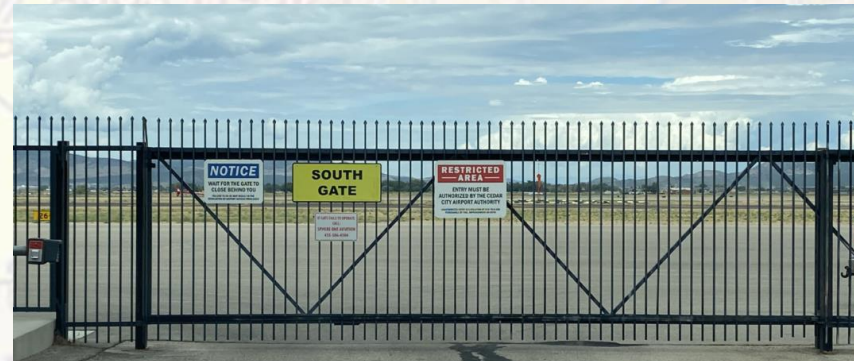
Airport Inventory – Taxiways

- TWY A
 - Full-length parallel taxiway for RWY 2/20
 - Associated connecting taxiways
 - TWY A1-A4
- TWY B
 - Runs along North GA Ramp
 - Associated connecting taxiway
 - TWY B1
- TWY C
 - Runs between commercial terminal and North end of TWY A
 - Associated connecting taxiway
 - TWY C1



Airport Inventory – Airfield

- Standard airfield signage/lighting
- Segmented circle and wind indicator
- Automated Surface Observation System (ASOS) station
- Rotating beacon
- Security fencing
 - Wildlife fencing for prairie dogs
- Powered vehicle security gates



Airport Inventory – Notable Facilities

- Commercial terminal
 - Approx. 15,000 sqft
 - Includes baggage claim, rental car desks, ticketing/bag check, security checkpoint
- Terminal parking lot
 - Space for approx. 204 vehicles, including rental cars
- Fixed-Base Operator (FBO)
 - GateOne (dba Sphere One) is sole facility
- Cargo Facility
 - FedEx hangar that is used by FedEx and Alpine Air
- ARFF Station – Cedar City Station #3



Forecast of Aviation Demand

Purpose: To understand and anticipate activity expected during the 20-year planning period (2022-2042). The forecast enables the sponsor and community to plan for future demand to assist with phasing, funding and ensuring the airport continues to safely operate in compliance with FAA standards.

Forecast Elements:

➤ **Commercial Service**

- Enplanements
- Operations

➤ **General Aviation**

- Itinerant
 - ❖ Air Taxi
 - ❖ General Aviation
 - ❖ Military
- Local
 - ❖ General Aviation
 - ❖ SUU
- Fleet Mix
- Based Aircraft

➤ **Critical Aircraft**



FAA Classification System

The FAA uses categories and codes to define design elements. The two primary groupings are:

- Aircraft Approach Category (AAC): Designated by a letter (A through E) and is a function of approach speed.
- Airplane Design Group (ADG): Designated by a Roman numeral (I through VI) and is a function of tail height or wingspan (whichever is greater).

Aircraft Approach Category (AAC)

Category	Speed
A	less than 91 knots
B	91 knots or more, less than 121 knots
C	121 knots or more, less than 141 knots
D	141 knots or more, less than 166 knots
E	166 knots or more

Airplane Design Group (ADG)

Group	Tail Height (Feet)	Wingspan (Feet)
I	<20	<49
II	20 - <30	49 - <79
III	30 - <45	79 - <118
IV	45 - <60	118 - <171
V	60 - <66	171 - <214
VI	66 - <80	214 - <262

Important Terms

Operations – A takeoff or landing, includes touch-and-go.

TAF – FAA Terminal Area Forecast, not to be confused with Terminal Aerodrome Forecast (which pilots use for weather information).

Load Factor - The percentage of filled revenue passenger seats to total available seats.

Capacity – Total available revenue passenger seats.

Enplanements – Boarding of an aircraft by a revenue passenger.



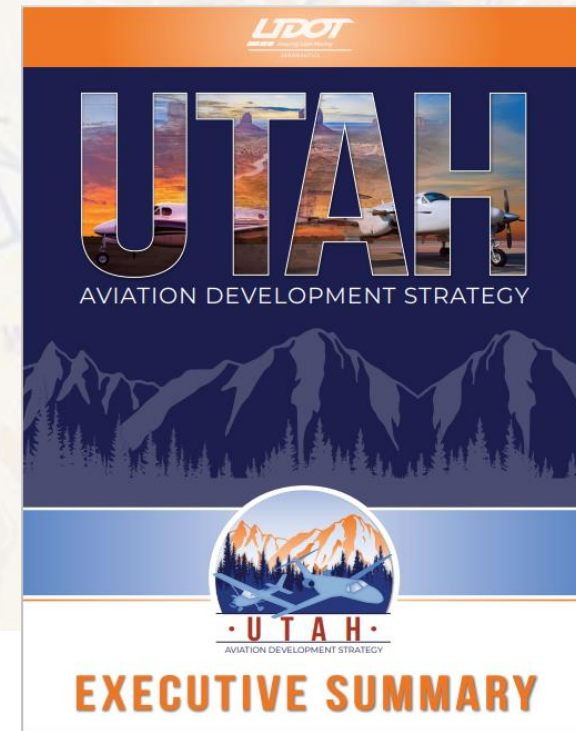
AIRPLANE DESIGN GROUP (ADG) - WINGSPAN

AIRCRAFT APPROACH CATEGORY (AAC) - APPROACH SPEED

	I <49'	II 49' - <79'	III 79' - <118'	IV 118' - <171'
A <91 kts	A-I Cessna 172, Bonanza, Cub 	A-II Pilatus PC-12, Cessna 208, Twin Otter 	A-III Canadair CL-415 Super Scooper 	
B 91 - <121 kts	B-I Citation Mustang, Baron 58 	B-II King Air 200, Air Tractor 802-A, Citation XLS+ 	B-III Global 5000 	
C 121 - <141 kts	C-I Learjet 45 	C-II Challenger 350, Citation X 	C-III Gulfstream V 	C-IV C-130 
D 141 - <166 kts		D-II Gulfstream IV 	D-III Gulfstream 550 	D-IV Douglas DC-10 

Data Sources

- FAA Aerospace Forecast 2022-2042
- FAA Terminal Area Forecast (TAF) 2021-2045
- 2020 Utah Aviation Development Strategy
- FAA Traffic Flow Management Systems Count (TFMSC)
- Department of Transportation (DOT) T-100 Database
- Virtower – Airport Operations Tracking System
- Motion activated cameras
- Airport Staff



Forecast Methodologies (Reference)

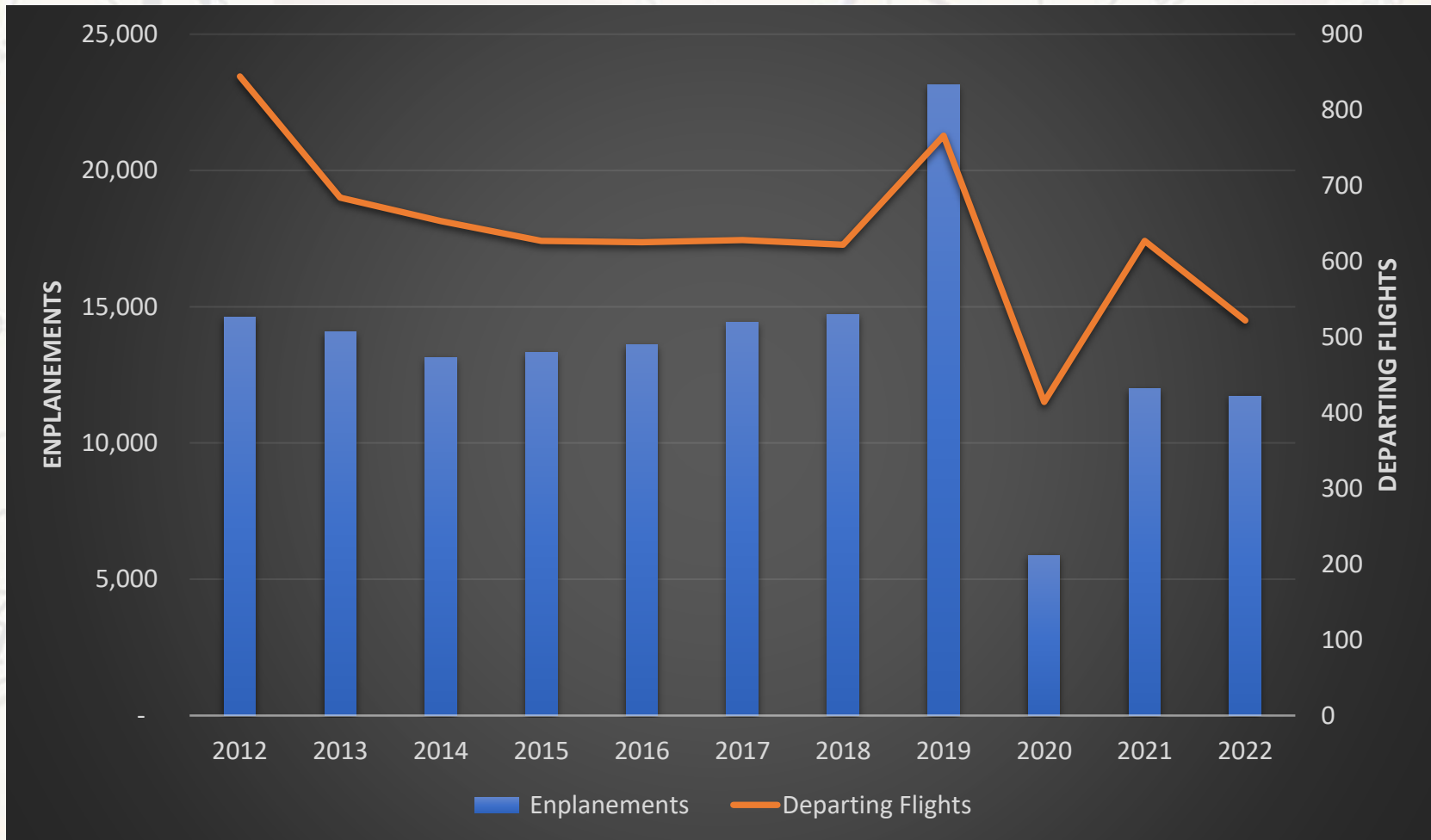
- **Regression Analysis** - Regression analysis is a statistical technique used to identify trends in data by measuring the relationship between a dependent (e.g., aviation demand) and independent variables (e.g., population or income). This method is effective when using relatively simple sets of data, a strong statistical correlation is evident, and reliable forecast data is available for the independent variables.
- **Trend Analysis** - Trend analysis uses historical patterns to project future activity. This approach is useful when local conditions are unusual enough to differentiate the study airport from other airports in the region.
- **Market Share Analysis**- This technique assumes a top-down relationship between national, regional, and local forecasts. It involves conducting a historical review of the airport activity and identifying its percentage, or share, of a larger regional, state, or national aviation market. The historical market share trend is then used to project the future market share based on forecasts developed for the larger geographical area. This type of forecast is useful when the activity has a constant share of a larger market.
- **Smoothing** - Smoothing is a statistical technique used to make predictions based on applying recent trends and conditions to historical data. It is most effective for generating short-term forecasts.

Industry Trends Affecting Commercial Service

CDC is an Essential Air Service (EAS) Airport and is contractually obligated to receive a certain number of air carrier flights.

- Fewer regional carriers to serve small communities
- Shifting airline economics and effects on capacity
- Airline fleet simplification and modernization
- National pilot shortage
- Lingering effects from Covid-19 pandemic

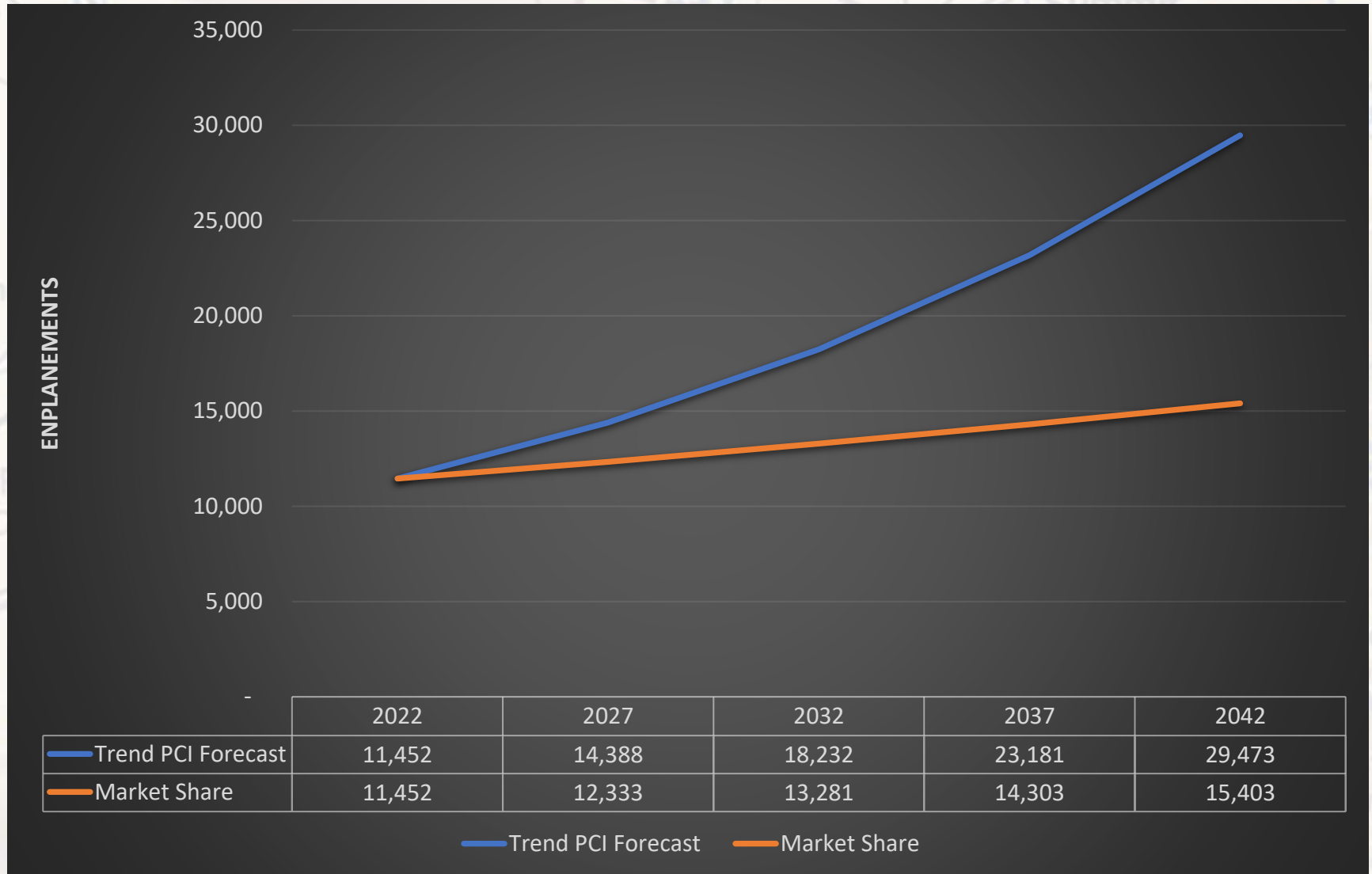
Historic Air Carrier Activity



Source: BTS T-100 Database

Enplanement Forecast

Forecast Methods: **Trend - Forecast Per Capita Income (PCI) Growth (4.8% CAGR) – Preferred**
Utah Market Share of enplanements (1.49% CAGR)



Load Factor Forecast

Typically, operations are demand driven depending on aircraft capacity and load factor.

*This forecast assumes that the CRJ200 will be phased out and replaced by a 70-seat aircraft in the long term forecast (2032-2042).

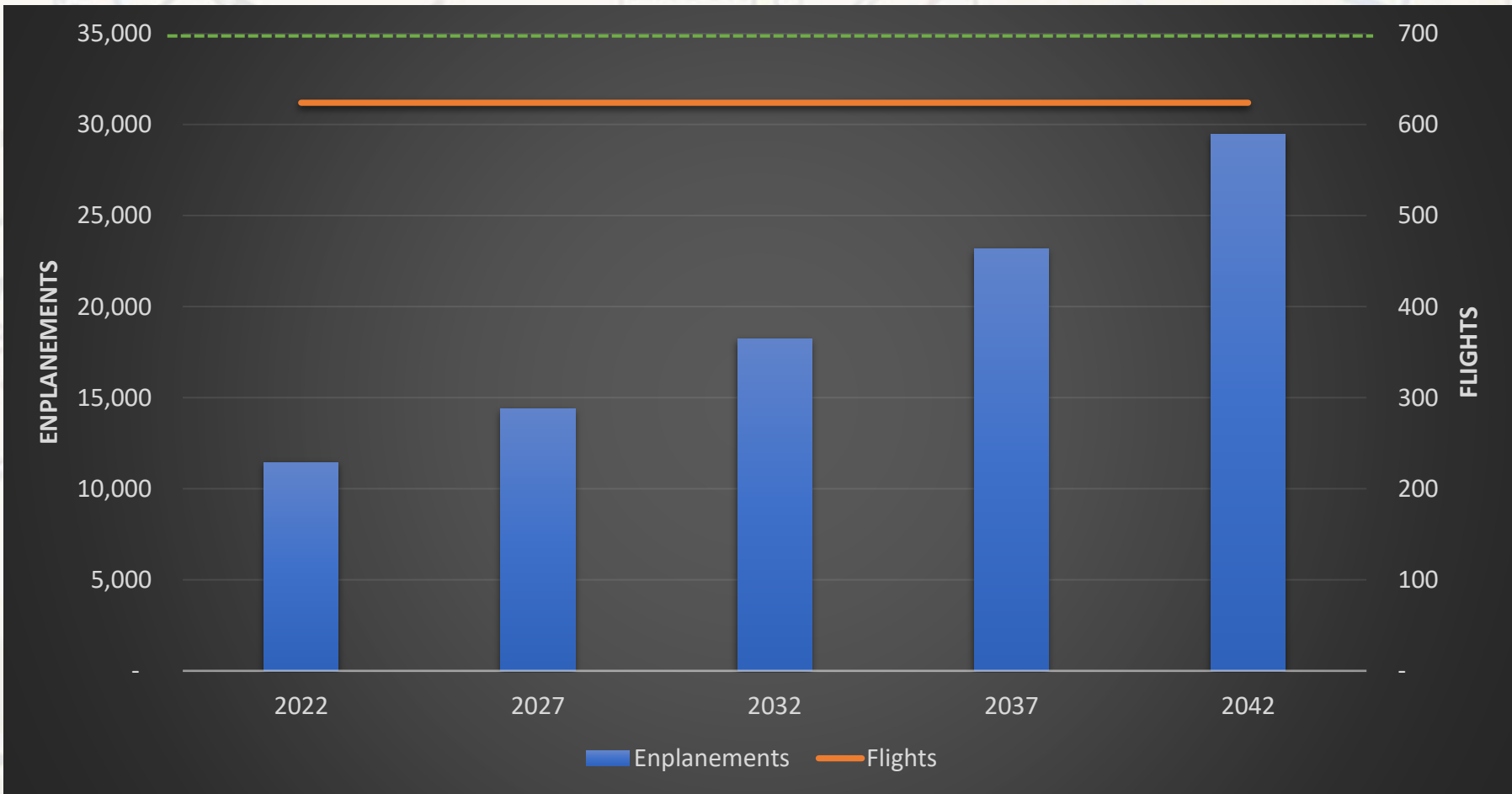
Enplanement Forecast

	Enplanements	Flights	Seats Available	Load Factor
2022	11,452	624	50	37%
2027	14,388	624	50	46%
2032	18,232	624	70	42%
2037	23,181	624	70	53%
2042	29,473	624	70	67%

EAS Air Carrier Forecast

Typically, operations are demand driven depending on how full the aircraft is (load factor). However, CDC air carrier operations are EAS contract determined. It is assumed the EAS contract will maintain the same number of flights over the planning period.

At 35,000 annual enplanements, the EAS 70-seat aircraft would be nearing 80% capacity (dashed green line). At this point, enplanements would potentially trigger the need for additional air carrier service to SLC.



General Aviation Forecast Overview

Forecasting Elements and Methods

- **General Aviation Operations: Regression Analysis (3.63% CAGR)**
 - Air Taxi
 - Itinerant General Aviation
 - Local General Aviation
- **SUU Operations – FAA Aerospace Forecast**
 - Fixed Wing: -0.40% CAGR
 - Rotary Wing: 1.30% CAGR
 - Overall: 0.5% CAGR
- **Based Aircraft – Forecast Population Growth (1.56% CAGR)**

Baseline Data

Virtower operations were validated through motion-activated cameras and the FAA TFMSC database.

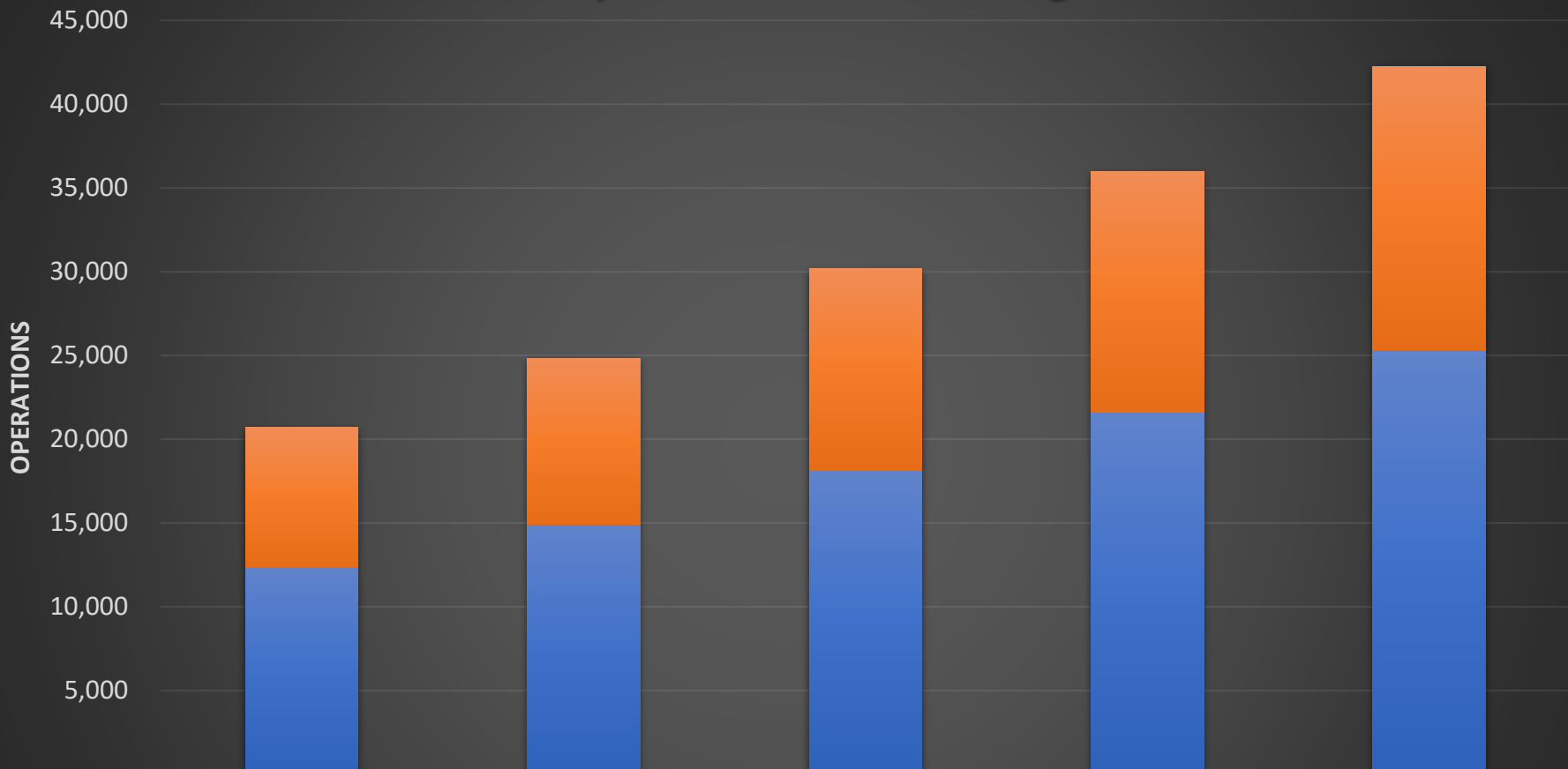
Itinerant GA includes air taxi operations. Total operations do not include Military or Air Carrier operations.

* It is assumed the percentages will remain the same over the planning period.

GA Baseline Operations		
	Percentage	2022 Operations
Itinerant GA	10%	12,418
Local GA	7%	8,279
SUU	82%	98,499
Total	99%	119,195

GA Operations - Regression Analysis

GA Operations - Excluding SUU



	2022	2027	2032	2037	2042
Local	8,279	9,936	12,081	14,397	16,901
Itinerant	12,418	14,905	18,121	21,596	25,352

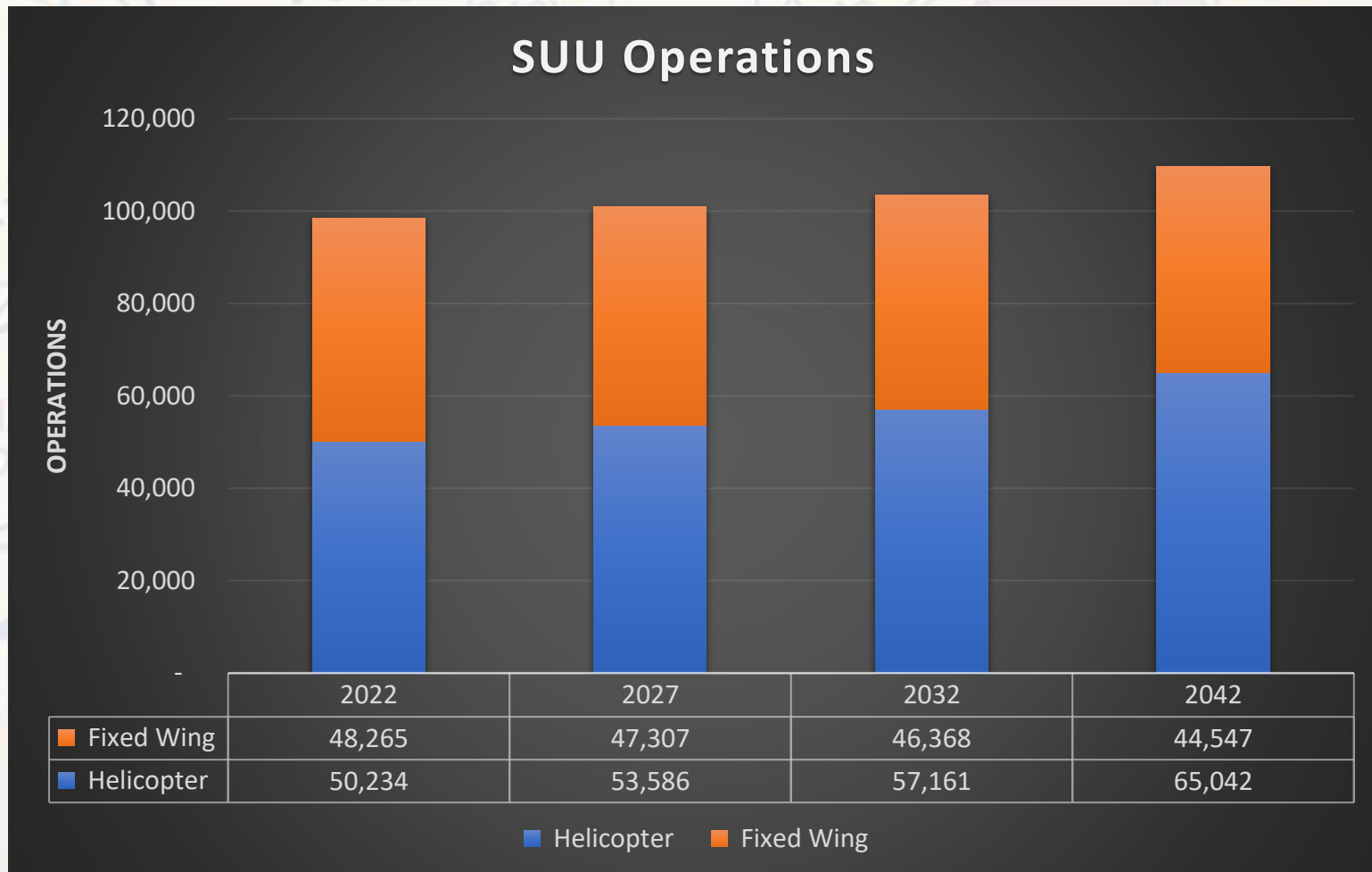
■ Itinerant ■ Local

SUU Operations – FAA Aerospace Forecast

Helicopter Operations account for 51% of operations.

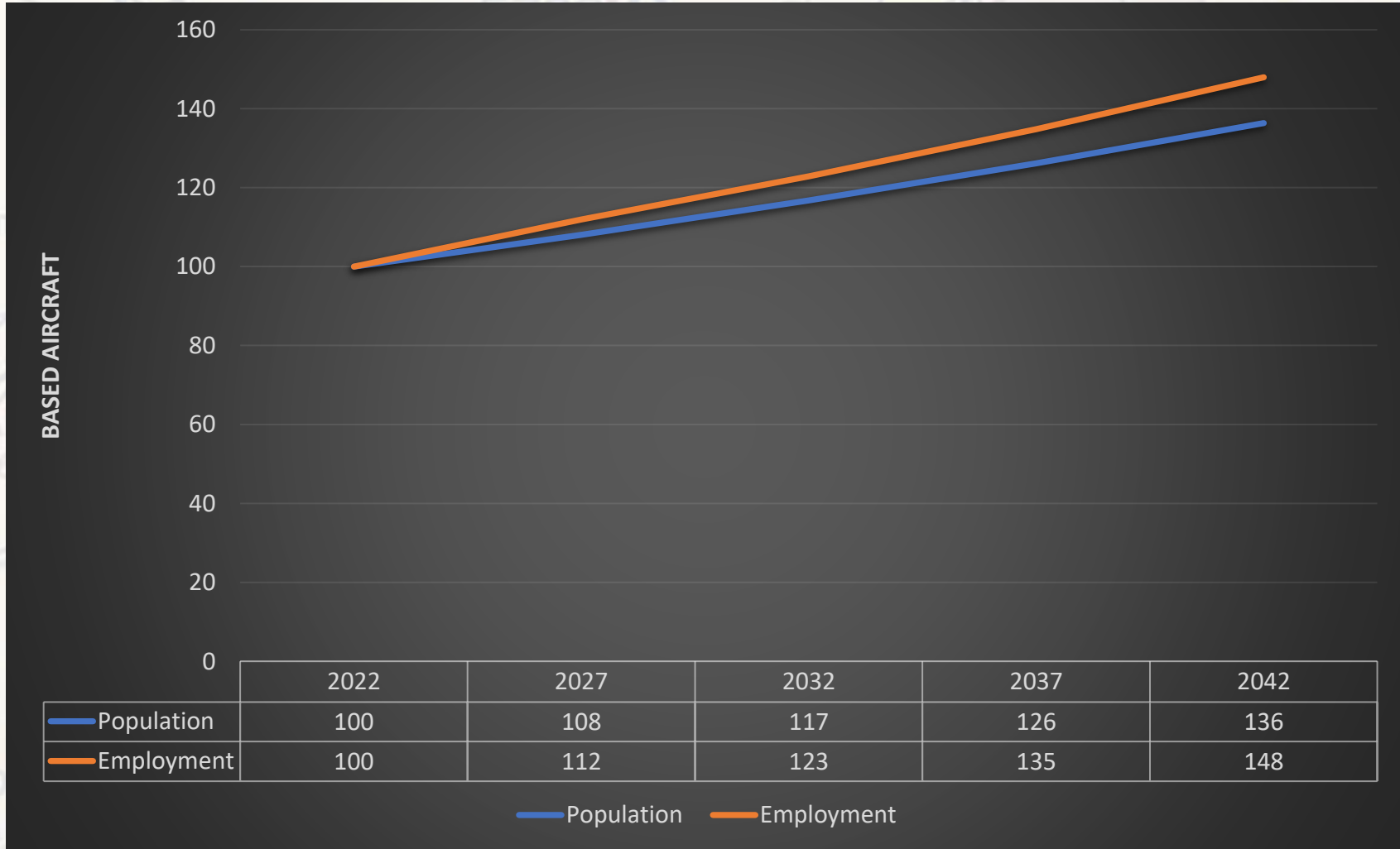
Fixed Wing Operations account for 49% of operations.

(Note: SUU nearing capacity – future growth expected to be minimal.)



Based Aircraft

Forecast Methods: **Trend - Forecast Population Growth (1.56% CAGR) – Preferred**
Trend – Employment Growth (1.88% CAGR)



Military Operations

Unless there is specific knowledge of an upcoming change, military operations are typically forecast at current TAF levels because the Department of Defense provides limited details regarding future activity levels.

There are no local military operations forecasted at this time. Although we know there are negotiations in progress, operational activity is unknown and therefore cannot be forecasted.

Military Operations Forecast	
Itinerant	
2022 (Baseline)	550
2027	550
2032	550
2037	550
2042	550

Forecast Summary

Year	Enplanements	Itinerant Operations					Local Operations				Total Ops	Based Aircraft
		Air Carrier	Air Taxi	GA	Military	Total	GA	SUU	Military	Total Local		
2022	15,133	1,248	1,182	11,236	550	14,216	8,279	98,499	-	106,778	120,993	102
2027	16,351	1,248	1,419	13,486	550	16,703	9,936	100,893	-	110,829	125,483	110
2032	17,667	1,248	1,725	16,396	550	19,919	12,081	103,529	-	115,609	129,900	119
2042	20,624	1,248	2,413	22,938	550	27,150	16,901	109,588	-	126,489	139,272	139

TAF Comparison

- FAA regulation states that for FAA approval a non hub commercial service airport, the forecast elements must differ less than 10% in the 5 year forecast, and less than 15% in the 10 year period from the TAF. If the forecast exceeds this, additional coordination is needed with the FAA. CDC meets this criteria for all forecasting elements except with enplanements and commercial service operations.
- The difference is due to historical inconsistencies with the TAF, which was also noted in the previous master plan. Additionally, the TAF shows no growth in these two forecasting elements, which is unreasonable considering national trends and more local socioeconomic trends.
- Once approved, the FAA should use this forecast to update the TAF.

	Enplanements			Commercial Operations		
	TAF	Master Plan	Difference	TAF	Master Plan	Difference
2022	10,600	11,452	8%	1,304	2,432	87%
2027	10,600	14,388	36%	1,304	2,667	105%
2032	10,600	18,232	72%	1,304	2,973	128%
2042	10,600	29,473	178%	1,304	3,661	181%

Critical Aircraft

- Also called “design aircraft” and is used to determine correct design standards for runways/taxiways.
- Criteria
 - Most demanding aircraft/group of aircraft with regular use (**500 annual operations**), excluding touch and go operations.
 - When there is not a single aircraft with 500 operations, the aircraft grouping with similar characteristics method allowed. This method **combines aircraft with comparable characteristics** (AAC and ADG separately) to determine the most demanding design criteria.
- Standard industry practice include critical aircraft identification with greater than **350 operations**, with an increasing trend.

2017 Airport Master Plan

Cedar City Regional Airport is currently designed to support AAC C, ADG III aircraft.

The 2017 Airport Master Plan used the aircraft grouping method to identify the design aircraft. Representative aircraft included the Avro RJ 85, Gulfstream V, KC-135, and forecasted E175.

Current Forecast

Based on the updated forecast, the critical aircraft and design standards for the airport are not anticipated to change.

Method- Aircraft grouping of Similar Characteristics.

	2022	2027	2032	2037	2042
A	66,143	71,244	77,624	84,539	92,030
B	2,314	2,493	2,716	2,958	3,220
C	1,512	1,752	1,798	1,847	1,900
D	35	38	41	45	49
I	66,300	71,413	77,808	84,740	92,249
II	3,312	3,691	2,662	2,899	3,156
III	393	423	1,709	1,750	1,794

Representative Critical Aircraft – Existing Avro RJ 85 (C-III)



Photo Credit: FireAviation.com

Critical Aircraft – Ultimate Embraer E175 (C-III)



Photo Credit: FireAviation.com

Conclusion

The critical aircraft determination from this forecast is consistent with the 2017 master plan and the design does not change over the planning period.

The next part of the master plan process will identify requirements and (if any) deficiencies to the FAA design standards.

Photo Credit: FireAviation.com

Next Steps

- Submittal of forecast to FAA for approval
- Facility Requirements based upon approved forecast/critical aircraft
- Development Alternatives to be drafted to fulfill Facility Requirements and Sponsor/community vision for the airport
- Public Meeting #3 – Completion of Facility Requirements and Presentation of Development Alternatives
 - Date TBD – estimated June 2023 (largely determined by when we receive forecast approval from the FAA)

Project Website – <https://cdcmasterplan.com>

The FAA Master Plan Process



RESEARCH

- Develop Scope of Work
- Inventory
- Aviation Forecast - Identify Critical Aircraft
- Forecast Approval



REQUIREMENTS

- Facility Requirements
- Develop Alternatives
- ALP Drawings



IMPLEMENTATION

- Cost Estimates, CIP, Implementation Plan
- Financial Analysis
- Final Documents

Thank you!

Please fill out a comment sheet

You may also email comments to any member of the planning team

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