Chapter 1. Study Design and Goals

1.1. Introduction

Colorado—known for its Rocky Mountains, world-class skiing, endless outdoor adventures, and many other unique activities and industries—is also home to over 65 publicly owned airports that support tourism, emergency response, manufacturing, shipping, and more. Whether these airports are used to reach a ski resort on vacation or remote communities in need of healthcare services, Colorado's system of airports provide access to, from, and within the Centennial State.

Providing a safe, efficient, and effective statewide aviation system is the core mission of the Colorado Department of Transportation (CDOT) Division of Aeronautics. The CDOT Division of Aeronautics undertakes several planning initiatives to maintain and enhance the state network of airports and establish a vision for aviation in Colorado. The CDOT Division of Aeronautics has been a pioneer in efforts to provide a safe, efficient, and sustainable air transportation system through innovative projects, such as the Colorado Airport Sustainability Program and the CDOT Division of Aeronautics' *2018 Strategic Plan*. As evidenced in these plans, the CDOT Division of Aeronautics recognizes the importance of planning in providing a prosperous future for aviation in the state.

A key plan historically used by the CDOT Division of Aeronautics to identify and prioritize aviation facility and service needs was the *2011 Colorado Aviation System Plan (CASP)*. In late 2018, the CDOT Division of Aeronautics embarked on a wholesale update to their 2011 CASP to reflect changes in the aviation industry, activity levels, facility needs, and more. Most importantly, this system plan update (2020 CASP) provides a fresh outlook on aviation in Colorado, including an overhaul of the goals previously guiding system development.

To complement the findings of the 2020 CASP, an economic impact study was conducted to realize the value of aviation activity in the state. The 2020 Colorado Aviation Economic Impact Study (CEIS) replaces the CDOT Division of Aeronautics' previous *2013 Economic Impact Study for Colorado Airports* and highlights the change in impact over time.

1.2. Study Process

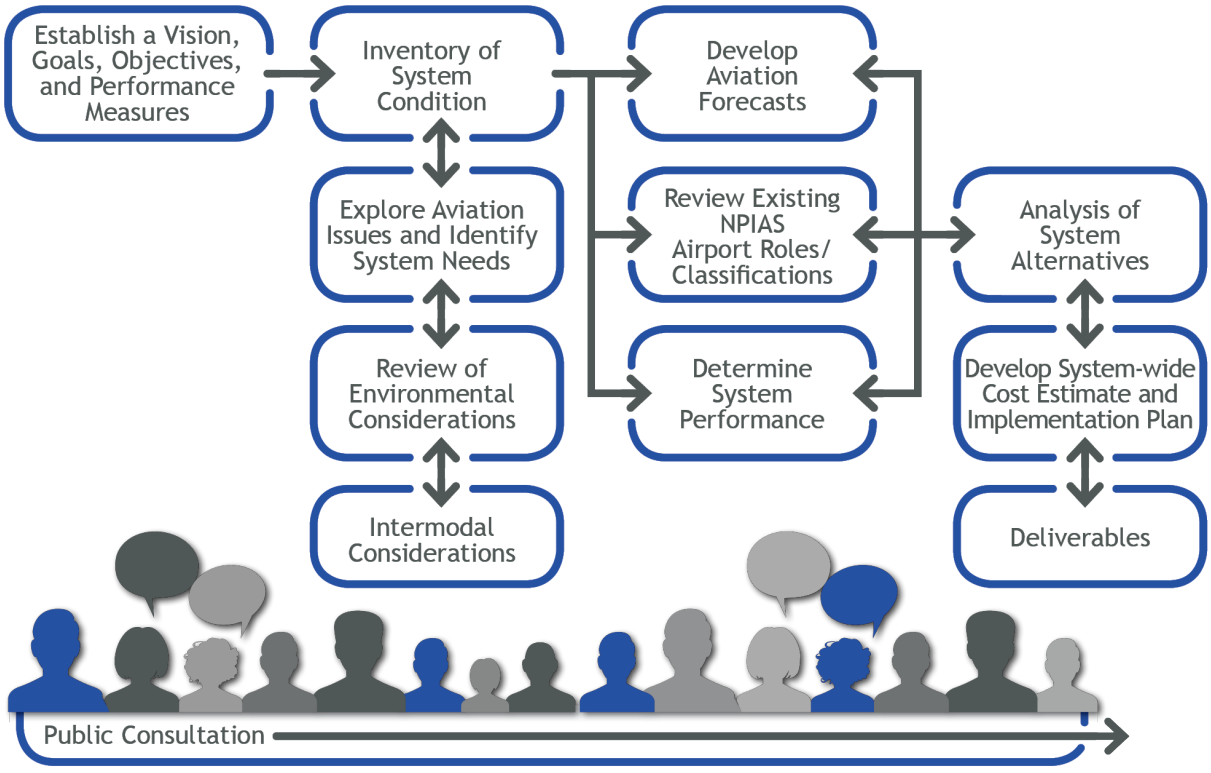
System plans are developed at the state-level but are typically guided by the Federal Aviation Administration (FAA) through Advisory Circular (AC) 150-5070-7, Change 1, *The Airport System Planning Process*. The FAA uses state aviation system plans at the federal-level to inform the national aviation system plan, known as the National Plan of Integrated Airport Systems (NPIAS). Many states also have publicly owned airports that are not included in the NPIAS but are important to their state systems as they accommodate aviation demand. These non-NPIAS airports are also included in many state aviation system plans, including the 2020 CASP. States and the FAA use system planning results to guide decision-making and distribute resources to develop a network of airports consistent with existing and future needs. This process is primarily achieved by coordinating the NPIAS with the federal Airports Capital Improvement Program (ACIP), which applies a systematic process for identifying, prioritizing, and assigning funds to those projects most critical for the National Airspace System (NAS).

Generally, system plans include the following non-sequential components:

- Establish System Goals and Measures
- Explore Aviation Issues
- Inventory System Assets
- Forecast System Demand
- Define Airport Roles
- Evaluate System Performance
- Identify System Needs
- Consider System Alternatives
- Recommend System Changes, Development, Funding, and Policy
- Identify Implementation Plan

The latest update to the AC calls for additional analyses, including evaluating airport needs relative to multimodal planning, and considering environmental conditions as a part of system plans. Each of these analyses were included in developing the 2020 CASP, as shown in **Figure 1.1**.

Figure 1.1. 2020 CASP Study Process



Source: Kimley-Horn, 2018

1.3. Goal Considerations

Core to developing a system plan is establishing goals and measurable actions to achieve those goals; this is the first step in system plan development. These goals determine measurement of the system's performance and ultimately the recommendations that result when a system plan is completed (which are then incorporated at the federal-level in the NPIAS, where appropriate).

To help guide the development of the 2020 CASP goals, a review of existing resources including the *2011 CASP*, the current Statewide Transportation Plan 2040 (*Transportation Matters [SWP 2040]*), the CDOT Division of Aeronautics' *2018 Strategic Plan*, and other state system plans was conducted. Additionally, feedback and suggestions for system goals were provided by members of the 2020 CASP Planning Advisory Committee (PAC) who represent Colorado's numerous aviation system stakeholders.

1.3.1. 2011 CASP

The 2011 CASP goals were reviewed at the onset of the study. Through discussion with the CDOT Division of Aeronautics staff, it was determined that new goals and measures were needed to achieve CDOT's vision for Colorado aviation and therefore the goals and measures from the 2011 CASP—which were carried forward from the 2005 plan—will not be used in the 2020 CASP.

1.3.2. CDOT Statewide Transportation Plan 2040, *Transportation Matters*

Coordinating and integrating state aviation system plans with other modal transportation plans has become increasingly important. The FAA has highlighted this importance in its 2015 update to AC 150-5070-7, Change 1, *The Airport System Planning Process*, suggesting additional emphasis be placed on the input and inclusion of intermodal transportation planning. According to the AC, an airport should be viewed as an element of the larger transportation system that serves a community, metropolitan area, or state.

CDOT regularly updates the Statewide Transportation Plan that considers all modes of transportation in Colorado. Previous versions of the CASP utilized goals established in the early 2000s, which do not align with the larger Statewide Transportation Plan. A key desire of the CDOT Division of Aeronautics was to align the goals of the 2020 CASP with the goals and measures of CDOT's latest SWP 2040. This multimodal plan utilizes four goals for the statewide transportation system: Safety, Mobility, Economic Vitality, and Maintaining the System. The plan also identifies objectives (descriptions of how goals will be achieved or the outcome of the goals) and performance measures (quantitative benchmarks used to calculate progress). **Table 1.1** presents the goals, objectives, and performance measures as reported in SWP 2040.

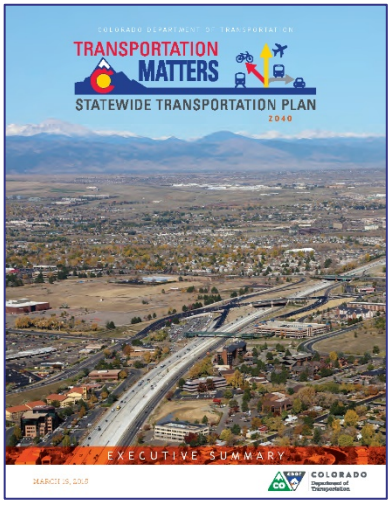


Table 1.1. Goals, Objectives, and Performance Measures from SWP 2040

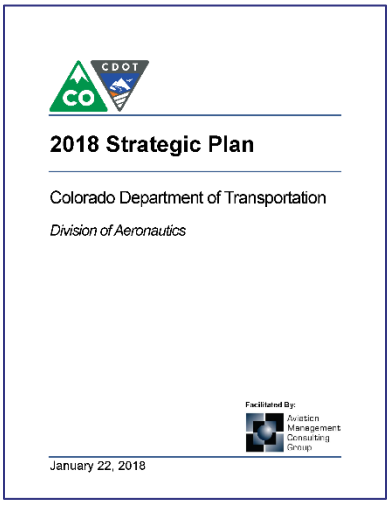
Goals, Objectives, and Performance Measures from STP 2040			
Goals	**Objectives**		**Performance Measures**
Safety: Move Colorado toward zero deaths by reducing traffic-related deaths and serious injuries.	*Fatalities and Serious Injuries*	Reduce the number and rate of all transportation fatalities and serious injuries, economic impact of crashes, and the number of bicyclist and pedestrian fatalities and serious injuries.	Number of fatalities
			Fatalities per vehicle miles traveled (VMT)
			Number of serious injuries
			Serious injuries per VMT
			Economic impact of crashes
			Number of bicyclist and pedestrian fatalities involving motorized vehicles
			Number of bicyclist and pedestrian serious injuries involving motorized vehicles
Mobility: Improve mobility and connectivity with a focus on operations and transportation choice.	*Highways*	Prevent the spread of congestion to uncongested highway segments and the growth of congested highway segments.	Planning Time Index – Additional time required above the time needed at free-flow speed to ensure on-time arrival • Interstates • National Highway System • Colorado Freight Corridors
	Transit	Increase ridership of small urban and rural transit agencies: maintain or increase the total number of miles of regional, interregional, and inter-city passenger services operated for the general public.	Transit Utilization – Ridership statewide and by subcategory: small urban and rural
			Transit Connectivity – Miles transit vehicles are available to general public
	Bicycle and Pedestrian	Develop data and resources to identify level of service measures provided by bicycle and pedestrian facilities.	Under development – obtaining data
Economic Vitality: Improve the competitive-ness of the state economy through strategic transportation investments.	*Freight and Economic Growth*	Support strategies and operational improvements that facilitate multimodal freight movement and promote state, regional, and local economic goals.	Under development – obtaining economic, road/rail, and freight data
	Job Access	Ensure transportation system provides access to jobs within reasonable commute times.	Under development – obtaining economic, road/rail, and freight data

Goals, Objectives, and Performance Measures from STP 2040			
Goals	**Objectives**		**Performance Measures**
Maintaining the System: Preserve and maintain the existing transportation system.	*Assets*	Maintain the condition of bridges; highway pavement; other assets (buildings, ITS, roadway equipment, culverts, geohazard sites, tunnels, traffic signals, and walls); and rural transit fleet vehicles.	Condition of National Highway System bridges and pavement condition, including Interstates
			Condition of bridges and pavement on State Highway System
			Condition of other assets
	Annual Maintenance	Maintain snow and ice removal performance and overall maintenance of the highway system.	Level of service for snow and ice removal
			Overall maintenance level of service achieved for the highway system
	Transit	Maintain the percentage of rural Colorado transit fleet vehicles operating in at least fair condition. Require all CDOT transit grantees to have Asset Management Plans by 2017.	Transit asset condition

Source: CDOT Statewide Transportation Plan 2040, Transportation Matters, 2015

1.3.3. CDOT Division of Aeronautics 2018 Strategic Plan

In addition to the SWP 2040, the CDOT Division of Aeronautics' mission and vision statements from the *2018 Strategic Plan* were reviewed for consideration in developing 2020 CASP goals and associated measures. Acknowledging these statements in developing the CASP goals provides a direct link between what the CDOT Division of Aeronautics is trying to achieve as an agency with how the state aviation system is evaluated and the system's performance is measured.



Mission Statement: The mission of the CDOT Division of Aeronautics is to *support Colorado's multimodal transportation system by advancing a safe, efficient, and effective statewide air and space system through collaboration, investment, and advocacy.*

Vision Statement: The vision of the CDOT Division of Aeronautics is to *be the leading state aviation organization by enhancing the efficiency, economic benefit, and sustainability of Colorado's air and space system through funding, innovation, education, and pioneering initiatives.*

1.3.4. Other State System Plans

System plans from a variety of states were analyzed to understand various methods of goal development and identify measures that might also be applicable to the state of Colorado. Plans from Idaho, Iowa, Arizona, Washington, South Dakota, Florida, and New Mexico were gathered to represent a

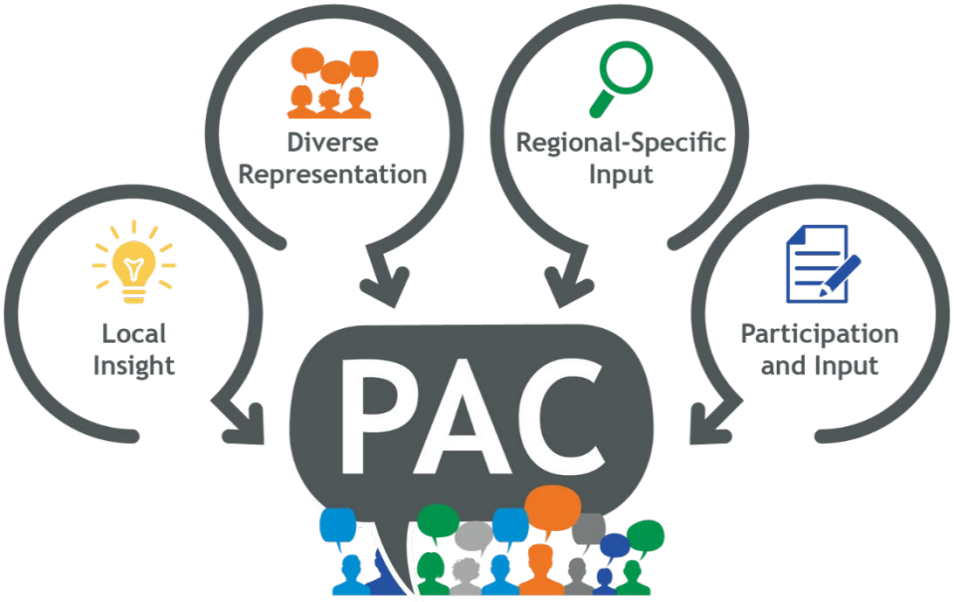
cross section of goal and measurement development strategies. Several of the performance measures were found to be appropriate to Colorado and were considered during the process.

1.3.5. Planning Advisory Committee

The 2020 CASP was guided by a PAC assembled by the CDOT Division of Aeronautics at the beginning of the study. This committee was engaged at every stage of the study process to provide important guidance and regional-specific insight into the future of aviation in Colorado. The PAC was composed of stakeholders from across the state with a broad range of knowledge and experience in airports, aviation, and other statewide issues impacting the airport system, as illustrated in **Figure 1.2**. The PAC includes representatives from the following types of organizations:

- Federal and state agencies (FAA, CDOT Division of Transportation Development, and CDOT Division of Aeronautics)
- Colorado Aeronautical Board (CAB)
- Airports, including general aviation (GA) and commercial service facilities
- Colorado Airport Operators Association (CAOA)

Figure 1.2. 2020 CASP PAC Role



Source: Kimley-Horn, 2018

Preliminary goals and measures identified through the CDOT Division of Aeronautics' review of existing resources were presented to the PAC for their feedback. An interactive exercise was conducted to gauge PAC members' support of each preliminary goal and measure and to solicit additional ideas for others that should be considered.

1.4. CASP Goals and Measures

After extensive review and consideration of existing resources and input from the PAC, a total of four goals, 14 performance measures, and 17 system indicators were established for the 2020 CASP. The following definitions describe the differences between each measurement type:

- **Goals:** Provide direction for desired results for the state system in key result areas and serve as a starting point for defining objectives and performance-related metrics
- **Objectives:** Descriptions of how goals will be achieved or the outcomes of the goals
- **Performance Measures (PMs):** Directly relate to measuring the system's performance in meeting the goals
- **System Indicators (SIs):** Informational analyses that inform and indirectly relate to the system's performance

It is especially important to understand the differences between PMs and SIs. PMs are measurements for which the CDOT Division of Aeronautics has some level of influence or control over. SIs are "informational" and indicate progress but may not be influenced by actions of the CDOT Division of Aeronautics.

Each of the four goals (illustrated in **Figure 1.3**) and associated measures and indicators are described in the following pages.

Figure 1.3. 2020 CASP Goals

Source: Kimley-Horn, 2018

1.4.1. Goal: Safety and Efficiency

*Advance Colorado's airport system by promoting and preserving **safe and efficient** facilities, on and off airports.*

Providing safe facilities and operating environments for the users of Colorado's aviation system helps preserve their continued operation and enhance community relations. **Table 1.2** outlines the Safety and Efficiency goal, PMs, SIs, and associated relevancy.

Table 1.2. Safety and Efficiency Goal, Performance Measures, and System Indicators

Goal		Performance Measures and System Indicators		Relevancy
Safety and Efficiency	Advance Colorado's airport system by promoting and preserving **safe and efficient** facilities, on and off airports.	Performance Measures	Percent of airports with approaches negatively impacted by obstructions	Promotes the safety of pilots, passengers, and public in and around the airport environs
			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	
		System Indicators	Percent of airports with adequate crosswind coverage	Promotes the safety of pilots, passengers, and public in and around the airport environs
			Percent of airports that meet runway length requirements for existing critical aircraft	
			Percent of airports that have a formalized program for receiving, managing, and responding to on-/near-airport Unmanned Aircraft Systems (UAS) use requests	
			Percent of airports with the level of activities to warrant an Air Traffic Control Tower (ATCT)	
			Percent of communities with emergency responders that have basic training in Aircraft Rescue and Fire Fighting (ARFF)	Provides critical ground-based services to people and aircraft in emergency situations
			Percent of airports that support aerial firefighting	Supports critical rapid-response aerial firefighting activities across the state
			Percent of airports that support medical emergency/evacuation aircraft	

Source: Kimley-Horn, 2018

1.4.2. Goal: Access and Mobility

*Provide Colorado's airports with infrastructure and sufficient capacity enabling the public adequate **access and mobility** utilizing the aviation system.*

Providing reasonable access to facilities and services that can accommodate demand helps promote air mobility across the state and beyond. **Table 1.3** outlines the Access and Mobility goal, performance measures, system indicators, and associated relevancy.

Table 1.3. Access and Mobility Goal, Performance Measures, and System Indicators

Goal		Performance Measures and System Indicators		Relevancy
Access and Mobility	Provide Colorado's airports with infrastructure and sufficient capacity to **access** the versatile aviation activities and facilities in the state and provide adequate **mobility** for users.	Performance Measures	Percent of airports with a dedicated snow removal equipment (SRE) building	Extends the life of airport assets that are critical to an operational airport
			Percent of population within a 30-minute drive time of an all-weather runway	Provides airport accessibility during inclement weather conditions, especially for emergency response/transport
			Percent of airports with adequate terminal capacity	Supports airport user throughput, both airside and landside
			Percent of airports with adequate transient hangar spaces	Supports transient aircraft overnight parking
		System Indicators	Percent of airports that provide ground transportation (courtesy car or other)	Provides transportation services to transient airport users
			Percent of population within a 30-minute drive time of a system airport	Supports access to airports deemed significant by the CDOT Division of Aeronautics
			Percent of airports providing access to remote and rural communities	Provides a gateway to remote communities, especially in emergency situations

Source: Kimley-Horn, 2018

1.4.3. Goal: Economic Sustainability

*Support **sustainable economic** growth and development and continue Colorado's existing status as a leader in technology, testing, and the aerospace industry.*

Equipping airports with the facilities and services to support business use of Colorado's aviation system will help expand the economic impact of Colorado airports. **Table 1.4** outlines the Economic Sustainability goal, performance measures, system indicators, and associated relevancy.

Table 1.4. Economic Sustainability Goal, Performance Measures, and System Indicators

Goal		Performance Measures and System Indicators		Relevancy
Economic Sustainability	Support **sustainable economic** growth and development and continue Colorado's existing status as a leader in technology, testing, and the aerospace industry.	Performance Measures	Percent of airports with necessary fuel type, available 24/7	Indicates demand and revenue generation at an airport
			Percent of airports that support the aerospace manufacturing, technology, and/or testing industry	
			Percent of airports with adequate utilities	Facilitates aviation and non-aviation development at an airport
		System Indicators	Percent of airports with active development partnerships with chambers of commerce, tourism bureaus, organizations, industries, governments, and recreational user groups	Demonstrates the airport is advancing business opportunities and developing partnerships
			Percent of airports with business parks or landside real estate development	
			Percent of airports recognized in local and/or regional comprehensive plans	Protects the airport from encroachment and indicates a relationship with the community
			Percent of airports that support aerial agricultural application	Supports the agriculture industry

Source: Kimley-Horn, 2018

1.4.4. Goal: System Viability

*Preserve airport **system** assets to promote fiscal responsibility and **sustainable**, cost-effective investments to ensure the system's long-term viability.*

Supporting projects that preserve infrastructure and further environmental and operational viability will help save limited resources. **Table 1.5** outlines the System Viability goal, performance measures, system indicators, and associated relevancy.

Table 1.5. System Viability Goal, Performance Measures, and System Indicators

Goal		Performance Measures and System Indicators		Relevancy
System Viability	Preserve, maintain, and enhance airport **system** assets through cost-effective investments to ensure the system's long-term viability.	Performance Measures	Percent of airports with certified on-site weather reporting (AWOS or ASOS)	Provides weather reporting information to pilots in a state that experiences dynamic weather conditions
			Percent of airports with pavement maintenance programs	Demonstrates responsible use of funds by devoting resources to extend the life of airport pavements
			Percent of airports with an average runway and taxiway Pavement Condition Index (PCI) of 70 or greater	
		System Indicators	Percent of airports that support aviation educational programs	Promotes aviation in the state and develops the next generation of aviation and aerospace professionals
			Percent of airports with a sustainability plan	Provides guidance on sustainable actions to reduce environmental impacts, promote stable economic growth, and achieve social progress
			Number of Colorado pilots per capita	Indicates Colorado's relationship to the national commercial pilot shortage

Source: Kimley-Horn, 2018

1.5. Summary

The goals, measures, and indicators presented in **Table 1.2** through **Table 1.5** form the foundation of the 2020 CASP. All subsequent tasks in developing the 2020 CASP are based upon the direction provided by these measures. Specifically, these measures and indicators are used to inventory system condition, calculate performance, identify successes and shortfalls, develop recommendations, and prioritize system needs.