



#### Introductions

- CDOT Aeronautics
- Kimley-Horn
- EBP (EDR)
- - Adventure Threats / ₩ History

- KRAMER aerotek
- PAC Members



#### Agenda

- PAC Meeting #3 Recap
- Progress Since the Last PAC Meeting
- System Needs
- System Financial Needs
- Alternatives Analysis
- CEIS Results
- Documentation
- Next Steps









### PAC Meeting #3 Topics

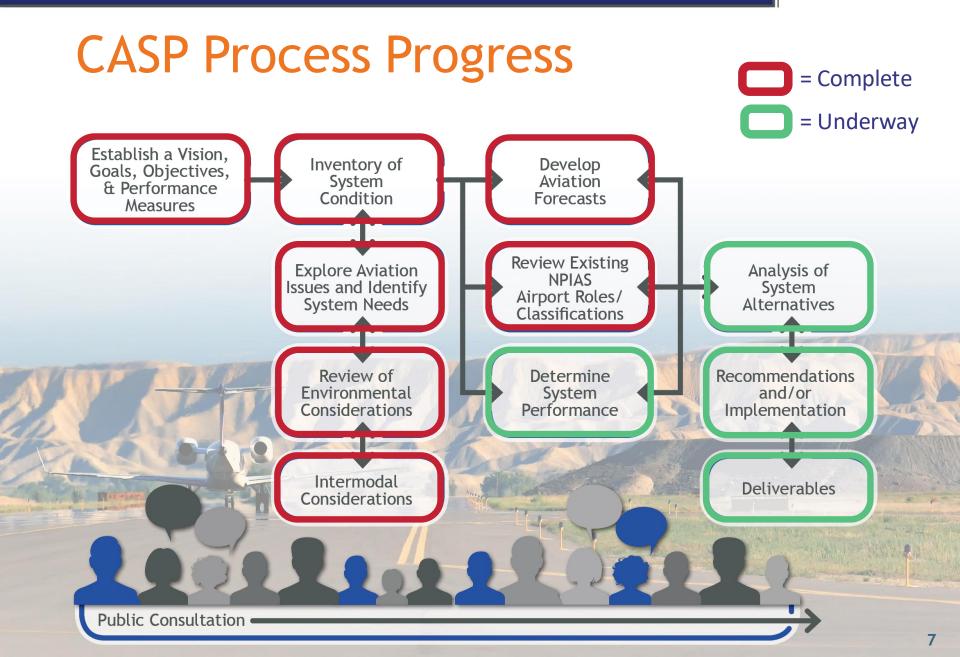
- Activity Forecasts
  - Trends (Commercial and GA)
  - Enplanements
  - Based Aircraft
  - GA operations
  - Commercial Operations
- Existing System Performance
  - Performance measures
  - Facility and service objectives
- Economic Impact Study Update
  - Preliminary results





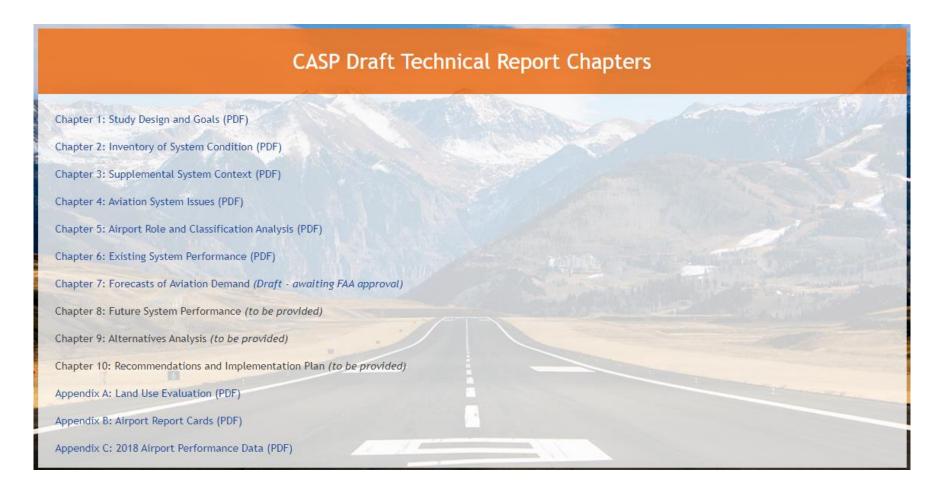






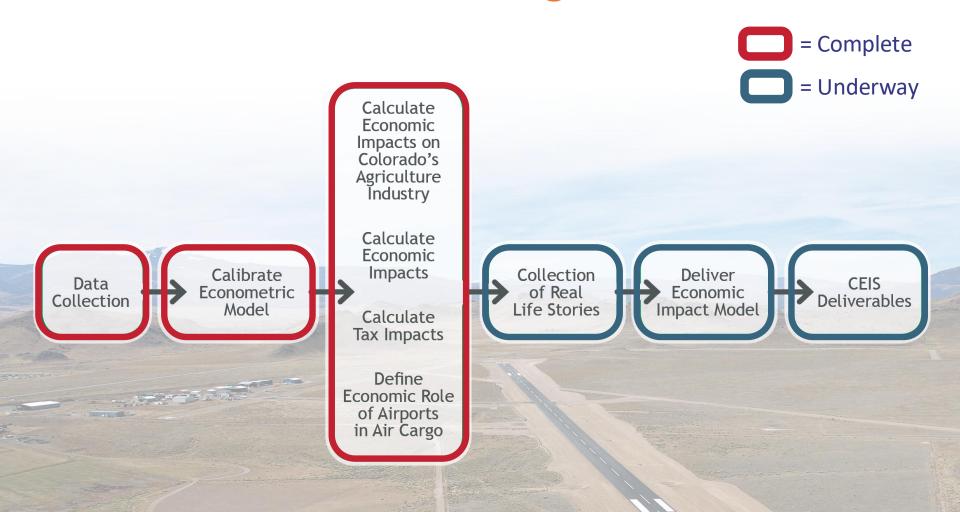


#### **CASP Documentation Progress**





## **CEIS Process and Progress**



#### **CEIS Technical Memos**

Tech Memo 1: Data Collection Process (PDF)

Tech Memo 2: Economic Impact Methodology (PDF)

Tech Memo 3: Tax Revenue Analysis (PDF)

Tech Memo 4: Economic Role of Air Cargo in Colorado (PDF)

Tech Memo 5: Colorado's Agricultural Sector and Airports (PDF)

Tech Memo 6: Summary of Economic Impact Results (to be provided)

Full Technical Report (to be provided)

#### 2020 Colorado Aviation Economic Impact Study (CEIS) Individual Airport Results

For more information on the methodology to quantify airport economic impacts, please refer to Tech Memo #2: Economic Impact Methodology.

Animas Air Park (OOC)

Aspen-Pitkin County (ASE)

Astronaut Kent Rominger (RCV)

Blake Field (AJZ)

Blanca (05V)

Boulder Municipal (BDU)

Brush Municipal (7V5)

Calhan (5V4)

Centennial (APA)

Central Colorado Regional (AEJ)

Colorado Air and Space Port (CFO)

Colorado Plains Regional (AKO)

Colorado Springs Municipal (COS)

Cortez Municipal (CEZ)

Craig-Moffat (CAG)

Crawford (99V)

Cuchara Valley (07V)

Denver International (DEN)

Durango-La Plata County (DRO)

Eads Municipal (9V7)

Eagle County Regional (EGE)

Erie Municipal (EIK)

Fort Morgan Municipal (FMM)

Fremont County (1V6)

Glenwood Springs Municipal (GWS)

Granby-Grand County (GNB)

Grand Junction Regional (GJT)

Greeley-Weld County (GXY)

Gunnison-Crested Butte Regional (GUC)

Harriet Alexander Field (ANK)

Haxtun Municipal (17V)

Holly (KO8)

Holyake (HEQ)

Hopkins Field (AIB)

Julesburg Municipal (7V8)

Kit Carson County (ITR)

La Junta Municipal (LHX)

Lake County (LXV)

Lamar Municipal (LAA)

Las Animas-Bent County (7V9)

Leach (1V8)

Limon Municipal (LIC)

Mc Elroy Airfield (20V)

Meadow Lake (FLY)

Meeker/Coulter Field (EEO) Mineral County Memorial (C24)

Montrose Regional (MTJ)

North Fork Valley (7V2)

Northern Colorado Regional (FNL)

Perry Stokes (TAD)

Pueblo Memorial (PUB)

Rangely (4V0)

Rifle Garfield County (RIL)

Rocky Mountain Metropolitan (BJC)

Saguache Municipal (04V)

San Luis Valley Regional (ALS)

Silver West (CO8)

Spanish Peaks Airfield (4V1)

Springfield Municipal (8V7)

Steamboat Springs (SBS)

Sterling Municipal (STK)

Stevens Field (PSO)

Telluride Regional (TEX)

Vance Brand (LMO)

Walden-Jackson County (33V)

Westwinds (D17)

Wray Municipal (2V5) Yampa Valley (HDN)

Yuma Municipal (2V6)



#### **CEIS** Documentation **Progress**





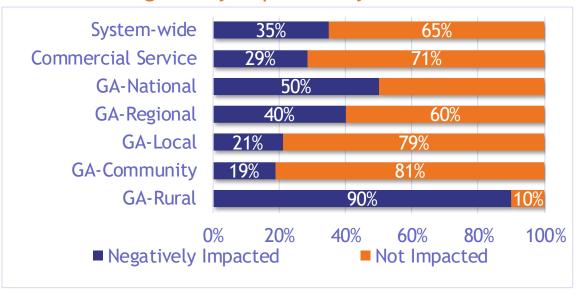


### **Existing System Performance**

## Chapter 6 presented results of all:

- Performance Measures (PMs)
- System Indicators (SIs)
- Facility & Service Objectives (FSOs)

Percent of airports with approaches negatively impacted by obstructions





#### **Future System Needs**

- Each PM examined to determine where future performance should be and what actions are needed
- SIs were not examined for future changes
- FSO analysis identified projects to meet identified FSOs
- Certain demand-driven elements impacted by future 2038 forecasts:
  - ARC
  - Operational Demand/Capacity
  - Terminal space
  - Hangar space
  - Apron tie-downs



# Bringing Together Initial Thoughts and Study Results:



Discussed with CDOT what they thought the biggest infrastructure priority needs were



Discussed at PAC Meeting #1 trends and issues with highest potential impact on system



# CDOT's Initial Infrastructure Priorities (from Project Kickoff)

- Pavement
- Terminals (small commercial/resort airports)
- Parking apron for air carriers
- Multi-use buildings (SRE, maintenance, pilot lounge)
- Utilities (water, cable, sewer, septic)



#### PAC Highest Priority Trends/Issues

- Technology (automation)
- Labor
- Alternate fuels/energy
- Increasing capital project costs/less funding
- Mountain airports (seasonal needs, aging terminals, runway length)
- Population growth
- Economic changes
- Land use compatibility/encroachment

These are referenced more widely used in a subsequent task



## PMs Analysis



#### Performance Measures



#### **Performance Measures**

Percent of airports with approaches negatively impacted by obstructions

Percent of airports that have full perimeter wildlife fencing

Percent of airports that have adopted appropriate land use controls

Percent of NPIAS airports that meet current FAA design standards under AC 150/5300-13A



## PM: Appropriate Land Use Controls

Percent of Airports by Classification that have Adopted Appropriate Land Use Controls and Height Controls

	2018 Performance			
Airport Classification	Land Use Controls	Height Controls		
Commercial Service (14)	71%	64%		
GA-National (2)	100%	100%		
GA-Regional (5)	100%	100%		
GA-Local (19)	74%	68%		
GA-Community (16)	50%	50%		
GA-Rural (10)	20%	10%		
System-wide (66)	62%	58%		





#### Land Use/Height Control Needs

- Land use/height control needs at 28 airports
- Recommendations/Options:
  - Airports to initiate/continue conversations with local zoning authority(ies)
  - Utilize resources from ACRP and others on zoning and land use compatibility
  - Statewide land use study or other action?







#### Performance Measures



#### Performance Measures

Percent of airports with a dedicated snow removal equipment (SRE) building

Percent of population within a 30-minute drive time of an all-weather runway

Percent of airports with adequate terminal capacity

Percent of airports with adequate transient hangar spaces



# PM: Dedicated Snow Removal Equipment (SRE) Building

Percent of Airports by Classification that have a Dedicated SRE Building - 2018 Performance/Future Performance Targets

Airport Classification	2018 Performance
Commercial Service (14)	64%
GA-National (2)	50%
GA-Regional (5)	60%
GA-Local (19)	53%
GA-Community (16)	38%
GA-Rural (10)	0%
System-wide (66)	44%



#### No target established:

- GA-Community (16)
- GA-Rural (10)



### **SRE Building Needs**

- SRE building needs at 17 airports
- Recommendations/Options:
  - Airports plan for new SRE buildings
  - Statewide SRE building action?





#### Performance Measures



#### Performance Measures

Percent of airports with necessary fuel type, available 24/7

Percent of airports that support the aerospace manufacturing, technology, and/or testing industry

Percent of airports with adequate utilities



#### PM: Adequate Utilities

## Percent of Airports by Classification that have Adequate Utilities - 2018 Performance/Future Performance Targets

Airport Classification	2018 Performance
Commercial Service (14)	64%
GA-National (2)	100%
GA-Regional (5)	100%
GA-Local (19)	53%
GA-Community (16)	50%
GA-Rural (10)	10%
System-wide (66)	53%



#### No target established:

GA-Rural (10)



#### Adequate Utilities Needs

- Utility needs at 22 airports
- Recommendations/Options:
  - Airports plan for new additional utilities
  - Statewide utilities action?





#### Performance Measures



#### Performance Measures

Percent of airports with certified on-site weather reporting (AWOS or ASOS)

Percent of airports with pavement maintenance programs

Percent of airports with an average runway and taxiway Pavement Condition Index (PCI) of 70 or greater



#### PM: Pavement Maintenance Programs

#### Percent of Airports by Classification that have Pavement Maintenance Programs - 2018 Performance/Future Performance Targets

Airport Classification	2018 Performance
Commercial Service (14)	86%
GA-National (2)	100%
GA-Regional (5)	100%
GA-Local (19)	74%
GA-Community (16)	50%
GA-Rural (10)*	10%
System-wide (66)	64%



Three GA-Rural airports are unpaved



#### Pavement Maintenance Program Needs

- PMP needs at 24 airports
- Recommendations/Options:
  - Airport to adopt a PMP





# PM: Average Runway and/or Taxiway PCI of 70 or greater

Percent of Airports by Classification that have an Average Runway and/or Taxiway PCI of 70 or Greater - 2018 Performance/Future Performance Targets

Airport Classification	2018 Performance
Commercial Service (14)	86%
GA-National (2)	100%
GA-Regional (5)	100%
GA-Local (19)	74%
GA-Community (16)	50%
<b>GA-Rural (10)*</b>	10%
System-wide (66)	64%





#### **PCI** Needs

- PCI Needs at 31 airports
- Recommendations/Options:
  - Continue statewide PCI program





## FSOs Analysis

## Needs Based on Meeting Facility and Service Objectives

Associated City: Fort Collins/Loveland
Airport Name: Northern Colorado Regional

FAA Identifier: F

2020 CASP Classification: Commercial Service

2020 CASP Classification:	Commercial Service					
Objective Category	Commercial Service Objectve	Cur	rrent (	Condition		Meets 2020 Objective?
	Ai	rfield				
ARC	C-III/C-II		C	-III		Yes
Runway Length	Align with Master Plan	8,500 fe	et (9,50	00 - 10,000 feet)		No
Runway Width	150 feet/100 feet		100	feet		Yes
Runway Strength	60,000 pounds	50,000 lbs SW,	65,000	lbs DW; 130,000 lb	s 2D	Yes
Taxiway	Full parallel		Full p	arallel	1	Yes
Runway Markings	Precision		Prec	ision		Yes
	Lighting	/NAVAIDS				
Approach	Precision		Prec	ision		Yes
Visual Aids	ALS, rotating beacon, lighted wind cone, REILs, VGSIs	MALSR, rotating b		lighted wind cone, iSIs	, REILs,	Yes
Runway Lighting	HIRL or MIRL		Н	IRL		Yes
Weather Reporting	On-site ASOS or AWOS		AWO	S-3PT		Yes
70 CO		t Facilities				
Terminal (CS and/or GA)	Acceptable ratio of terminal square footage and commercial apron for passenger enplanements and commercial operations	Minimum required terminal square footage:	15,000 sq ft	Terminal building square footage:	4,020 sq ft	No
Apron Tie-Downs	Tie-downs for 20% of based aircraft fleet plus 50% of weekly average overnight transient storage during peak season	20% of based aircraft fleet plus 50% transient aircraft fleet:	54	Total tie-down spaces:	46	No
	Hangars for 80% of based aircraft fleet and 50% of weekly	80% of based aircraft fleet:	204	Number of based aircraft hangar spaces:	212	2557
Hangars	average overnight transient storage	50% of transient aircraft fleet:	3	Number of transient aircraft hangar spaces:	2 No	No
Dedicated Maintenance/SRE Storage Building	Yes	Yes		Yes		
Electric Vehicle Charging Stations	Yes	Yes		Yes		
Perimeter Security	Full perimeter fencing with security gates and appropriate signage	Full perimeter fencing with security gates and appropriate signage		Yes		
	Servic	es/Other				
Jet A Fuel	Full service	Full service		Yes		
AvGas Fuel	Full service	Full service		Yes		
Aircraft De-icing	De-icing facilities including fluid collection	De-icing facilities without fluid collection		No		
Courtesy Car	Yes	Yes		Yes		
Sustainability Plan	Yes	No		No		
	Minimums	for All Airports				
Restroom (24-hr accessible)	Cell Phone Service	Airport Layout Plan (ALP)		Wi-Fi Service		



## Demand-Driven Needs



#### Airport Dimensional/Design Standard Needs

Airport	Current ARC	ARC Need
Colorado Springs	C-IV	D-IV
Mineral County	B-I	B-II
North Fork Valley	A-I	A-II
Haxtun	A-I	B-II

#### Recommendations/Options:

Evaluate ARCs through a master plan or ALP



### Operational Demand/Capacity

Airport	2018 % ASV	2038 % ASV
Denver International	81.4%	123.4%
Northern Colorado Regional	56.2%	89.0%
Centennial	64.9%	112.0%
Rocky Mountain Metro	60.1%	85.3%
Greeley-Weld County	47.6%	67.9%

#### Recommendations/Options:

- Regional demand/capacity study
- Other?



# PM: Adequate Commercial Service Terminal Capacity

Percent of Airports by Classification with Adequate Terminal Capacity (Commercial Service) - 2018 Performance/Future Performance Targets

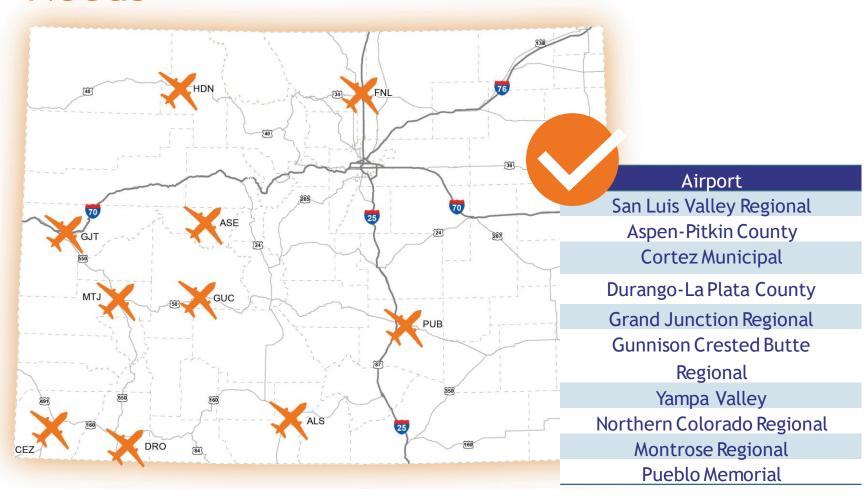
Airport Classification 2018 Performance

Commercial Service (14) 64%





## Commercial Service Terminal Building Needs





# PM: Adequate General Aviation Terminal Capacity

Percent of Airports by Classification with Adequate Terminal Capacity (General Aviation) - 2018 Performance/Future Performance Targets

Airport Classification	2018 Performance
Commercial Service (14)	72%
GA-National (2)	100%
GA-Regional (5)	40%
GA-Local (19)	79%
GA-Community (16)	50%
<b>GA-Rural (10)*</b>	10%
System-wide (66)	58%





# General Aviation Terminal Building Needs (expansion or new-build)

- Terminal building needs at 25 airports in 2018
- Terminal building needs at 31 airports by 2038
- Recommendations/Options:
  - Re-allocate more state funds to GA terminal buildings?



#### PM: Adequate Transient Hangar Spaces

## Percent of Airports by Classification that have Adequate Transient Hangar Spaces - 2018 Performance/Future Performance Targets

Airport Classification	2018 Performance
Commercial Service (14)	50%
GA-National (2)	0%
GA-Regional (5)	20%
GA-Local (19)	42%
GA-Community (16)	100%
<b>GA-Rural (10)*</b>	0%
System-wide (66)	44%



#### No target established:

- GA-Community (16)
- GA-Rural (10)



# Number of Airports with Hangar and Tie-Down Needs (Existing and Future)

Year	Hangars for Based Aircraft	Hangars for Transient Aircraft	Apron-Tie downs
2018	7	24	28
2038	13	25	32



#### Additional System Needs

- Address taxiway geometry issues at 40+ airports (but not an immediate need)
- Runway extension needs at 30+ airports
- IAP needs at 10+ airports
- Visual Aid needs (REIL, ALS, rotating beacon, lighted wind cone, and/or VGSI) at 20 airports





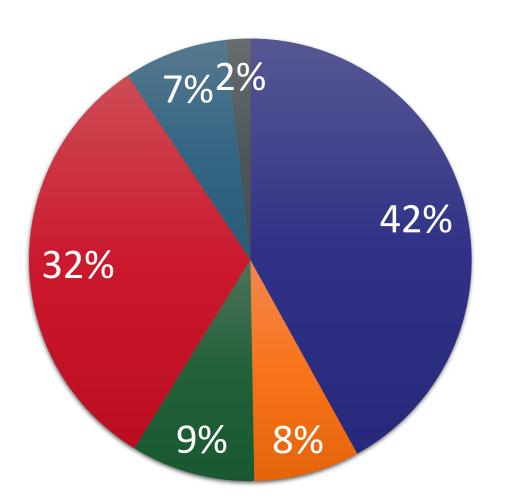


#### **Cost Estimate Process**

- CDOT Programmed CIP
- Developed needs based on PMs and FSOs
  - Compared CDOT CIP and removed duplicates
  - Identified duplication between PM and FSO projects
  - Not all PMs and FSOs have project costs (e.g., taxiway geometries)
- Planning-level unit costs based on airport classifications
- Useful for CDOT planning and programming purposes



## System Financial Needs by Classification\*



## \$2.5 Billion

- **■** Commercial Service
- GA-National
- GA-Regional
- GA-Local
- **■** GA-Community
- GA-Rural



#### **DEN Needs**

- Concourses A, B, and C \$1.8 B
- Jeppesen Terminal \$1.1 B
- Airside \$300 M (does not include 7<sup>th</sup> runway)
- Landside \$200 M
- DEN Real Estate \$100 M
- \$3.5 Billion (DEN)
- \$2.5 Billion (other airports)
- \$6.0 Billion (Total System)



#### Overlapping PMs and FSOs

- Fencing (Wildlife vs. Security)
- SRE Buildings
- GA Terminals
- Transient Hangars







#### PAC Highest Priority Trends/Issues

- Technology (automation)
- Labor





- Mountain airports (seasonal needs, aging terminals, runway length)
- Population growth
- Economic changes
- Land use compatibility/encroachment





## Alternatives (What-if? Could-we?)









- Took note of issues identified in PAC 1
- Aviation-related
  - GA fleet mix changes/electric aircraft
  - UAM/UAS Growth
  - Changes in Commercial Air Service



- Non-aviation-related
  - Population changes
  - Transportation changes
  - Economic changes (climate change, aerospace industry)



#### What if?... Could we?...

#### What if...

electric aircraft usage is limited by the availability of charging stations and electricity supplies in Colorado?



#### Could We...

implement a competitive state grant program to help fund this critical infrastructure and develop partnerships with private industry to increase renewable energy generation in rural areas?

#### What if...

What if existing educational programs in Colorado could integrate UAM operations knowledge into their courses?

#### Could We...

train a new sector of aviation professionals that have the expertise to develop, maintain, and pilot UAM technologies?







#### **CEIS Tech Memos**

- TM #1: Data Collection Process
- TM #2: Economic Impact Methodology
- TM #3: Tax Revenue Analysis
- TM #4: Economic Role of Air Cargo in Colorado
- TM #5: Colorado's Agricultural Sector and Airports
- TM #6: Summary of Economic Impact Results



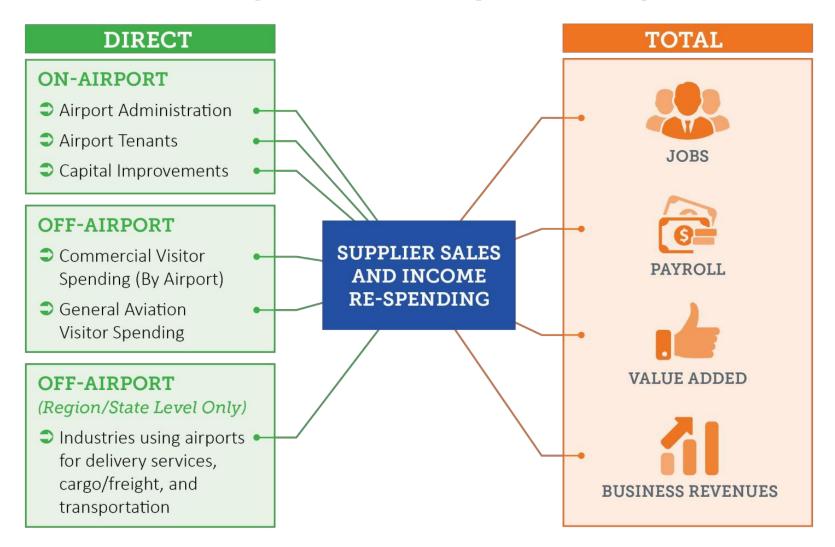
#### Outreach to Airports throughout CEIS

- Data collection in late 2018/early 2019
- Airport webinar in February 2019
- Confirmation of direct impacts May 2019
- Tenant employment confirmation (via CAOA June 2019 conference in Greeley)
- CDOT/KH telephone correspondence with airports on an individual basis





#### **Calculating Total Airport Impacts**





#### Aviation Activities Subject to Taxes

**Fuel Sales On-Airport Activities Rental Cars** Retail Restaurants Services

Construction

**Retail Sales** Visitors Lodging Food and Beverage **Entertainment** Recreation **Local Transportation** 

Airport Employees Administration **On-Airport Businesses** Construction **Visitor Support Businesses** Off-Airport Air Cargo



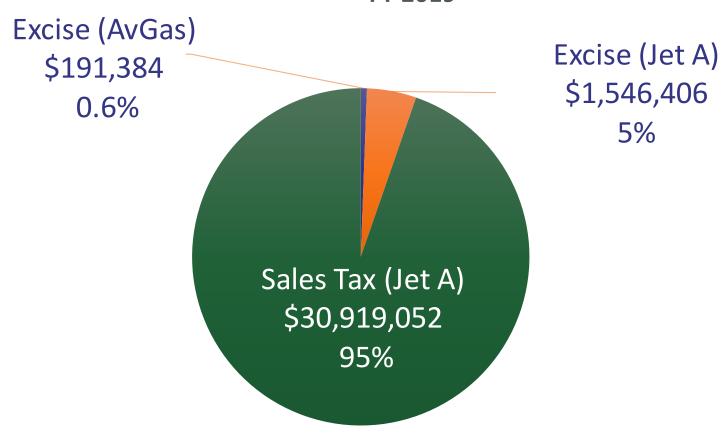
#### Summary of Tax Impacts

- Total Sales and State Income Taxes \$1.8 Billion
  - Sales Taxes \$1.6 Billion
  - State Income Taxes \$168.8 Million
- Airport Contributions to Sales and Income Taxes
  - Denver International \$1.5 Billion
  - Other Commercial Service Airports \$216 Million
  - GA Airports \$52 Million
  - Off-Airport Cargo \$30 Million
- Key Contributors to State and Local Sales Taxes
  - Off-Airport Visitors \$1.1 Billion
  - Airport Tenants \$287 Million
  - Employees Supporting Aviation Activities \$233 Million
- Aviation Fuel Taxes \$32.7M in FY 2019



#### Aviation Fuel Taxes-\$32.7 Million

FY 2019



■ Excise (AvGas) ■ Excise (Jet A) ■ Sales Tax (Jet A)



# Total Statewide Off-Airport Cargo Impacts

 Documents the off-airport activities that are supported by air cargo services at CO airports

Impact Category	Jobs	Payroll	Value Added	Business Revenues
Direct	6,079	\$672.0M	\$1.2B	\$2.7B
Supplier Sales	3,493	\$293.7M	\$462.5M	\$809.1M
Income Re-spending	4,988	\$248.4M	\$524.7M	\$881.5M
Total	14,560	\$1.2B	\$2.2B	\$4.4B

Source: EBP, IMPLAN 2017



### **Agricultural Impacts**

Total Contribution of Aerial Application to the Colorado Economy (2018\$)

Impact Category	Jobs	Payroll	Value Added	Business Revenues
Direct	1,630	\$52.3M	\$77.6M	\$431.5M
Supplier Sales	2,470	\$113.8M	\$176.2M	\$284.6M
Income Re-spending	1,040	\$50.4M	\$91.7M	\$156.7M
Total	5,140	\$216.6M	\$345.6M	\$872.8M

Source: EBP, IMPLAN 2017



#### Drumroll....

And the TOTAL economic impact of Aviation in Colorado is...



# 548.6 BILLIONI



#### **TOTAL** Statewide Aviation Impacts

345,661



\$16.2 BILLION



\$27.0 BILLION



\$48.6 BILLION



**JOBS** 

**PAYROLL** 

VALUE ADDED BUSINESS REVENUES



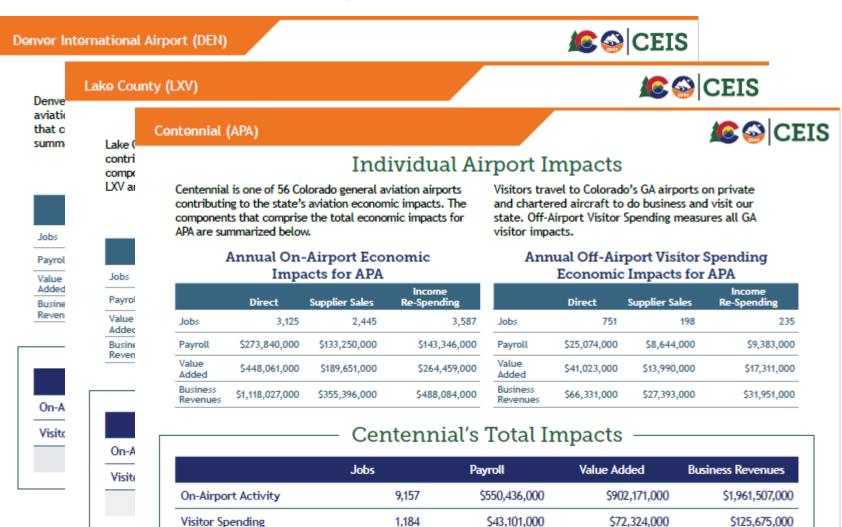
## Comparison of Study Results

	Data Year 2013	Data Year 2018	Change (#)	Change (%)	
Jobs	265,701	345,661	79,959	30%	
Payroll	\$12.6B	\$16.2B	\$3.6B	29%	
Value Added	N/A	\$27.0B	N/A	N/A	
Business Revenues	\$36.7B	\$48.6B	11.9B	32%	



#### Individual Airport Handouts

Total



10,341

\$593.54 Million

\$974.5 Million

\$2.1 Billion

Columns may not add due to rounding.







#### Remaining Documentation

- CASP Full Technical Report
- CEIS Full Technical Report
- CASP Executive Summary Brochure
- CEIS Executive Summary Brochure
- CASP/CEIS Individual Airport Brochures
- Videos









## Documentation Exercise

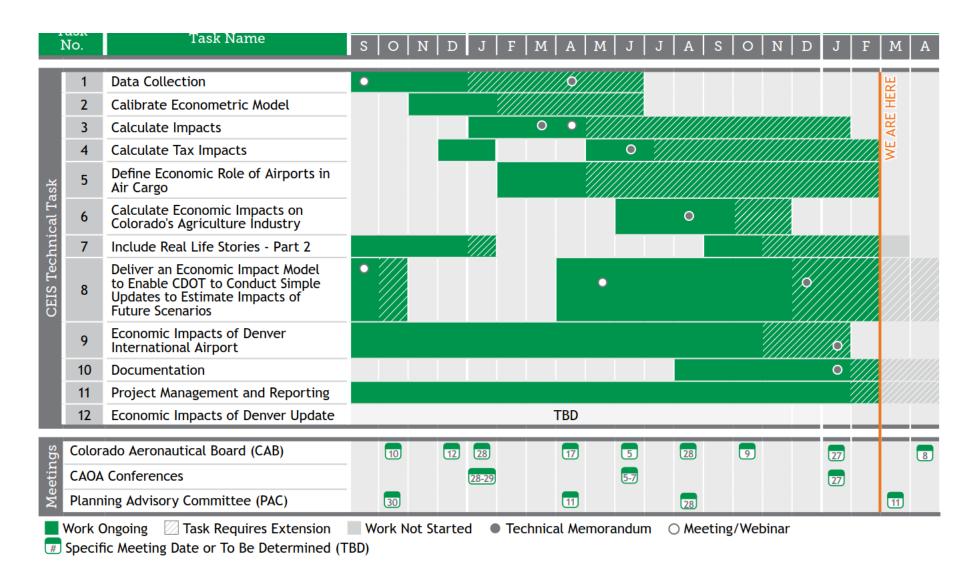






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No.	Task Name	s o	Ир	J	F M	A M	] J  ,	J A	s o i	1 D J	F M
1	Scoping - Study Design										
2	Project Management and Consultant Team Coordination										
3	Public Consultation and Project Advisory Committee (PAC)										
4	Establish Study Design and Goals		<b>\</b>								
5	Inventory of System Condition				1///						
6 7 8 9 10 10 11 11 11 11 11 11 11 11 11 11 11	Review Existing NPIAS Airport Roles/Classifications										
7	System Performance			П							
8	Develop Aviation Forecasts										<u>E</u>
9	Explore Aviation Issues and Identify System Needs						<b>\langle</b>				皇
10	Review of Intermodal Integration and Airport Access										ARE
11	Review of Environmental Considerations										WE,
12	Analysis of System Alternatives									<b>%</b> ////	
13	Develop System-Wide Cost Estimate and Implementation Plan										
14	Data Management, Evaluation, and Reporting - Non-Federal						1	TBD			
15	Include Real Life Stories Part I - Non-Federal										
16	Deliverables										
Col	orado Aeronautical Board (CAB)	10	12	28		17	5	28	9	11 27	
CAC	DA Conferences			28-29			5-7		٠	27	
Plai	nning Advisory Committee	30				11		28			11
CDC	OT Modal Manager (Modal)				13						
Reg	ional Planning Organizations (RPO)			25							
Eme	ergency Service Providers (ESP)			9							
	Ongoing  Task Requires Extension Work Not Started cific Meeting Date or To Be Determined (TBD)	Chapte	er <	> Whi	te Pa	oer/Co	ntent	to be I	ncluded	in Chapte	er







#### Next Steps

#### CASP

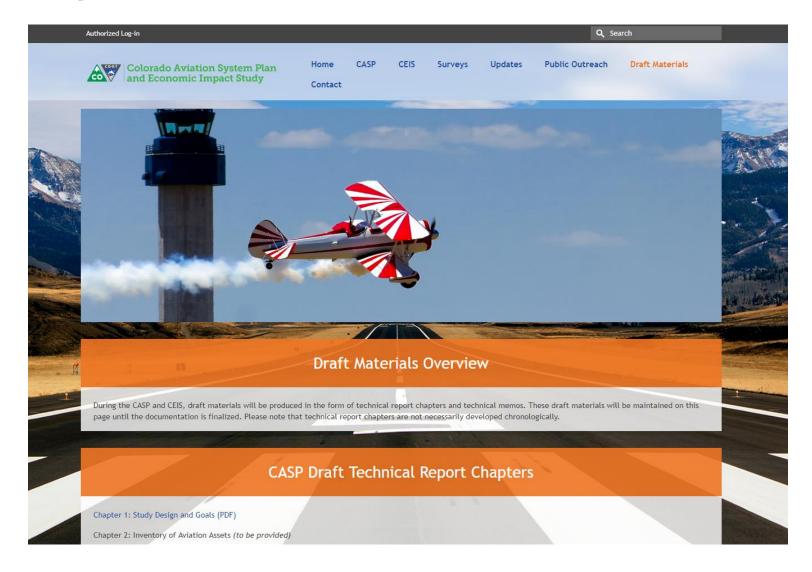
- Send Alternatives Analysis to PAC
- Finalize System Needs (projects and policies)
- Draft final technical report/executive summary brochure
- Individual airport reports (combined CASP/CEIS)

#### CEIS

- Complete documentation of "real life story" interviews and case studies
- Finalize technical report
- Draft executive summary brochure
- Draft PPT presentation of CEIS findings
- Draft Dynamic Calculator tool and User's Guide



## **Project Website**





# Thank YOU!





## Questions?

Thank you for your participation!

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