DOÑA ANA COUNTY
INTERNATIONAL JETPORT

AIR CARGO STUDY UPDATE
TECHNICAL REPORT

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Bohannan Huston

Doña Ana County International Jetport – Air Cargo Study Update

Prepared for:

Doña Ana County and the Doña Ana County International Jetport (DNA)

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Prepared by:

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1 Introduction

Doña Ana County International Jetport (Jetport or DNA) completed a research project to identify the Jetport's potential to attract air cargo activity and to understand facilities that are desirable to satisfy identified demand. This report documents research that was completed in conjunction with the project. A key focus of this study is to determine the Jetport's potential to function as an air cargo airport to serve the El Paso Metropolitan Statistical Area and the larger El Paso-Juárez "Borderplex." The Borderplex is one of the world's largest border communities with a population of over 2.7 million people. The area is also a major center for manufacturing and international trade. The Santa Teresa Port of Entry (POE), existing rail lines and an intermodal rail facility, along with area industrial parks all support growing economic development in the Borderplex. Southern Doña Ana County is characterized by sustained economic growth that currently supports nearly 6,000 jobs and more than $1.1 billion in annual local economic impact, according to a 2021 study completed by New Mexico State University.

The Jetport completed a similar air cargo assessment study in 2016. Since the 2016 air cargo study was completed, the Jetport has invested approximately $9 million to upgrade its existing 9,550-foot by 100-foot runway, Runway 10-28. Upgrades include the replacement of runway lighting system and runway pavement strengthening to accommodate larger aircraft weighing up to 94,000-pounds. These improvements and investment will help the Jetport realize its air cargo potential. As this report documents, the level of interest in using the Jetport for air cargo service remains strong. One of the users that has a high potential to use air cargo service at the Jetport is Foxconn. Its two million square foot plant is located just over the border in San Jerónimo, Mexico. Manufacturers of electronics often rely on air cargo. Foxconn is a major electronics manufacturer that assembles 90 percent of all HP and Dell PCs, laptops, and servers sold in the U.S. Flying as opposed to trucking goods/materials from Los Angeles would increase Foxconn's logistic efficiency, decreasing transport time from days to only a couple of hours. As this study discovered, there are other nearby manufacturers that could benefit from air cargo service at the Jetport.

The State of New Mexico recently announced $64 million in infrastructure investment to further economic development in the Borderplex. This investment includes $20 million specifically earmarked for the Jetport to accomplish projects to accommodate heavier air cargo aircraft. Results from this project will enable Doña Ana County to identify the best course of action to maximize the potential for the Jetport to attract and support air cargo service. The overarching goal of this study is to establish a plan for the Jetport that promotes air cargo related development. Specific study objectives include:

- Evaluate potential demand for air cargo services at the Jetport
- Determine/validate the critical cargo aircraft and its operational requirements
- Determine airport air cargo facilities required to support potential air cargo activity at the Jetport

In addition to addressing short term needs for the Jetport's existing facilities, as they relate to serving air cargo demand, longer term needs are also considered. Spatial and access requirements for future air cargo development, to ensure comprehensive and thoughtful planning, are also part of the study. For the longer term, the development of a new Runway 3-21 is examined in the study. This Technical Report provides a wealth of information on the air cargo industry, the Jetport's market area, existing air cargo activity in the region, potential air cargo demand for the Jetport, and facilities that are desirable to support air cargo activity. The report is organized to provide information on each of the following topics:

- An overview of the air cargo industry which includes information on the various types of air cargo operators and the wide range of aircraft they use to carry cargo

- A discussion of the various types and locations of airports that currently serve air cargo activity.
- Information on trends in air cargo, both globally and in the U.S.
- Data on the types of commodities and businesses that typically rely on air cargo for moving raw material and finished goods.
- Documentation of facilities that are in place at the Jetport.
- A review of the Jetport's market area including demographics, nearby areas of manufacturing, and locational and infrastructure assets.
- Information on other airports in the region that currently serve air cargo demand, including their levels of demand and air cargo facilities.
- Projections of potential air cargo demand for the Jetport, including results from a survey of potential users.
- Identification of facilities needed to meet anticipated air cargo demand at the Jetport and recommendations for desired development.

A summary of the highlights from the study follows. Detailed results from the research and investigation that supported this study follow the project summary.

2 Overview of the Air Cargo Industry

An important step in air cargo facility planning is educating stakeholders on various aspects that characterize the movement of goods by air. To set a framework for this study, it is important to provide a multifaceted understanding of the air cargo industry. This understanding includes providing background information on:

- Air cargo operators
- Key players and stakeholders in the air cargo industry
- Global and U.S. trends in the air cargo industry
- Air cargo commodities

The air cargo industry provides shippers and consignees (the recipients of cargo) significant advantages in both the speed and reliability of shipments, but at a much higher cost. Air cargo demand is generated when there is a need for expeditious transportation of materials and goods between two points. In the business world, logistics managers must justify the cost of air cargo as their preferred mode of transport, as opposed to shipping by road, rail, or water. Several factors influence the decision to transport materials via air, including:

- Cost of transporting the material
- Level of service commitment to the customer or end-user
- Value of the material
- Time-sensitivity of the material

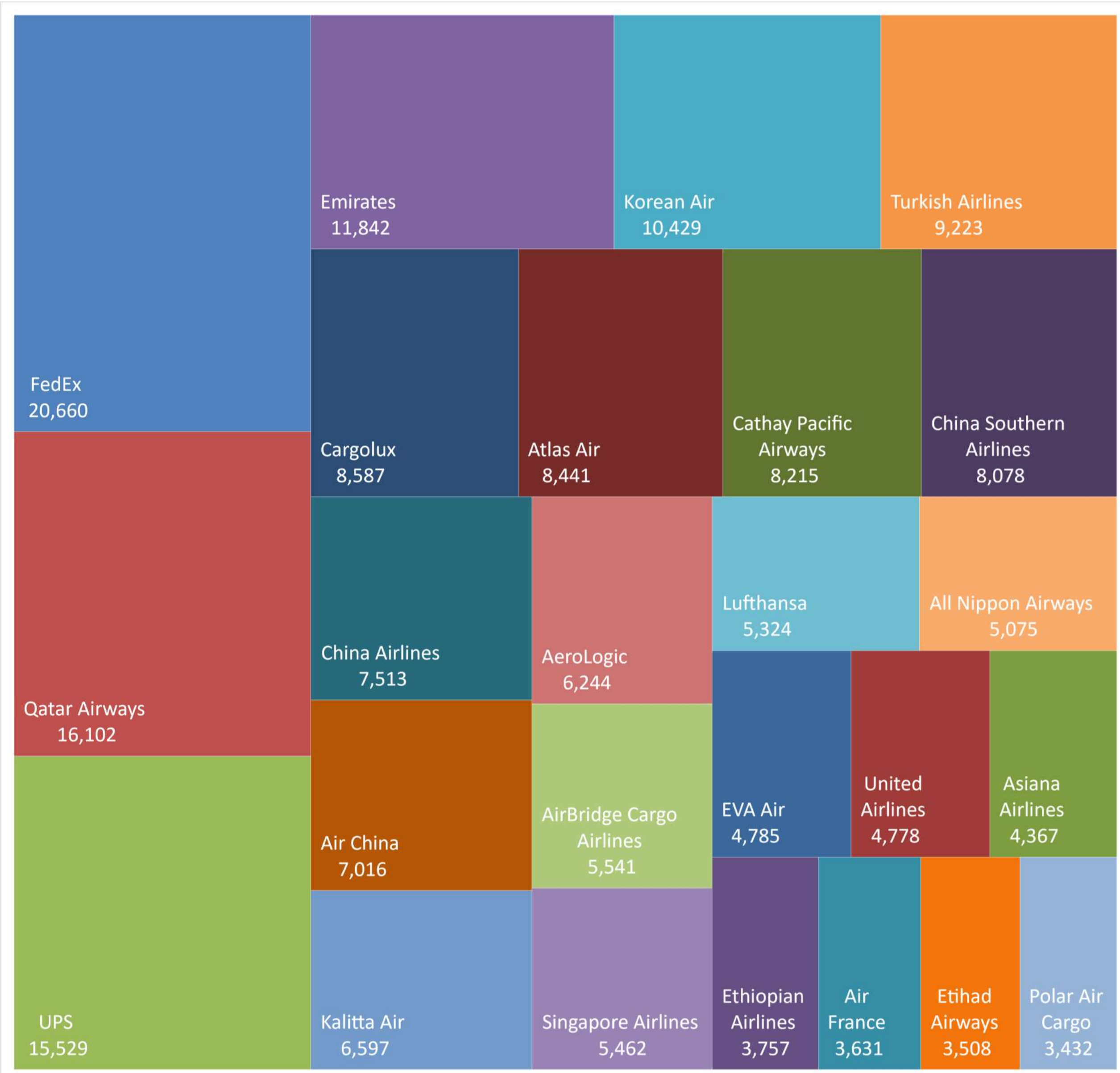
This section of the study is divided into the following sections:

- Air cargo carriers
- Common aircraft supporting the air cargo industry
- Airports supporting the air cargo industry
- Global air cargo trends
- Domestic air cargo trends
- Air cargo commodities

2.1 Air Cargo Carriers

Air cargo is defined by the Federal Aviation Administration (FAA) as express parcels, freight, and mail moved on aircraft. Air cargo is transported in the baggage compartment, or belly, of passenger aircraft or on all-cargo aircraft, sometimes called freighters. Air cargo falls either into the international or domestic category, depending on its point of origin or destination. The various types of carriers involved in the movement of air cargo are discussed in the following sections. **Figure 2-1** presents the world's top 25 largest air cargo carriers in 2021 by scheduled freight-ton-kilometers.

Figure 2-1: Top 25 Global Air Cargo Carriers in 2021 by Scheduled Freight-Ton-Kilometers (Metric Tons)



Source: IATA's World Air Transport Statistics 2021, Jviation

2.1.1 Passenger Airlines

Air cargo services provided by passenger airlines vary in scope and size from airline to airline, generally based on the type of aircraft operating within the airline's fleet. Passenger airlines provide airport-to-airport service, with freight and mail carried as "belly" cargo. While airlines provide cargo service, it is important to

note that passenger baggage has loading priority over mail and freight; this can, in some instances, delay air cargo transport.

Airlines operating wide-body passenger aircraft often have containerized lower decks capable of handling large volumes of cargo and baggage. Unit load devices (s), which include containers and flat pallets, are loaded through large cargo doors in the aircraft belly. The lower decks are fitted with rollers fastened to the deck of the aircraft so containers and pallets laden with freight and mail can be rolled on and off aircraft with relative ease. While wide-body passenger jets comprise the majority of transoceanic flights, a few legacy carriers, such as Delta Air Lines, American Airlines, and United Airlines, operate wide-body passenger jets on transcontinental domestic routes.

A regional airline with a fleet of narrow-body regional passenger jets typically cannot accommodate bulky cargo due to limited cargo capacity in their baggage compartments. If a carrier operating smaller gauge aircraft, such as a regional jet, does not have the capacity to accommodate cargo, the station manager may choose to break the cargo into smaller shipments or arrange for truck transport to the air carrier's hub where larger gauge aircraft can accommodate the cargo.

Freight transported on passenger airlines is often dropped off at a warehouse at or near the origination airport by the shipper (or their agent such as an air forwarder). After arriving on the passenger airline, the freight is then picked up at the destination airport by the customer (or air forwarder).

The COVID-19 pandemic caused numerous passenger airlines to use aircraft for cargo-only flights (earning the moniker of "preighter" flights). With the significant downturn in passenger travel as a result of the pandemic, some airlines found themselves with surplus aircraft. Using passenger aircraft enabled the shipment of vital medical supplies and kept many passenger aircraft (that would have otherwise been grounded) earning vital revenue. In these instances, cargo was loaded into both the belly compartment of the aircraft as well as the main deck, where it was placed into passenger seats and overhead compartments. In some cases, airlines chose to remove passenger seats from aircraft to accommodate larger volumes of cargo. In this scenario, the cargo loading and unloading process is very labor-intensive.

2.1.2 Combination Carriers

A limited number of carriers have both passenger and freighter aircraft in their operational fleets; they are considered "combination carriers." These carriers include Emirates, Lufthansa, and many Asian airlines. In the U.S., only one carrier, Alaska Airlines, operates both passenger aircraft and freighter aircraft. Korean Air Cargo, Asiana Cargo, Cathay Pacific Cargo, China Airlines Cargo, Eva Air Cargo, Lufthansa Cargo, Qatar Airways Cargo, and Turkish Airlines Cargo are other prominent examples of combination carriers. Combination carriers typically operate in two areas on an airport, at the passenger terminal and in the air cargo complex.

2.1.3 Integrated Express

Integrated express operators, sometimes referred to as "integrators," move customer goods door-to-door, providing shipment, collection, transport (via aircraft/truck), delivery, and customs clearance functions for international shipments. Integrated express operators include FedEx Express, UPS, and DHL. DHL's U.S. domestic pickup and delivery services were discontinued in 2009 in favor of international shipments.

Figure 2-2 identifies U.S. integrated express hub airports for DHL, FedEx Express, and UPS. DHL's North America hub is located at Cincinnati/Northern Kentucky International Airport (CVG), while the primary hub for FedEx Express (known as the Super Hub) is located in Memphis, where the FedEx Corporation is headquartered. The UPS equivalent, dubbed Worldport, is located in Louisville, Kentucky. All cargo hubs are centered in the Midwest to facilitate the efficient north/south and east/west distribution of cargo.

Integrated express operators utilize a hub-and-spoke transport model, similar to some passenger airlines. An air cargo hub used for package sorting and aircraft transfer is the backbone of the integrated express model. The hub allows for connections to any market in the operator's system daily or even multiple times a day. Each day, flights from around North America (and the world) arrive at the hub, where packages are unloaded, sorted by destination market, and then loaded onto outbound aircraft. Integrated express carrier fleets include both wide-body and narrow-body freighter aircraft, many of which are passenger-to-cargo conversion aircraft.

Figure 2-2: Integrated Express Carrier Domestic Hub Airports

DHL	FedEx Express	UPS
	United States/Canada	
Cincinnati/Northern Kentucky International (CVG)	Memphis International (MEM)	Louisville International (SDF)
	Indianapolis International (IND)	Philadelphia International (PHL)
	Ontario International (ONT)	Ontario International (ONT)
	Newark Liberty International (EWR)	Dallas/Fort Worth International (DFW)
	Oakland International (OAK)	Chicago Rockford International (RFD)
	Ted Stevens Anchorage International (ANC)	Ted Stevens Anchorage International (ANC)
	Piedmont Triad International (GSO)	Columbia Metropolitan (CAE)
	Perot Field Fort Worth Alliance (AFW)	John C. Munro Hamilton International (YHM)
	Toronto Pearson International (YYZ)	
	Latin America/Caribbean	
Miami International (MIA)	Miami International (MIA)	Miami International (MIA)
Tocumen International (PTY)		
	Europe/Middle East/Africa	
Leipzig/Halle (LEJ)	Cologne/Bonn (CGN)	Cologne/Bonn (CGN)
East Midlands (EMA)	Liège (LGG)	East Midlands (EMA)
Milan Malpensa (MXP)	Milan Malpensa (MXP)	
Chennai International (MAA)	Paris Charles de Gaulle (CDG)	

DHL	FedEx Express	UPS
Bahrain International (BAH)	Dubai International (DXB)	
	Asia Pacific	
Hong Kong International (HKG)	Guangzhou Baiyun International (CAN)	Hong Kong International (HKG)
Bangalore Kempegowda International (BLR)	Osaka Kansai International (KIX)	Kuala Lumpur International (LIA)
	Seoul Incheon International (ICN)	Shenzen Bao'an International (SZX)
	Shanghai Pudong International (PVG)	Shanghai Pudong International (PVG)
	Singapore Changi (SIN)	

Source: Jviation

2.1.4 Regional Air Cargo Carriers

Regional air cargo carriers (Martinaire, Ameriflight, Alpine Air) use turboprop aircraft and/or small business jets to operate between local market stations and smaller, or more remote, cargo markets. These carriers typically operate in support of a larger integrated express cargo operator such as FedEx Express, UPS, or DHL. Alpine Air, Mountain Air Cargo, Wiggins Airways, Empire Airways, Martinaire, and Ameriflight are examples of contracted "feeder" airlines for both UPS and FedEx Express.

Feeder flights often transport cargo from a smaller market to an awaiting cargo jet bound for the carrier's hub. Feeder aircraft may also fly directly to a hub from a nearby smaller market. In addition, some regional air cargo carriers operate charter-only services with a fleet of cargo aircraft on an as-needed basis. These aircraft provide on-demand service to support a customer's immediate air cargo transport needs. For example, an automotive manufacturer who needs to transport critical automobile parts to an assembly plant may utilize on-demand air cargo service.

2.1.5 All-Cargo Carriers

All-cargo carriers exclusively operate scheduled airport-to-airport air cargo service for their customers; they do not offer passenger service or ground movement/forwarding of cargo shipments. In the U.S., these non-integrated carriers include Polar Air Cargo, Atlas Air, Kalitta Air, and several others. These carriers typically operate independently but may also partner with integrated express carriers by providing aircraft, crews, aircraft maintenance, and insurance (ACMI) contract services under the integrator brand. These arrangements can include both international and domestic routes.

2.1.6 Heavy Lift Cargo Freighters

Heavy lift cargo freighters are operated by charter cargo airlines like Volga-Dnepr Airlines and Antonov Airlines. These carriers provide specialized heavy-lift operations with fleets of Antonov An-124 aircraft. Limited numbers of these aircraft exist, as they are some of the largest aircraft in the world and specifically designed for strategic cargo airlift; therefore, operations by heavy lift cargo freighters are typically highly specialized ad hoc, or on demand, charter operators. These carriers transport goods and equipment for businesses and governments on an ad hoc basis. This type of cargo activity is commonly referred to as "outsized charter" or "project cargo" operations.

2.1.7 Specialty Cargo Carriers

Specialty cargo carriers support cargo operations for a specific industry or customer. These carriers may specialize in the transport of flowers, medical supplies and lab samples, or e-commerce. Some e-commerce retailers have sought to increase control of their supply chains through dedicated all cargo "own-controlled" freighter services. Amazon Air was the first, and two Chinese e-commerce giants, JD.com and Alibaba/Cainiao, are also investing heavily in this arena.

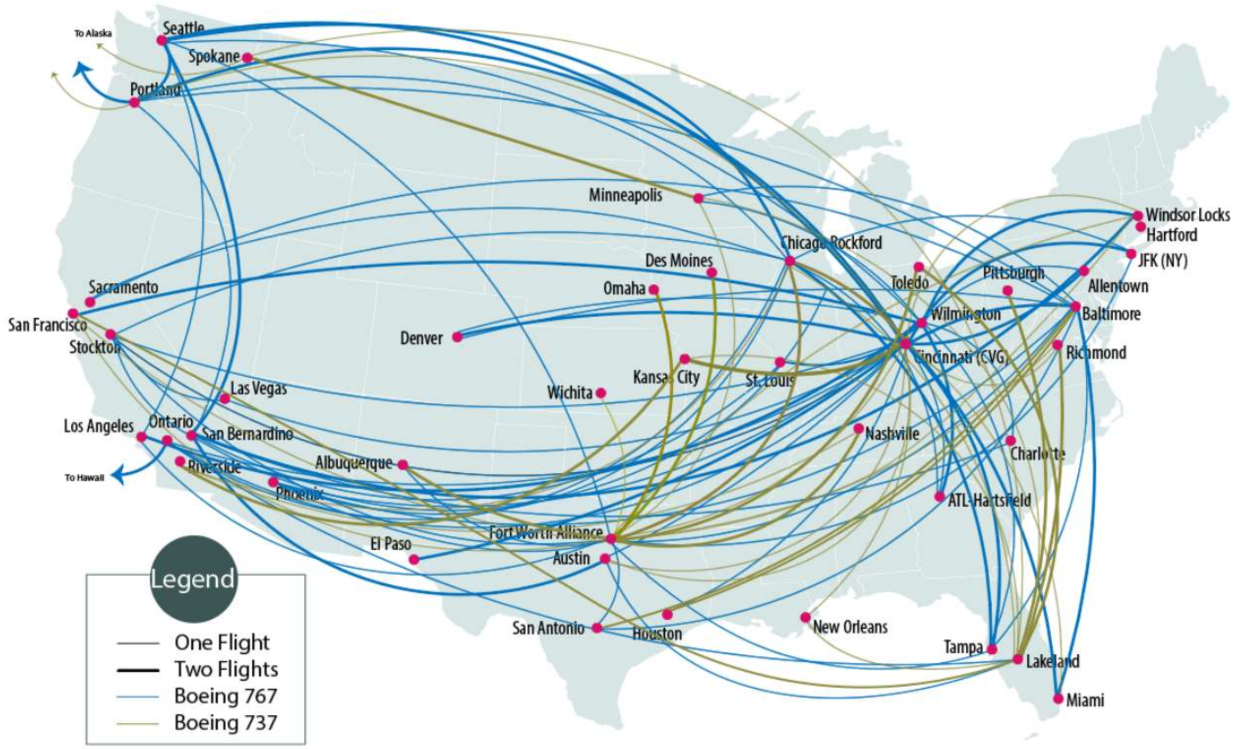
Amazon Air is a specialty cargo carrier operating own-controlled freighter operations exclusively to transport Amazon e-commerce packages and inventory between its fulfillment centers. In 2017, the carrier changed its name from Amazon Prime Air to Amazon Air to differentiate itself from the Amazon drone delivery service currently under development. Until January 2021, when it purchased used Boeing 767-300 passenger jets, the airline relied solely on ACMI services through other operators.

As of September 2022, Amazon Air's network included approximately 55 U.S. airports. This number is constantly evolving as in late 2022, Amazon started service at several new airports, including Albuquerque International Sunport (ABQ), and El Paso International (ELP), and Lihue Airport (LIH) in Hawaii[1]. The Amazon Air network consists of over 190 daily flights across approximately its airport network. This network positions the service within 100 miles of 73 percent of the U.S. population. Because of this, there is speculation that Amazon may enter the third-party shipping business (integrated express carrier service) in direct competition with FedEx Express and UPS. In fact, Amazon already offers fulfillment services to other retail business through its *Fulfillment by Amazon* service. This service could be expanded to become a more general third-party delivery service, but Amazon's current service is still a long way from offering next-day delivery service.[2] **Figure 2-3** identifies Amazon Air routes as of September 2022.

[1] https://sourcingjournal.com/topics/logistics/amazon-air-network-kentucky-hub-growth-depaul-chaddick-institute-374558/

[2] Chaddick Policy Brief | September 20, 2022

Figure 2-3: Amazon Air – U.S. Route Network (As of September 2022)



Source: Chaddick Institute for Metropolitan Development at DePaul University[3]

Quest Diagnostics, a medical diagnostic testing and information services company, has its own fleet of aircraft and is an example of another type of specialty air cargo carrier. They provide transport service for laboratory test samples, medical materials, radiopharmaceuticals, and related equipment. Their fleet is comprised of small business jets, turboprop, and piston-engine aircraft which are customized to carry time and temperature-sensitive items. Quest operates a maintenance base and a small hub and spoke network. LabCorp is another medical laboratory testing company operating its own fleet of cargo aircraft with missions similar to Quest Diagnostics.

2.1.8 Road Feeder Service (RFS) Airport-to-Airport

Road Feeder Service (RFS), or air expedited service, is offered by a scheduled air cargo operator; this service moves goods between two airports by truck to avoid the cost of air shipment, particularly when the airports are within a one-day driving distance. Road feeder service allows a carrier to offer services to a city that its aircraft do not serve. Cargo moved via this service is typically allocated an airline waybill number, although no aircraft may be involved in actual the transport. RFS providers operate scheduled “lanes.” For example, a truck may depart El Paso at noon each day for next morning arrival at DFW. **Figure 2-4** identifies the top six road feeder providers in the U.S. Like air freight forwarders, many of these entities likely operate in the El Paso-Juárez Borderplex region.

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[3] Chaddick Policy Brief | September 20, 2022

Figure 2-4: U.S. Top Six Road Feeder Service (RFS) Trucking Firms in 2022

Rank 2022	Company	Revenue (000)
1	Forward Air	$1,151,244
2	ArcBest	$359,900
3	Covenant Transport	$337,100
4	Magnate Worldwide	$73,000
5	Sameday Worldwide	$7,400
6	NFI	$5,000

Source: Transport Topics News, Top 100 Rankings, 2022 (https://www.ttnews.com/top100/air/2022), Jviation

2.1.9 Air Freight Forwarders

An air freight forwarder is an intermediary that arranges the best means of transport for goods, typically by accepting cargo from shippers and consolidating them into container loads. These loads are transferred by the air forwarder to a cargo carrier or passenger airline, which then delivers the load to an air forwarder agent or subsidiary at the destination airport. FedEx Express, UPS, and DHL often sell capacity to forwarders when space permits.

Air forwarders rely heavily on capacity provided by commercial passenger airlines, road feeder service providers (trucking companies), as well as all-cargo carriers. Air forwarders generally have facilities near major hub airports or large international gateway airports such as Chicago O'Hare International (ORD) and New York's John F. Kennedy International (JFK). Their facilities may be located on an airport, but they are often located off airport property. The largest international air forwarders are DHL Supply Chain & Global Forwarding, Kuehne + Nagel, DB Schenker, DSV Panalpina, and UPS Supply Chain Solutions. In the U.S., the largest forwarders are Expeditors, UPS Supply Chain Solutions, Crane Worldwide Logistics, C.H. Robinson, Pilot Freight Services, and FedEx Logistics. Many of these forwarders likely operate in the El Paso-Juárez Borderplex region.

The top 25 global air freight forwarders by annual metric tonnage are listed in **Figure 2-5**.

Figure 2-5: Top Global Air Freight Forwarders in 2021

Rank 2021	Provider	Home Country	Air (Metric Tons)
1	Kuehne + Nagel	Switzerland	2,220,000
2	DHL Supply Chain & Global Forwarding	Germany	2,096,000
3	DSV	Denmark	1,510,833
4	DB Schenker	Germany	1,438,000
5	Expeditors	USA	1,047,200
6	UPS Supply Chain Solutions	USA	988,880
7	Nippon Express	Japan	971,763
8	Allcargo Logistics	India	901,000
9	Sinotrans	China	804,000
10	Kintetsu World Express	Japan	728,534
11	Bolloré Logistics	France	656,000
12	Hellmann Worldwide Logistics	Germany	652,100

Rank 2021	Provider	Home Country	Air (Metric Tons)
13	Kerry Logistics	Hong Kong	520,415
14	AWOT Global Logistics Group	China	486,216
15	CEVA Logistics	France	474,000
16	CTS International Logistics	China	416,190
17	Yusen Logistics	Japan	410,000
18	DACHSER	Germany	365,000
19	GEODIS	France	346,667
20	Crane Worldwide Logistics	USA	337,300
21	C.H. Robinson	USA	300,000
22	NNR Global Logistics	Japan	288,837
23	Pilot Freight Services	USA	280,000
24	FedEx Logistics	USA	265,600
25	Dimerco Express Group	Taiwan	251,967

Source: Armstrong & Associates, Inc. estimates

Notably, some ocean shipping companies operate dedicated all cargo "own-controlled" aircraft freighter services. These services meet growing customer demand while creating more routing options and flexibility for customers looking to improve their time-critical supply chains. CMA CGM Air Cargo is the airline division of the French shipping container company, CMA CGM. This company was founded in 2021. It currently has a fleet of four Airbus A330 and two Boeing 777F aircraft, with four Airbus A350 freighters on order. CMA CGM operates out of hubs in Paris (CDG) and Liège (LGG) with service to Atlanta (ATL), Chicago (ORD), and Hong Kong (HKG).[4]

Maersk Air Cargo is the new in-house airline of Danish shipping giant A.P. Moller-Maersk, formed from Maersk's Star Air Cargo brand. Maersk Air Cargo operates 15 Boeing 767 freighters from hubs in Germany and England and has agreements to lease three more planes, in addition to an order for two new Boeing 777 freighters. They started service in October 2022 from Seoul (ICN) to Chicago Rockford (RFD) and Greenville-Spartanburg (GSP).[5] EVA Air Cargo and Nippon Cargo Airlines are two older all-cargo carriers that are owned by ocean shipping companies.

2.2 Common Aircraft Supporting the Air Cargo Industry

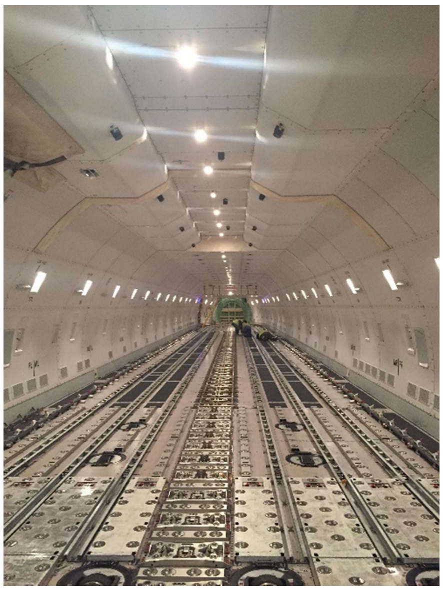
Three major types of aircraft serve as air freighters: wide-body jets, narrow-body jets, and narrow-body turboprop aircraft (these planes typically function as feeder aircraft for larger air cargo aircraft). A significant number of freighters in service today are converted passenger aircraft. Other freighters, particularly wide-body freighters, are manufactured by companies such as Boeing and Airbus. The converted passenger freighters tend to be significantly older, less fuel-efficient, and, given their age, more susceptible to maintenance problems than recently manufactured freighters.

Figure 2-6 lists common types of air cargo aircraft and their FAA Airport Reference Code (ARC) by grouping according to size. The FAA defines operational and physical characteristics of the most demanding aircraft that are expected to operate at an airport. This aircraft, referred to as the critical aircraft, is the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular

[4] CMA CGM Air Cargo website
[5] https://www.freightwaves.com/news/maersk-air-cargo-opens-us-base-with-south-korea-service-set-to-debut

use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing.[6]

The ARC has two components related to the critical aircraft: the aircraft approach category and the aircraft design group. The first component, the aircraft approach category (identified as A, B, C, or D) is based on the aircraft approach speed. The second component, the design group (identified with roman numerals) relates to the aircraft wingspan and/or tail height. Faster, wider cargo aircraft are listed at the top of **Figure 2-6**, while smaller, slower cargo aircraft are listed at the bottom. The ARC information by air cargo aircraft is presented to serve as a reference point in future portions of this study. DNA has an ARC of C-II; facility analysis completed later in this report will show how the current ARC is suited or perhaps not suited to the operational needs of the cargo aircraft shown in **Figure 2-6**.



In the U.S., wide-body freighter aircraft are used by integrated express carriers on both domestic and international routes, whereas all-cargo carriers use wide-body freighter aircraft primarily on international routes. Wide-body freighter aircraft can operate with payloads ranging from 80,000 to 234,000 pounds. Narrow-body jet aircraft are typically used for short-haul domestic routes, while feeder aircraft serve small market needs. Narrow-body aircraft payloads range from 18,000 pounds to 95,000 pounds. Feeder aircraft payloads can range from 2,000 to 10,000 pounds.

Upper decks on narrow-body aircraft accommodate containers or pallets with cargo packages contoured to fit in the aircraft fuselage. The aircraft's lower deck is bulk loaded—a process where individual pieces of freight are placed directly into the aircraft without the benefit of containers. Feeder aircraft are typically only bulk loaded. However, some newer, larger feeder aircraft such as the Cessna 408 SkyCourier and the ATR-72-600F are capable of handling containers.

Perhaps one of the most unique attributes of both wide-body and narrow-body aircraft is their ability to accommodate containers, such as unit load devices (ULD), also referred to as containers, and pallets, on their main decks. These aircraft have large doors and rollers fastened to their decks that allow containers and pallets, laden with freight and mail, to be rolled on and off aircraft either manually or mechanically.

Cargo aircraft are generally equipped with one large door on the port, or lefthand, side of the aircraft on the upper deck and two (baggage compartment) doors on the starboard, or righthand, side of the lower deck. Some cargo aircraft are loaded through an opening at the front of the aircraft, which is revealed when the nose of the aircraft is lifted. Cargo aircraft with nose-loading capabilities can accommodate large items that do not fit through side door openings.

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[6] FAA AC 150/5000-17 - Critical Aircraft and Regular Use Determination

Figure 2-6: Common Types of Air Cargo Aircraft by Size Group (Descending Order by Payload)

Aircraft Make and Model	Cargo Aircraft Type	Airport Reference Code (ARC) Design Group*	Approximate Cargo Payload (Pounds)**
Boeing 747-8F	Wide-Body	D-VI	246,400
Antonov An-124	Wide-Body	C-VI	211,680
Boeing 747-400F	Wide-Body	D-V	200,000
Boeing 777-8F	Wide-Body	D-IV	198,000
Airbus A350F***	Wide-Body	D-V	192,240
Boeing 777F	Wide-Body	D-V	184,000
McDonnell-Douglas MD-11F	Wide-Body	D-IV	144,000
Airbus A330P2F	Wide-Body	C-V	109,280
Airbus A330-200F	Wide-Body	C-V	107,600
Boeing 767-300F	Wide-Body	D-IV	92,000
Boeing 767-300BCF	Wide-Body	C-IV	91,200
Airbus A300-600F	Wide-Body	C-IV	84,000
McDonnell-Douglas MD-10F	Wide-Body	C-IV	80,000
Douglas DC-8-70	Wide-Body	C-IV	79,360
Boeing 767-200F	Wide-Body	C-IV	72,000
Airbus A310-200F	Wide-Body	C-IV	71,600
Airbus A310-300F	Wide-Body	C-IV	68,800
Boeing 757-200F	Narrow-Body	C-IV	56,000
Airbus A321P2F	Narrow-Body	C-IV	47,600
Boeing 727-200F	Narrow-Body	C-III	42,400
Boeing 737-800BCF	Narrow-Body	D-III	42,240
McDonnell-Douglas MD-80SF	Narrow-Body	C-III	36,800
Boeing 737-400F	Narrow-Body	C-III	36,000
Boeing 737-300F	Narrow-Body	C-III	34,000
Boeing 737-700F	Narrow-Body	C-III	32,000
Douglas DC-9	Narrow-Body	C-III	17,600
ATR 72-600F	Regional	B-III	14,462
Convair 580	Regional	B-III	12,000
ATR 42-300	Regional	B-II	9,488
DeHavilland Dash 8 Q200	Regional	A-III	7,120
Embraer EMB-120	Regional	B-II	6,000
Short SD3-60	Regional	B-II	5,643
Cessna 408 SkyCourier	Regional	B-II	4,800
Beechcraft BE1900	Regional	B-II	4,720
Fairchild Swearingen SA227 Metroliner	Regional	B-III	3,920
Cessna 208B Super Cargomaster	Regional	A-II	2,880
Beechcraft B99	Regional	A-II	2,880
Learjet LJ35	Regional	C-I	2,385
Pilatus PC12	Regional	A-II	2,000
Rockwell Commander 500	Regional	B-II	1,520

Aircraft Make and Model	Cargo Aircraft Type	Airport Reference Code (ARC) Design Group*	Approximate Cargo Payload (Pounds)**
Piper PA31	Regional	B-I	1,400

*Note: ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on an airport.

**Note: Assumes 80% of maximum aircraft payload due to "bulking out" by volume. Actual cargo payload may vary depending on aircraft operator

*** Note: Aircraft type not yet operational as of October 2022

Source: Manufacturer specifications (aircraft characteristic manuals), aircraft flight planning manuals, FAA Flight Records, Jviation, October 2022

Larger, heavier, wide-body aircraft require longer and wider runways due to their faster approach speeds and wingspans, while smaller, slower aircraft can operate on shorter and narrower runways. To identify an airport's required runway length, the FAA uses the operational and physical characteristics of the most demanding aircraft that operates or is expected to operate at each airport to determine the critical, or design, aircraft. An airport's design aircraft, also known as the critical aircraft, is determined by the largest aircraft to have at least a combined total of 500 takeoffs and landings annually. The critical aircraft establishes the airport's ARC (Airport Reference Code) and determining an airport's critical aircraft and ARC are part of the master planning process. The ARC has two components that relate to approach speed and aircraft wingspan and/or tail height. Individual runways have a Runway Design Code (RDC). This is the ARC of aircraft using the runway with the addition of a visibility component. More information on ARC is provided in the **Section 6.2**.

A snapshot of jet aircraft fleets for U.S.-based cargo airlines, not including regional feeder aircraft, is presented in **Figure 2-7**. As shown, there are over 1,000 U.S.-based jet freighter aircraft. Note this is not a comprehensive list of all U.S. cargo carriers, and numbers are subject to frequent change as cargo aircraft fleets are upgraded or modernized.

Figure 2-7: U.S.-Based Air Cargo Airline Jet Aircraft Fleet Mix

Freighter Aircraft Type	21 Air	ABX Air	Air Transport International (ATI)	Alaska Airlines	Aloha Air Cargo	Amazon Air	Amerijet International	Ameristar Jet Charter	Asia Pacific Airlines	Atlas Air	Everts Air Cargo	FedEx Express	USA Jet Airlines	Kalitta Air / Kalitta Charters	Mesa Airlines	Northern Air Cargo	Polar Air Cargo	Sun Country Airlines	Swift/iAero Airways	UPS Airlines
B737-200					6			1								2				
B737-300					4					1				3		3			1	
B737-400														6	3				2	
B737-500														1						
B737-700				3																
B737-800BCF						26				8					1	1		12	7	
B757-200			1				6		4			115								75
B767-200	3	12	7			12	6													
B767-300	4	8	33			54	11			26		121				4	4			8

Freighter Aircraft Type	21 Air	ABX Air	Air Transport International (ATI)	Alaska Airlines	Aloha Air Cargo	Amazon Air	Amerijet International	Ameristar Jet Charter	Asia Pacific Airlines	Atlas Air	Everts Air Cargo	FedEx Express	USA Jet Airlines	Kalitta Air / Kalitta Charters	Mesa Airlines	Northern Air Cargo	Polar Air Cargo	Sun Country Airlines	Swift/iAero Airways	UPS Airlines
A300-600RF												65								52
B777F										14		53		5			8			
DC-9													6							
MD-80											8		5							
MD-10-30F												6								
MD-11F												56								42
B747-400F										39							2			13
B747-8F										11							6			28
Sum*	**7**	**20**	**41**	**3**	**10**	**92**	**23**	**1**	**4**	**74**	**8**	**416**	**11**	**15**	**4**	**10**	**20**	**12**	**10**	**218**

*Note: This is not a comprehensive list of all U.S. cargo airlines. Aircraft fleets are constantly evolving; totals may include double counting as many carriers fly for others, i.e., Amazon aircraft are operated by multiple carriers such as ATI, Atlas Air, and ABX. ABX is owned by ATI and also flies for DHL.
Source: Carrier Websites, Press Releases, Jviation, October 2022

2.2.1 Integrated Express Carrier Aircraft Acquisition Plans

The aviation industry is constantly evolving and changing, and this includes the air cargo industry. Integrated express carriers sell time-definite shipping services to most addresses throughout the U.S. and over 200 countries. These door-to-door shipping services rely on large aircraft fleets and ground vehicles to move parcels between their vast networks of on- and off-airport facilities. Airports are the backbone of the hub-and-spoke model used to facilitate these services.

Pickup and delivery times are predicated on speed and distance. Although integrated express carriers have relatively mature networks, they are always seeking to optimize their route networks to provide improved service. In the simplest terms, this means locating facilities closest to the customer demand “center of gravity” to offer earlier delivery times in the morning and later pickup times in the evening. If the center of customer demand shifts or roadway congestion precludes acceptable pick up and drop off times for customers, network expansion presents one reasonable alternative for integrators to overcome these obstacles. Review of near-term acquisition plans shows that FedEx Express, UPS, and DHL all have plans to bring additional aircraft into their fleets.

FedEx Express

While FedEx Express operates a variety of mainline jets on trunk routes to and from their hub airports, they also operate various types of propeller-driven feeder aircraft out of smaller regional airports to supplement, or “feed,” their mainline aircraft. Two common feeder aircraft include the Cessna 208 and the ATR 42/72. The Cessna 208 is a single-engine turboprop aircraft, while both ATR models are larger twin-turboprop aircraft.

In addition to the 40 older model ATR 42 and 72 air cargo freighters in its global fleet, FedEx Express is also acquiring 30 new ATR 72-600F aircraft. This ATR variant is the only purpose-built air cargo freighter, and it was designed and developed with input from FedEx Express who is the launch customer for this plane. With an internal volume of 2,600 cubic feet, it is the first air cargo feeder freighter capable of carrying containers or palletized freight. This plane can accommodate up to five 88-inch by 108-inch pallets or seven ULD containers. It is designed for longer and heavier shipments; it has payload of around 15,000 pounds and a range of over 1,000 miles. The new ATR 72-600F will play an important role for FedEx Express in its network to deliver fast, economical service to small and medium sized markets. This aircraft will be used to serve markets that have insufficient volumes of air cargo to support a Boeing 757.[7] Images of the new ATR 72-600F in FedEx Express livery is presented in **Figure 2-8**.

Figure 2-8: ATR 72-600F

Source: FedEx Express Press Release, December 2020; ATR-Aircraft.com 2022

FedEx Express has also ordered 50, with an option for 50 more, of the new clean-sheet-design Cessna 408 SkyCourier aircraft. The SkyCourier is a twin-engine, high-wing turboprop capable of accommodating up to three ULD containers and a 5,000-pound payload. This is nearly twice the capacity by weight and volume of the Cessna 208; the Cessna 208 is currently the prominent feeder air cargo aircraft. The ability for the SkyCourier to handle pre-loaded containers, coupled with its large cargo door and a flat floor cabin, enables faster loading and unloading. This aircraft is suited to serve small and medium sized markets where loose/bulk loaded cargo is the norm. This aircraft has a range of 1,035 miles and a cruise speed of 230 miles per hour. At maximum takeoff weight (MTOW), this air cargo feeder aircraft has excellent short field performance and can operate on runways as short as 3,300 feet.[8] Renderings of the new SkyCourier in FedEx Express livery are presented in **Figure 2-9**.

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[7] https://simpleflying.com/atr-freighter-turboprop-maiden/
https://www.freightwaves.com/news/new-custom-built-atr-72-600-gives-fedex-more-cargo-capacity
https://www.flightglobal.com/airframers/fedex-takes-first-line-built-atr-72-600-freighter/141617.article
https://newsroom.fedex.com/newsroom/fedex-express-further-modernises-fleet-with-delivery-of-first-purpose-built-regional-atr-freighter/

[8] https://newsroom.fedex.com/newsroom/fedex-express-introduces-new-feeder-aircraft/
https://simpleflying.com/fedex-cessna408-skycourier-delivery/
https://www.freightwaves.com/news/textron-completes-1st-skycourier-feeder-freighter-for-fedex

Figure 2-9: Cessna 408 SkyCourier

Source: Textron Aviation, FedEx Express Press Release, November 2017

In total, FedEx Express has nearly 700 aircraft in its fleet, including feeders. Approximately 360 aircraft are mainline jets, and the remainder are turboprop feeder aircraft. Most of the small feeder aircraft are owned by FedEx Express and are leased to third-party carriers who operate under their own operating certificates. FedEx Express feeders use a dry lease program; in a dry lease, the contractor leases the aircraft from FedEx Express and provides a crew to operate the aircraft, solely for FedEx Express. All feeder aircraft operated in the U.S. are owned by FedEx Express and are painted with FedEx Express branding.

Single-engine Cessna 208 Caravans are considered the lifeblood of the FedEx Express feeder network. Coupled with the new ATR 72-600F and the Cessna 408 SkyCourier, FedEx Express is increasing its investment in turboprop feeder aircraft, while boosting capacity and generating efficiencies.

FedEx Express is also expanding its fleet of mainline jet cargo aircraft. They are investing in additional Boeing 767-300F and Boeing 777 freighters. These aircraft will be replacing their aging Airbus A300F, MD-10F, and MD-11F aircraft.

UPS

Similar to FedEx Express, UPS contracts with a number of feeder airlines to extend its service into smaller communities throughout its global network. Unlike FedEx Express, UPS does not own any turboprop, short haul aircraft; their aircraft are chartered from carriers such as Ameriflight, Martinaire, Air Cargo Carriers, Alpine Air, and Wiggins Airways. Since feeder aircraft are not owned by UPS, these aircraft most often do not have UPS branding. A large majority of the UPS feeder air cargo aircraft are Cessna 208 Caravans. Other types of feeder aircraft operated to support UPS operations include the Embraer EMB 120, the Beechcraft 1900, the Beechcraft 99, the Fairchild Swearingen SA-277 Metroliner, and the Short SD3-60.

In 2021, UPS announced plans to purchase the new Alia, which is an electric vertical takeoff and landing (eVTOL) aircraft. The Alia is manufactured by Beta Technologies, a Vermont-based eVTOL manufacturer that has secured 10 initial orders from UPS's Flight Forward program, with options for up to 150 more eVTOLs. The aircraft is expected to have a range of 250 miles and have a cargo payload of up to 7,500 pounds. This aircraft may operate as crewed or uncrewed.[9]

UPS plans to use the Alia as a Small Feeder Aircraft (SFAC) to support regional point-to-point cargo delivery. This aircraft will have the capability to take off and land on property at UPS facilities, creating a "micro air feeder network without the noise or operating emissions of traditional aircraft," according to Beta founder and CEO Kyle Clark.

UPS expects its new fleet to benefit healthcare providers, small and medium-sized businesses, and other companies in smaller communities. The aircraft is expected to fly either one long route or a series of short routes on a single battery charge. UPS will also use Beta's proprietary modular charging stations, which can recharge the aircraft in less than an hour. UPS also expects to use the charging stations for its growing fleet of electric ground vehicles. UPS is expected to take delivery of its first 10 aircraft in 2024.[10] **Figure 2-10** presents images of UPS Flight Forward initiatives, including the Beta Alia eVTOL, a Beta Technologies charging/landing station, and a last-mile delivery van helper UAS.

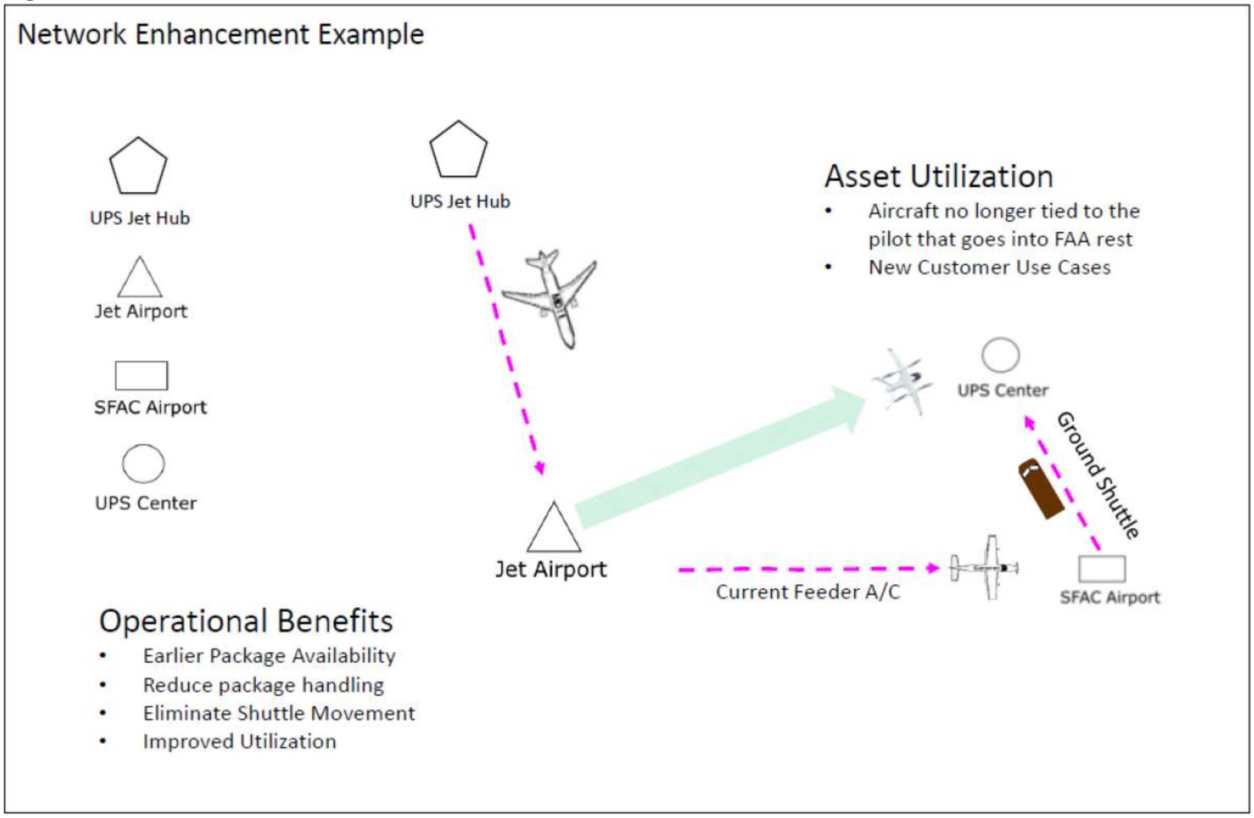
[9] https://about.ups.com/be/en/newsroom/press-releases/innovation-driven/ups-flight-forward-adds-new-aircraft.html
[10] https://evtol.com/news/beta-technologies-ups-deal-150-evtol-aircraft/

Figure 2-10: UPS Flight Forward Images

Top-Left: Beta Alia eVTOL; Bottom-Left: Beta Landing/Charging Station; Right: Last-Mile Delivery Helper UAS, Beta Alia eVTOL
Source: UPS Fight Forward, Beta Technologies, April 2021

New eVTOL aircraft technology, such as the Beta Alia eVTOL ordered by UPS, provides an opportunity to change the air cargo delivery model. As shown in **Figure 2-11**, new eVTOL aircraft could fly direct point-to-point flights from a jet hub airport to off-airport UPS facilities. This model could potentially eliminate small feeder aircraft (SFAC) routes from jet hub airports to SFAC airports and/or eliminate the need for ground vehicle transfers.

Figure 2-11: UPS Small Feeder Aircraft Network Enhancement



Source: UPS Flight Forward press release, April 2021

It is worth noting that UPS was the launch customer of the Boeing 767-300F, the production freighter version of the Boeing 767-300ER. This aircraft is seen as the future for the UPS jet air cargo fleet. With recent orders, UPS will have a total of 91 of these planes in its fleet.[11] In 2021, UPS began modernizing the avionics suite for its 52 Airbus A300s. This upgrade will allow UPS to fly the A300 for another 20 years.[12] UPS is also the largest operator of the Boeing 747-8F, having taken delivery of the 28th and final one of these planes in April 2022.[13] In total, UPS currently has 290 mainline jet aircraft in its fleet.

DHL

Like FedEx Express and UPS, DHL extends the reach of its network through the use of contracted feeder air cargo operators. In April 2022, it was announced that Suburban Air Freight was being acquired by Alpine Air Express. Alpine Air Express is a Utah-based feeder for FedEx Express, UPS, and the U.S. Postal Service and is one of the largest regional air cargo carriers in the U.S. Its acquisition of Suburban Air Freight will enable this carrier to begin flying for DHL Express to support that air cargo operator's domestic expansion efforts. Alpine Air operates a fleet of 85 different feeder

[11] https://www.freightwaves.com/news/ups-orders-19-extra-767-freighters-from-boeing
[12] https://about.ups.com/us/en/our-stories/innovation-driven/giving-airplanes-new-life-with-new-cockpits.html
[13] https://aeroxplorer.com/articles/ups-747-takes-delivery-of-final-747-marking-the-end-of-an-era.php

aircraft. Alpine Air is pursuing a growth strategy with the conversion of 25 Beechcraft 1900D passenger aircraft to dedicated cargo configurations. Alpine Air Express will likely add more Cessna Caravans to the fleet, which will also enable it to explore autonomous or remotely piloted aircraft using Xwing and Reliable Robotics flight control technology.[14]

In 2021, DHL announced an order for 12 all-electric aircraft called the Alice eCargo from Eviation. With deliveries anticipated in 2024, the Alice is a single pilot aircraft that has a 500-mile range, a 2,500-pound payload, a 250-miles-per-hour cruise speed, a 2,000-foot-per-minute climb rate, and a 32,000-foot service ceiling. It has forward and aft access doors for rapid loading and unloading of its 450-cubic-foot cargo hold. The cargo hold will be climate controlled to serve temperature-sensitive shipments such as pharmaceuticals. DHL anticipates using the Alice on routes where piston and turboprop aircraft are currently used, initially focusing operations in the Southeast and West Coast of the United States.[15] Images of the new Eviation Alice eCargo aircraft are presented in **Figure 2-12**.

Figure 2-12: Eviation Alice eCargo Aircraft in DHL Livery

Source: DHL press release, August 2021

At the larger end of the spectrum, DHL is investing in additional Boeing 767-300 and Boeing 777 freighters, having placed an order for nine converted 767s and six 777s in recent years.[16] DHL is also investing in converted Airbus freighters such as the wide-body A330-300 and narrow-body A321-200. In total, DHL operates over 260 dedicated air cargo aircraft with 17 partner airlines; they operate over 600 daily flights across 220 countries and territories.[17]

Amazon

As previously discussed, Amazon Air is relatively new carrier with a rapidly growing fleet aircraft. As of October 2022, Amazon had a fleet of 88 U.S.-based aircraft comprised of five ATR 72s, 28 Boeing 737-800(BCF), and 55 Boeing 767-300 models that operate under the Amazon Air brand. Operators of these Amazon aircraft include Silver Airways, Sun Country Airlines, ASL Airlines Ireland, Air Transport International, Atlas Air, and Cargojet Airways. Amazon reportedly has long had interest in acquiring longer range wide-body freighter aircraft such as the Boeing 777-300 and Airbus A330-300, which could be used to directly import goods on transpacific flights

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[14] https://www.freightwaves.com/news/fedex-ups-feeder-operator-acquires-small-cargo-airline
[15] https://www.dhl.com/global-en/home/press/press-archive/2021/dhl-express-shapes-future-for-sustainable-aviation-with-the-order-of-first-ever-all-electric-cargo-planes-from-eviation.html
[16] https://www.freightwaves.com/news/dhl-commits-to-buy-6-more-777-cargo-jets-from-boeing; https://simpleflying.com/dhl-boeing-767-converted-freighter/
[17] https://www.dhl.com/global-en/home/press/press-archive/2021/dhl-express-continues-to-strengthen-its-global-aviation-network-with-the-purchase-of-eight-additional-boeing-777-freighters.html

from China.[18] In October 2022, it was announced Amazon acquired a stake in Hawaiian Airlines to operate an initial fleet of 10 Airbus A330-300 converted freighters between airports near Amazon fulfillment centers for at least eight years. The A330s, which are replacements for older Boeing 767s that will be retired, will likely be deployed on the highest volume routes in its network. Service is expected to begin in fall 2023.[19]

Other Trends in Cargo Aircraft Technology (AAM and UAS)

Advanced Air Mobility (AAM) and Uncrewed Aircraft Systems (UAS) technology developments are moving forward rapidly. Developments in alternative aviation fuels such as electricity, sustainable aviation fuel (SAF), and hydrogen powered aircraft are also being explored. In the future, new innovative aircraft may become a highly important factor in air cargo operations. These developments have significant implications on the airport infrastructure required to support these aircraft types. Below are a few prominent AAM manufacturers and notable order firms or potential customers.[20]

- Elroy Air Chaparral (AYR Logistics, FedEx Express)
- Pipistrel Nuuva (SF Express)
- Beta Technologies Alia (UPS, United Theraputics)
- Electra
- Lilium Jet (ASL Aviation)
- Eviation Alice (DHL)
- Natilus (Ameriflight)
- Sabrewing (Ameriflight)

In February of 2023, Ameriflight, one of the largest regional cargo airlines that contracts as a feeder for FedEx, UPS, and DHL, announced interest in in two new AAM platforms: the Natilus Kona and the Sabrewing Rhaegal-A. The Natilus Kona is an autonomous, conventional takeoff and landing cargo aircraft with a blended-wing-body designed to reduce fuel consumption. It was designed specifically for cargo as it has a boxier fuselage which offers more flexibility for cargo shipments. The Kona is expected to have a payload of 4.3 metric tons and a range of 900 nautical miles.[21] The Sabrewing Rhaegal-A is an autonomous vertical takeoff and landing (VTOL) cargo drone with an expected payload of 2 tons and a payload of over 1,000 nautical miles.[22] These aircraft, and others, have the potential to augment the air cargo feeder networks across the U.S.

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[18] https://www.bloomberg.com/news/articles/2021-10-13/amazon-seeks-used-long-range-cargo-jets-able-to-fly-from-china?leadSource=uverify%20wall
[19] https://www.freightwaves.com/news/amazon-hawaiian-airlines-gear-up-for-2023-launch-of-airbus-freighters
[20] AAM Reality Index
[21] https://www.futureflight.aero/news-article/2023-01-27/ameriflight-orders-20-autonomous-cargo-airplanes-natilus
[22] https://www.freightwaves.com/news/ameriflight-adds-35-heavy-duty-cargo-drones-to-wish-list

2.3 Airports Supporting the Air Cargo Industry

Types of airports supporting air cargo are derived from observations of air cargo activity currently accommodated at airports. The cargo "type" is used to describe the level of activity and airport supported air cargo functions. These descriptors do not equate to FAA classifications for airports included in the federal airport system.

2.3.1 International Gateway Airports

An international gateway functions as a consolidation, distribution, and processing point for international air cargo. To a certain extent, an international air cargo gateway is similar to a commercial hub airport in that the gateway airport is not reliant on the surrounding market area to generate sufficient cargo activity to justify international air cargo-related operations. As with an air cargo hub, much of the cargo moving through a gateway airport does not originate in and is not destined for the gateway airport's surrounding market area. The cargo is often trucked to and from markets hundreds, if not thousands, of miles away.

Airports in the U.S. that are considered international gateway airports include: Miami International (MIA), John F. Kennedy International (JFK), Los Angeles International (LAX), and Chicago O'Hare International (ORD), Hartsfield-Jackson Atlanta International (ATL), Dallas/Fort Worth International (DFW), and George Bush Intercontinental (IAH).

2.3.2 Integrated Express Primary Hub Airports

The hub airports are the backbone for integrated express carriers since the hub provides connections to each market in the integrator's network. Each day, international and domestic air cargo flights arrive at the hub. Once at the hub, packages are unloaded, sorted to the appropriate destination market, and then loaded back onto the appropriate outbound aircraft. The majority of enplaned air cargo traffic at a hub/sort facility is generated from the aircraft-to-sort-to-aircraft process. The cargo volumes originating or destined for the local market are often a small percentage of the airport's total enplaned cargo activity.

In effect, the hub imports and exports demand for air cargo at the host airport. Major cargo hub airports include:

- Memphis International (MEM), where FedEx Express operates its Super Hub
- Louisville International (SDF), where UPS has its Worldport
- Cincinnati/Northern Kentucky International (CVG), where DHL operates its U.S. hub.

The market area for an airport's integrated express cargo hub is typically within a two- to three-hour driving radius of the airport. Often, there are no cargo flights from the hub to airports within this radius since trucking is a less expensive transportation alternative.

2.3.3 Integrated Express Regional Hub Airports

Regional hubs serve the larger regional market area in which they are located; they support cargo sorting and distribution functions for a carrier's primary hub. For example, UPS has regional hubs at Dallas-Fort Worth International (DFW), Chicago Rockford International (RFD), Columbia Metropolitan (CAE), and Ontario International (ONT). A regional hub allows cargo within those market areas to bypass the main the hub. In the case of UPS, the main Louisville hub can be bypassed by using RFD, CAE, or other regional hubs. Similarly, FedEx Express has regional hubs at Oakland International (OAK), Perot Field Fort Worth Alliance (AFW), Piedmont Triad International (GSO), and Indianapolis International (IND). These hubs enable cargo in those markets to bypass the main hub FedEx hub in Memphis.

2.3.4 Integrated Express Local Market Stations

The criteria for establishing a local market station or direct air cargo service (origin and destination [O&D] service for an airport's surrounding market area) generally coincides with population density, concentrations of industry and commerce, and the availability of alternative transportation infrastructure. Often referred to as a "node" within a cargo carrier's network, the local market station is the simplest and most common type of air cargo facility. These stations represent the "spokes" in an integrated carrier's hub-and-spoke network. For airport-to-airport service providers, the local market station represents the origin or destination point for air cargo they transport.

2.3.5 Cargo-Focused Airports

Cargo focused airports are dedicated to the movement of air cargo and offer the advantage of uncongested airspace, relative to airports with passenger airline service. Just as the lack of passenger service is an advantage to cargo carriers operating at these airports, it is also a disadvantage for forwarders and other air cargo customers as airline aircraft belly space for freight and mail is unavailable. As a result, relatively few examples of strictly air cargo airports exist. For example, Rickenbacker International Airport (LCK) in Columbus, Ohio serves as an intermodal cargo airport for FedEx Express, Mountain Air Cargo (a contracted feeder airline for FedEx Express), UPS, several air forwarders, and several international cargo carriers such as Cathay Pacific Cargo, Korean Air Cargo, Emirates, Etihad Cargo, Cargolux Turkish Airlines Cargo, and Qatar Airways. Other examples of cargo-focused airports and the cargo airlines they serve include:

- Chicago Rockford International (RFD) – Amazon Air, Korean Air Cargo, Maersk Air, and UPS
- Perot Field Fort Worth Alliance (AFW) – Amazon Air and FedEx Express
- Sacramento Mather (MHR) – Ameriflight, DHL, and UPS
- Boeing Field Airport (BFI) – AirPac Airlines, Ameriflight, Skylink Express, UPS, Western Air Express
- Stockton Metropolitan Airport (SCK) – Amazon Air

As a result of the COVID-19 pandemic, many air cargo-focused airports saw substantial growth. This can be attributed to the shift to online retail, or e-commerce, which was already the fastest growing segment of air cargo even before the onset of the pandemic. Surging volumes of traffic from online retailers to homes and businesses altered the way transportation and logistics infrastructure is used. High customer expectations for delivery time and transparency/tracking means that air cargo is often necessary to meet the need. As a result, cargo-focused airports saw significant increases in tonnage throughput. This shift towards cargo-focused airports is expected to continue.[23]

[23] Chaddick Policy Institute Briefing, March 2021

2.3.6 Military Airfields

The U.S. military often has air cargo operations on their respective bases, and their facilities are utilized by military aircraft to transport air cargo. Civilian air cargo operations seldom occur at military bases.

2.3.7 Airport Competition

Airports compete for customers, including air cargo. Each airport serves areas that vary in size and scale based on the types of aviation services provided and the proximity of other airports that provide similar or better service. The area an airport serves is generally driven by three major considerations – aviation service supply factors, demand factors, and costs in time and resources to the customer.

Areas served by cargo carriers vary in size depending on the level of air cargo service provided by carriers and businesses in the area providing air cargo-related shipping services. For example, an international gateway airport typically has cargo shippers/air cargo dependent businesses located within its market area, and they may also receive cargo from locations outside their market area for air shipment. These locations may be as far away as a 16-hour truck drive or more; cargo trucked long distances to an international gateway is likely bound for international locations. Nearest to DNA, Dallas/Fort Worth International (DFW) and George Bush Intercontinental (IAH) are examples of international gateway airports, while El Paso International (ELP) and Albuquerque International Sunport (ABQ) are examples of local market station airports. Airports functioning as local origin and destination stations for integrated express carriers typically, based on speed and distance considerations, serve drive-time areas of 60-120 minutes.

Examples of General Aviation Airports Serving Schedule Air Cargo Demand

While most carriers that provide scheduled air cargo flights operate at airports that also accommodate commercial airlines, there are examples of general aviation airports that have scheduled air cargo activity. This section provides examples of two general airports that have attracted scheduled air cargo carriers.

General aviation airports, such as Doña Ana County International Jetport, are used by air cargo operators because these airports provide advantages over larger commercial service airports. General aviation airports are typically less congested in terms of their airspace, their aircraft operational capacity, and their ground access. General aviation airports typically have shorter taxi-times from the runway to landside facilities, and general aviation airports usually have less congested highway access than do commercial airports which tend to be in more densely developed urban areas. When an area can support additional air cargo activity, general aviation airports which are equipped to serve air cargo aircraft, provide a viable option. Two recent examples of general aviation airports that have attracted scheduled air cargo activity include airports in Gary, Indiana and Lakeland, Florida.

The two general aviation airports which recently attracted scheduled air cargo activity are Gary/Chicago International (GYY) in northern Indiana and Lakeland Linder International (LAL) in central Florida. Gary/Chicago International, south of the Chicago Metropolitan Area, has air cargo service provided by United Parcel Service (UPS). Lakeland Linder International is located in proximity to both the Tampa and Orlando Metropolitan Areas; this airport has air cargo service provided by Amazon Air. Improvements to infrastructure and commensurate financial investment were required at both airports before they attracted scheduled air cargo service. Facility improvements and investment were not, however, solely responsible for either general aviation airport securing scheduled air cargo service. For both example airports, they secured air cargo service because of increasing demand, they provided more economical operating/lease terms, and/or other airports were not able to expand to adequately meet growing demand.

Gary/Chicago International Airport (GYY)

Gary/Chicago International Airport (GYY) is a joint civil-military public general aviation airport in Gary, Indiana. It is three miles northwest of the City of Gary and 25 miles southeast of the City of Chicago. It is operated by the Gary/Chicago International Airport Authority. The airport covers 763 acres and has two asphalt runways: 12/30 is 8,859 feet by 150 feet and 2/20 is 3,604 feet by 100 feet. The airport's proximity to economic activity in the Chicago area and good ground were attributes which helped to attract an air cargo operator. While area attributes made the airport appealing for scheduled cargo operations, the airport also made improvements to ready itself for air cargo operations, primarily through a major project to resolve runway safety area compliance.

In order to accommodate scheduled air cargo operations, this airport took steps to improve its Runway Safety Areas (RSAs) to meet FAA design standards for larger air cargo jets. The RSA project required railroad track relation. The airport acquired property to support this relocation. In addition, the airport relocated a large fuel storage tank, restructured a portion of an access road between two roadways, buried high-voltage power cables, and built an electrical transfer station to accommodate the buried high-voltage cables. Over a four-year timeframe, over $126 million was spent to accomplish needed improvements. Major funding sources for the program included:

- The FAA ($60.6M)
- The Northwest Indiana Regional Development Authority ($50.0M)
- The Chicago Department of Aviation ($9.5M) funded through passenger facility charges (PFCs)
- The Federal Highway Administration ($6.0M)

UPS began scheduled operations at Gary/Chicago International Airport in November 2020 with an Airbus A300 jet. UPS and the airport entered a lease agreement that includes one round trip between Gary and Louisville (the location of the primary hub for UPS). The UPS lease has a five-year term, with two five-year extensions possible. As part of the agreement, UPS leases 14,000 square feet of office space in the airport's terminal; a 150,000 square foot ramp that provides space to park two A300s; and an additional 5,800 square feet of hangar space to support their operations. UPS employs approximately 60 people at its Gary facility, including ground handlers, administrative employees, aircraft maintenance technicians, and managers.

UPS typically operates Airbus A300-600F and Boeing 757-200F aircraft at GYY on a regular basis. Flights are to and from the UPS Worldport in Louisville (SDF) and to a UPS regional hub at Philadelphia International Airport (PHL). UPS occasionally operates flights into GYY from other UPS support airports such as Boston/Manchester (MHT) in New Hampshire and Columbia Metro Airport (CAE) in South Carolina.

The airport's location in proximity to demand was the major catalyst for attracting scheduled air cargo operations. In addition, the airport completed a Strategic Business Plan that concluded that "the geographic positioning of the region offers potential for the integration of other modes and the longer-term potential of cargo charter activity". Through a coalition of investors and a collaboration with UPS, this airport attracted scheduled air cargo service.

Lakeland Linder International Airport (LAL)

Lakeland Linder International Airport (LAL) is a public general aviation airport located five miles southwest of Lakeland, in Polk County, Florida. The airport has a Class 1 Federal Aviation Regulation (FAR) Part 139 operating certificate. Amazon Air began operations at the airport in 2020. LAL is located one hour east from TPA placing it midway between Tampa and Orlando. The airport is one half of a mile from Interstate 4 via the Polk Parkway; the airport's location in the I-4 corridor was attractive to Amazon Air.

Lakeland Linder International Airport encompasses 1,710 acres and has two asphalt runways: 10/28 is 8,500 feet by 150 feet and 5/23 is 5,000 feet by 150 feet. Runway 10/28, its associated taxiway system, and the current airport terminal apron can accommodate aircraft as large as the Boeing 747 and 777 .

In May 2019, the City of Lakeland approved a proposal between LAL and Amazon. A $100 million investment from Amazon.com Services, Inc. went toward the construction of an air cargo facility and an associated aircraft apron area. Amazon's main building is three stories and covers nearly 300,000 square feet. Amazon owns or leases over 100 aircraft to support its e-commerce deliveries. Within its network of airports, LAL serves as a Regional Air Hub. This means that the airport not only has space to park and load and unload cargo, but that the airport also has dedicated Amazon facilities and package processing and sorting facilities.

To support Amazon operations, LAL upgraded the approach landing system at the airport to facilitate aircraft operations in inclement weather; made improvements to Runway 9-27; and added five additional fuel tanks in the airport's existing north and south fuel farms. LAL infrastructure improvements cost $18 million, and $25 million more was spent to improve the runway. Combined between Amazon and airport investment, a reported $133 million was initially spent to support the airport's new air cargo operations. Based on their development and the new jobs that they would support, Amazon qualified for a $225,000 tax credit. County and City funded tax credits were paid out over four years. While Amazon valued the tax credits, they were not pivotal in attracting the cargo carrier to the airport.

Amazon facilities have been developed on a 47-acre parcel leased from the airport. Amazon pays approximately $80,000 a month for the land, with the option to renew the lease three times for ten years each. Amazon pays LAL $0.85 per 1,000 pounds of cargo landed, with a 3-cent surcharge per gallon of fuel purchased at the airport. Most recently, monthly airport revenue from Amazon was reported at $180,000.

LAL has a U.S. Customs and Border Protection office at the airport. Justification for the customs facility was based not only on the potential for Amazon use, but also on the airport's ability to accept international passenger charter and other general aviation flights. The customs facility enables the airport to handle international freight, should Amazon use the airport as an international point of entry at some point in the future.

In 2021, Amazon approached the airport with additional plans to expand, leasing an additional 60 acres. Expansion plans include a larger cargo building, additional parking for three jets, a 370-slot truck bay, and a larger employee parking lot. These facilities enable Amazon to double its number of flights per day, from 22 to 44 by 2027. This will make Lakeland's Amazon hub the largest Amazon facility in the southeast U.S.

With a strategic location, acreage open for development, appropriate airport facilities, competitive lease agreements, good highway access, and other attributes, general aviation airports not previously serving cargo can be candidates for scheduled air cargo service.

Summary

In both examples, the general aviation airport secured new air cargo service because there was notable demand within the airports market area. The two examples show that both airports had the following characteristics:

- A strategic location as it relates to centers of economic activity
- Facilities typically sought by air cargo operators or the was able and willing to provide these facilities
- The desire to change the current airport role
- Sufficient available undeveloped property to serve air cargo operations
- Proximity to major highways, including interstate highways

Considering these factors and others, Doña Ana County International Jetport appears to have characteristics sought by scheduled air cargo operators. Other multiple-airport markets in the U.S., similar in size to the DNA market area, with cargo carrier operations include the following:

- **Columbus, Ohio**
  - John Glenn Columbus International Airport (CMH): Passenger belly cargo
  - Rickenbacker International Airport (LCK): AirNet Express, Cargolux, Castle Aviation, Cathay Pacific, Emirates SkyCargo, Etihad Cargo, FedEx Express, Kalitta Air, Korean Air Cargo, National Airlines, Qatar Airways Cargo, Turkish Airlines Cargo, UPS
  - Wilmington Air Park (between Columbus, Cincinnati, and Dayton): Amazon Air
- **Detroit, Michigan**
  - Detroit Metropolitan Wayne County Airport (DTW): FedEx Express, UPS, Passenger belly cargo
  - Willow Run Airport (YIP): Kalitta Air, Kalitta Charters, National Airlines, USA Jet Airlines, Ameriflight, Alpine Air, Sun Country Airlines (Amazon Air), Everts Air Cargo
- **Sacramento, California**
  - Sacramento International Airport (SMF): Amazon Air, Amerijet International, FedEx Express, Passenger belly cargo
  - Sacramento Mather Airport (MHR): Ameriflight, DHL, UPS
- **San Antonio, Texas**
  - San Antonio International Airport (SAT): Ameriflight, DHL, FedEx Express, Martinaire, UPS, Passenger belly cargo
  - Kelly Field (SKF): Amazon Air
- **Seattle, Washington**
  - Seattle-Tacoma International Airport (SEA): AeroLogic, Aloha Air Cargo, Amazon Air, Ameriflight, Alaska Air Cargo, Asiana Air Cargo, Cargolux, China Airlines Cargo, DHL Aviation, EVA Air Cargo, FedEx Express, Kalitta Air, Korean Air Cargo, Lufthansa Cargo, Singapore Airlines Cargo, Passenger belly cargo
  - Boeing Field (BFI): AirPac Airlines, Ameriflight, SkyLink Express, UPS, Western Air Express
  - Paine Field (PAE): FedEx Express

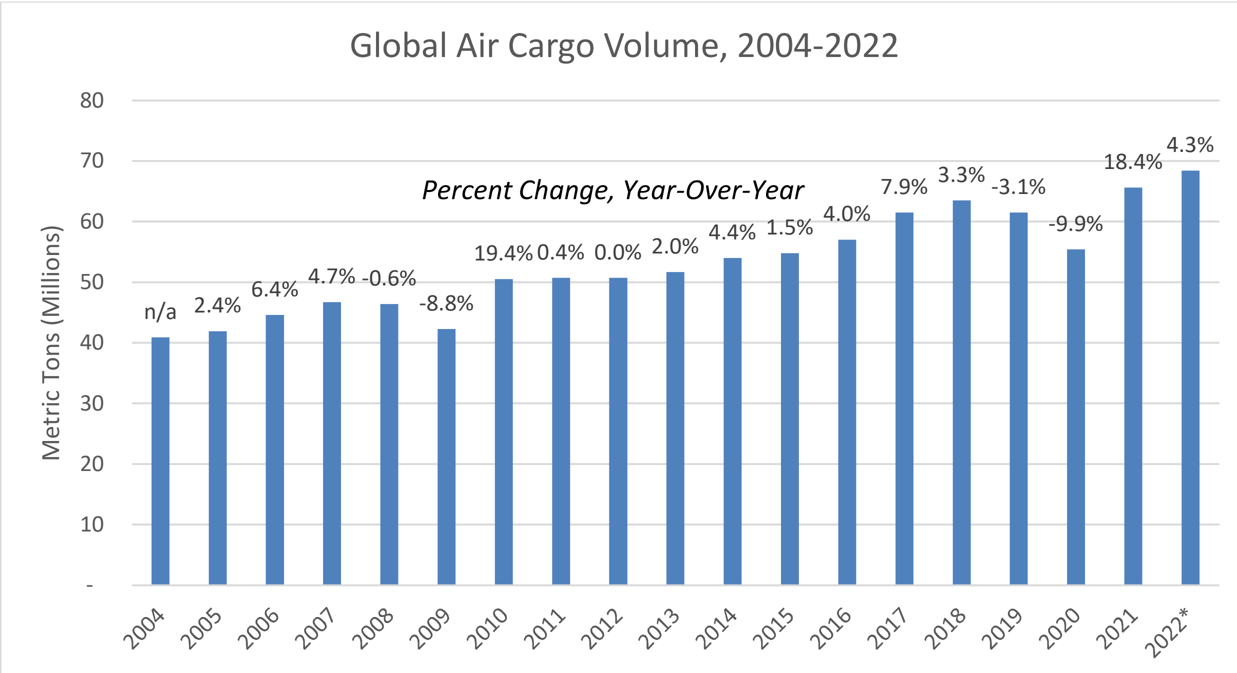
Other multi-cargo airport market examples exist in larger metropolitan areas, such as Dallas-Fort Worth, New York, Chicago, Los Angeles, Houston, and the San Francisco Bay Area. The example cities listed above are more similar in market size to that of DNA. The air cargo carriers operating at these airports may warrant further analysis to better understand the air cargo market dynamics that may also exist at DNA or those that could be achieved.

2.4 Global Air Cargo Trends

Since 2004, global air cargo volumes have increased steadily, despite minor fluctuations and two notable downturns due to major global economic events. From 2004 to 2007, global air cargo traffic grew by an average of 4.5 percent annually before declining by more than 9 percent in 2008 and 2009 due to the Great Recession. In 2010, global air cargo volumes rebounded above pre-recession levels and then experienced slow growth (1.6 percent annually) through 2015.

The latter half of the decade saw accelerated growth, with global air cargo volumes growing 2.9 percent annually from 2015 to 2019. The onset of the COVID-19 pandemic saw global air cargo volumes decrease by over 10 percent. However, according to International Air Transport Association (IATA) data, air cargo volumes in 2021 rebounded to pre-COVID-19 levels. As shown in **Figure 2-13**, since 2004 the overall global air cargo volumes experienced an average annual growth rate of 2.8 percent through 2019 or 2.9 percent through 2022 (forecast).

Figure 2-13: Global Air Cargo Volume in Metric Tons, 2004-2022

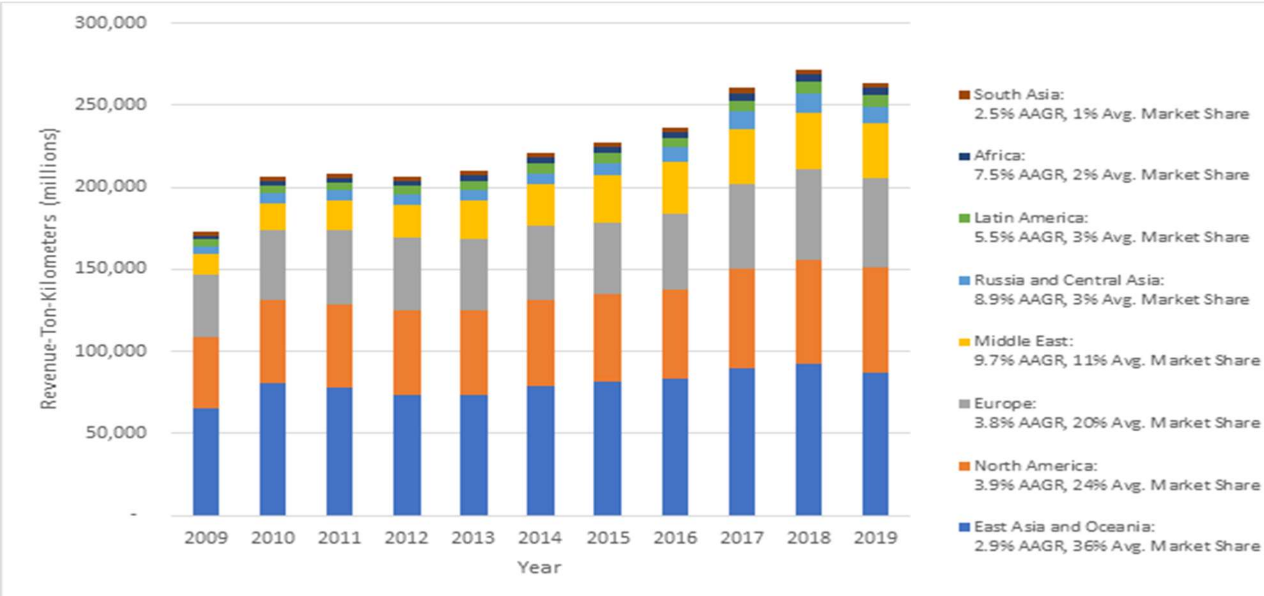


*Note: 2022 projection based on partial year data
Source: International Air Transport Association (IATA), Statista

According to the *Boeing World Air Cargo Forecast 2020-2039*, air cargo traffic increased across all regions worldwide from 2009 to 2019 in revenue-ton-kilometers (RTKs)[24]. A revenue-ton-kilometer translates to the revenue earned for transporting one ton of freight across one kilometer. This is a metric used in freight shipping, and transportation industries, and is important factor in determining profitability. East Asia and Oceania region represented the largest share of global air cargo traffic, followed by North America, Europe, and the Middle East. Combined, the regions of Russia and Central Asia, Latin America, Africa, and South Asia represented less than 10 percent of the global market share. By average annual rate of growth, the Middle East region was the fastest-growing region at 9.7 percent, followed by Russia[25] and Central Asia at 8.9 percent, Africa at 7.5 percent, and Latin America at 5.5 percent. As shown in **Figure 2-14**, air cargo in Europe, North America, East Asia and Oceania, and South Asia each grew by 2.5 to 3.9 percent.

[24] The revenue load in ton multiplied by the distance flown
[25] Data published in 2020; does not account for declines in Russian air cargo as a result of the Russo-Ukrainian war.

Figure 2-14: Global Air Cargo Traffic by Region in Revenue-Ton-Kilometers, 2009-2019

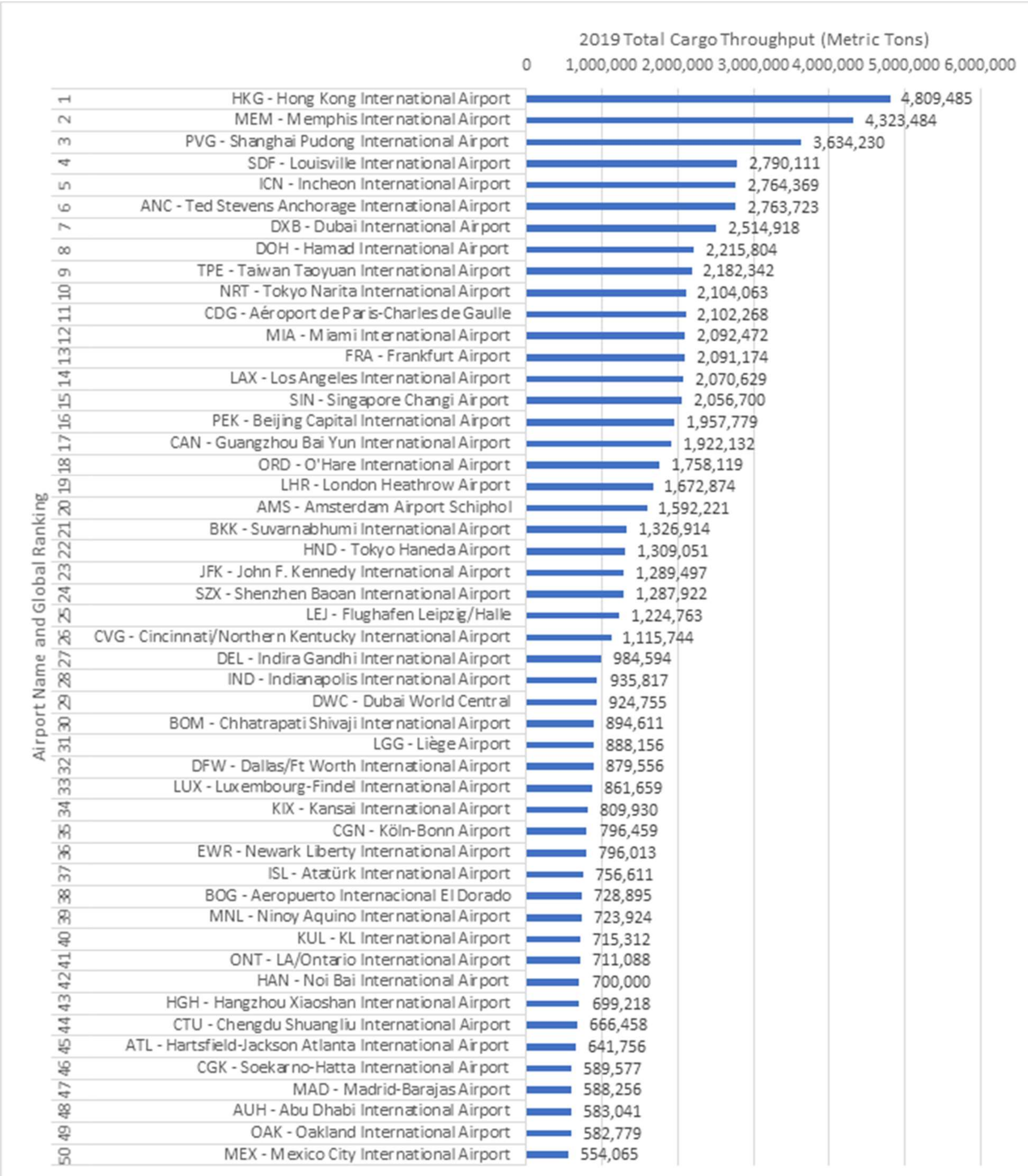


Source: Boeing World Air Cargo Forecast 2020-2039

2.4.1 Top Global Airports by Cargo Throughput

The busiest airports in the world, in terms of air cargo tonnage throughput, are either major international gateway airports with significant passenger wide-body aircraft, airports served by dedicated freighter activity, and/or primary hub airports for a particular cargo carrier. **Figure 2-15** identifies the world's top 50 busiest cargo airports by 2019 tonnage, which was the last data available for this source. As shown, the five largest cargo airports in 2019, as measured by tonnage, were Hong Kong (HKG), Memphis (MEM), Shanghai (PVD), Louisville (SDF), and Seoul (ICN). Out of the top 50 airports, 14 are in North America, 12 in East Asia, 10 in Europe, 6 in Southeast Asia, 4 in the Middle East, 2 in South Asia, and 2 in Latin America. DFW ranks 32nd globally for its cargo tonnage, and it ranks 10th in North America.

Figure 2-15: Top 50 Global Cargo Airports, 2019 Volume in Metric Tons



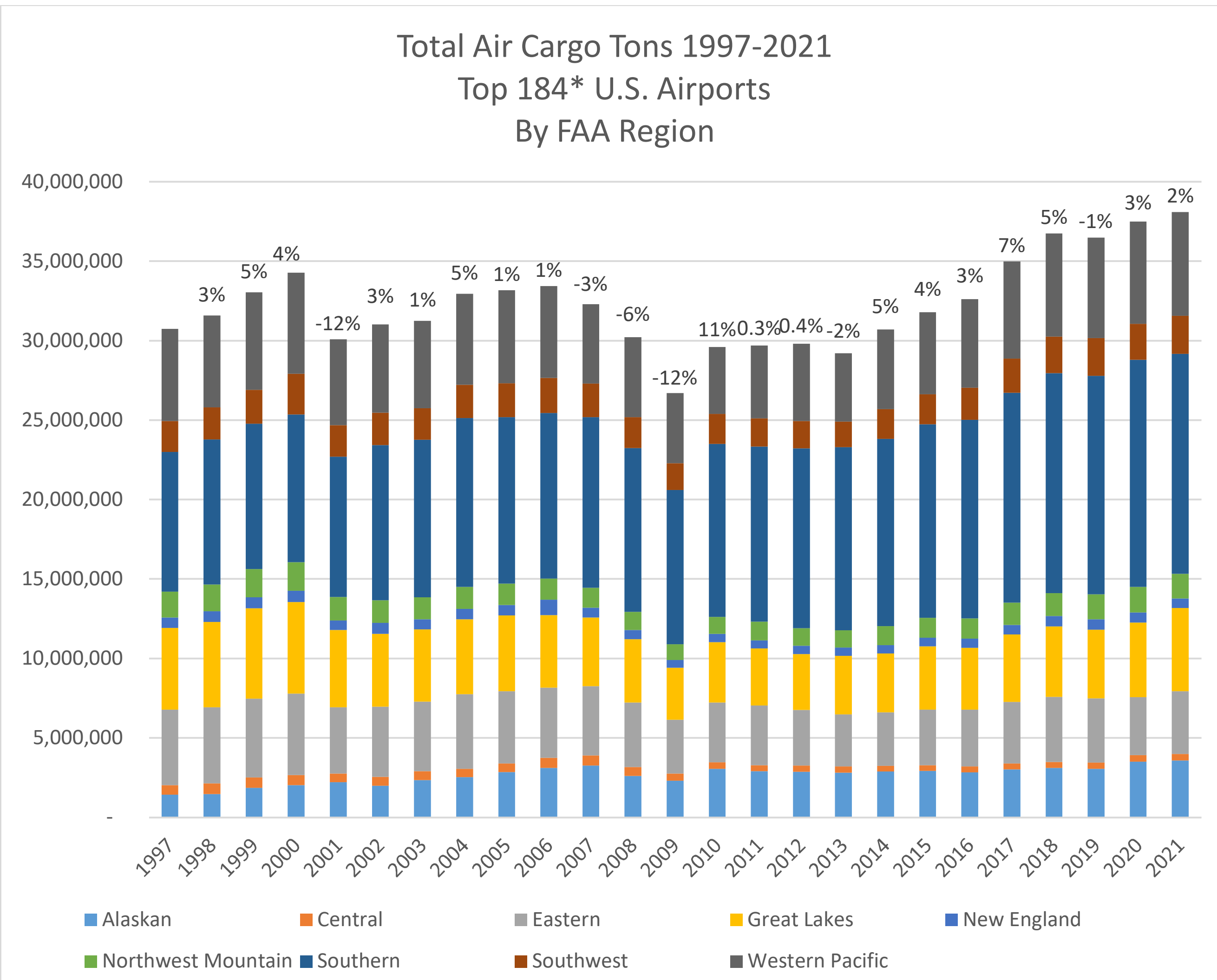
Source: Air Cargo World

2.5 U.S. Air Cargo Trends

Airports Council International-North America (ACI-NA), an airport trade organization, provides data from the top 200 busiest North American airports for total cargo tonnage served each year. As of 2021, there are 184 U.S. airports included in the list. Other airports are located outside the U.S., primarily in Canada. **Figure 2-16** displays the change in volume by FAA Region from 1997 to 2021 for the busiest U.S. air cargo airports.

Cargo volumes included in the ACI-NA data showed notable increase. In 2011, 29.7 million metric tons were moved through the 184 busiest U.S. air cargo airports, growing to nearly 38.1 million metric tons in 2021. This represents an average annual growth rate of 2.5 percent. Online retail and the growth of e-commerce and Amazon Air over this timeframe are primary reasons for the large increase.

Figure 2-16: Total Air Cargo Tons 1997-2021, Top 184 U.S. Airports



*Note: 184 U.S. airports were included in the data for the top 200 North American airports for CY2021; number may vary in previous years.
Source: Airports Council International (ACI-NA) Traffic Reports Data 1997 to 2021

2.5.1 Recent Trends

As of late 2022, air cargo demand has been softening due to a variety of factors including inflation, fuel prices, high-interest rates, the Russia-Ukraine war, lower global industrial production, high consumer goods inventory levels, and lower consumer spending amid concerns of a recession. Consumer discretionary spending is also exhibiting a shift toward travel and services instead of goods. With ocean ports less congested than during the pandemic, many shippers are shifting air volumes to ocean freight to save on cost. Before the pandemic overturned normal business cycles, the 2022 decline is more of a correction back to previous trend lines after record-breaking demand for goods and a supply shock over the past two and a half years.[26]

FedEx Express has announced plans to cut flights and ground older aircraft to account for slowing e-commerce demand, which has returned to pre-pandemic rates after spiking in 2020 and 2021. During the pandemic, online sales as a percentage of overall retail sales peaked at 22 percent, up from 16 percent before the crisis. FedEx management estimates that the U.S. e-commerce market is now at about 18 to 19 percent of total retail sales, which is affecting the integrated express business. Another possible headwind for integrated express carriers is the full recovery of passenger routes, which will increase available belly space for freight and potentially reduce traffic for freighter operators.[27]

Despite recent negative trends, many transportation and logistics executives are cautiously optimistic that shippers will resume strong order activity in early 2023 as retail inventories are exhausted, but the future demand will likely depend on whether the global economy officially enters a recession and whether it is mild or severe.[26] Airlines still offer the only solution to moving goods quickly over long distances within or across borders, which is increasingly important to support e-commerce. This is an inherent advantage of air cargo and is why both cargo conversion specialists and aircraft manufacturers are confident about future demand for freighters.[28]

These factors somewhat dampen the near-term outlook for national and global air cargo demand in 2023, but economic indicators for long term demand suggest continued long-term growth.[29] Air cargo's recent surge can be attributed to shifts in consumer behavior towards e-commerce that is expected to remain permanent. E-commerce now accounts for around 20 percent of all air cargo, up from five percent as recently as 2017.

2.6 Air Cargo Commodities

Air cargo demand is generated when there is a need for expeditious transportation of material and goods between two points. In the business world, logistics managers must justify the use of air cargo as their preferred mode of transport, as shipping by air has a greater cost than shipping via truck, rail, and maritime modes. Factors involved in deciding to transport via air include:

- Cost of transporting the material
- Level of service commitment to the customer or end user
- Value of the material
- Time-sensitivity or perishability of the material

Products best suited for air cargo shipping are those that benefit from increased speed of distribution or better stock availability. Commodities transported by air are often high-value, time-sensitive goods.

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[26] Air cargo market stuck in doldrums during normal busy season - FreightWaves
[27] FedEx to outsource more cargo flying in cost-cutting effort - FreightWaves
[28] After all the hype, has the air cargo boom gone away? | Analysis | Flight Global
[29] Tiaca positive for air cargo in 2023 despite tough outlook | Air Cargo News

Businesses in several of these categories rely directly on-air transport to deliver products effectively and efficiently within, to, and from the Borderplex region.

Products that require quick distribution and frequent availability include:

- Aerospace - Equipment & Parts
- Automotive - Equipment & Parts
- Energy Development
- Pharmaceuticals
- Computers, Laptops & Computer Components
- Medical Diagnostic Equipment and Specimens
- Medical/Surgical Devices and Equipment
- Textiles – Garments, Seasonal Apparel, and Shoes
- Consumer Electronics
- Telecommunications Equipment - Cell Phones, iPads, etc.
- Perishables - Flowers, Fruit, Vegetables & Seafood
- Economically Perishable Materials - Printed Material
- E-commerce retail goods

The higher the value per pound, the more likely the commodity is to be shipped via air cargo. The recent surge in vaccines and pharmaceutical development and distribution has increased the awareness of both the public and economic development officials on the importance of access to expedited air cargo services in their communities.

3 Inventory of Air Cargo Facilities at DNA

An inventory of facilities at Doña Ana County International Jetport (DNA) relevant for air cargo activity are presented in this section. Reported facilities are a result of correspondence, inspection, and a review of documents, exhibits, and electronic files provided by the Airport and stakeholders. This section documents existing conditions and provides background information for planning future airport cargo development at DNA.

3.1 Airport Facilities

DNA's existing airport facilities and features that support or are available to support potential airport cargo operations are detailed.

3.1.1 Runways, Taxiways, and NAVAIDs

Information regarding DNA's primary runway, including length, width, pavement type, and weight-bearing capacities, is shown **Figure 3-1**.

Figure 3-1: DNA Primary Runway Characteristics

Runway	Length	Width	Pavement Type	Runway Strength: Single-Wheel Landing Gear	Runway Strength: Dual-Wheel Landing Gear
10-28	9,550 feet	100 feet	Grooved Asphalt	50,000 pounds	90,000 pounds

Source: FAA Airport Data and Information Portal (ADIP), August 2022

The airfield has a single northwest-southeast runway designated as Runway 10-28. The runway is asphalt with dimensions of 9,550 feet by 100 feet; the runway is served by Medium Intensity Runway Lights (MIRL). Since the Airport's 2016 Air Cargo Study was completed, DNA has invested approximately $9 million to upgrade the runway. Upgrades included the replacement of the runway lighting system and runway pavement strengthening to accommodate up to 90,000-pound aircraft in a dual wheel main landing gear configuration. Previously, the runway had three sections of uneven weight bearing capacity, with the lowest being 20,000 pounds (single wheel configuration).

Runway 10-28 is served by a full-length parallel taxiway, Taxiway A, located 445 feet from the runway, measured between runway and taxiway centerlines. Taxiway A is 75 feet wide with 25-foot shoulders; the taxiway has Medium Intensity Taxiway Lights (MITL). There are five connecting taxiways between the runway and Taxiway A, and five connector taxiways between Taxiway A and the main ramp area. The connecting taxiways range from 35 to 75 feet in width.

According to the FAA's Airport Reference Code criteria, DNA is designed to serve airplanes in Aircraft Approach Speed (AAC) categories A, B, and C, which includes approach speeds up to, but not including 141 knots. The two other principal airport design criteria are aircraft wingspan and weight. DNA meets the FAA design requirements for aircraft in Airplane Design Groups (ADG) I and II, which includes wingspans up to, but not including 79 feet based upon runway to taxiway separation standards. An airport location map is presented in **Figure 3-2**.

Figure 3-2: Location Map of DNA

Source: Jviation, a Woolpert Company

Runway 10 has one instrument approach, as well as a circling approach. Both approaches have 1 mile visibility minimums for Category A and B aircraft and 1 ¾ visibility minimums for Category C aircraft. The LNAV approach has a visibility minimum of 1¾ mile for Category D aircraft, and the Circling approach has a visibility minimum of 2 miles. For example, a Boeing 757-200 is a common Category C cargo aircraft whereas a Boeing 767-300 is a common Category D cargo aircraft.

Currently there is no precision approach at DNA and while Runway 28 does not currently have any approach, a GPS approach has been designed for Runway 28 and will be resubmitted to the FAA in the near future – likely accompanying a future rebuild of the existing runway. The FAA has reportedly been opposed to a precision approach into Runway 28 due to mountainous terrain and airspace overlay with El Paso International Airport (ELP) to the east. The airport Approach types and NAVAIDs for Runway 10/28 are shown in **Figure 3-3**, and the cloud ceiling and visibility minimums for instrument approach procedures are shown in **Figure 3-4**.

Understanding cloud cover and horizontal visibility at an airport assists pilots in determining if they are able to land or depart. A cloud ceiling is the height of the base of the lowest clouds that covers more than half of the sky. For pilots using the automated weather data read out, the ceiling is the lowest measured overcast or broken cloud layer. When there is no measurable cloud ceiling the sky is defined as clear. Horizontal visibility is simply the greatest distance (how far) an object can be seen on the ground.

Figure 3-3: NAVAIDS at DNA Runway 10/28

Runway	Electronic NAVAIDs	Visual NAVAIDs
10	RNAV (GPS) / LNAV	MIRL, REIL, PAPI
28	None	MIRL, REIL, PAPI
RNAV – Area Navigation		REIL – Runway End Identifier Lights
LNAV – Lateral Navigation		MIRL – Medium Intensity Runway Lighting
GPS – Global Positioning System		PAPI – Precision Approach Path Indicator

Source: FAA Instrument Approach Procedure (IAP) Charts, Airport Data, and Information Portal (ADIP), August 2022

Figure 3-4: DNA Published Approach Procedures

		Category A and B		Category C		Category D	
Runway End	Approach Procedure	Cloud Ceiling Minimums	Visibility Minimums	Cloud Ceiling Minimums	Visibility Minimums	Cloud Ceiling Minimums	Visibility Minimums
10	LNAV	588	1	588	1 3/4	588	1 3/4
10	Circling	647	1	647	1 3/4	647	2

Source: FAA Instrument Approach Procedure (IAP) Charts, DNA, Sept 2022. Note: Runway 28 does not have any published instrument approaches.

3.1.2 Weather Systems

DNA is equipped with an on-airport Automated Weather Observing System III (AWOS III P/T). The AWOS is a suite of sensors that measures, collects, and broadcasts weather data to help pilots and flight dispatchers prepare and monitor weather forecasts, plan flight routes, and provide necessary information for correct takeoffs and landings. In addition to the basic altimeter, wind speed, wind direction, temperature, dew point, and density altitude data, DNA's AWOS III P/T also reports visibility, cloud/ceiling data up to 12,000 feet, and thunderstorm detection (30-mile radius). The AWOS III P/T is one of the most capable and useful airport weather reporting systems, and it is vital to enabling safe and efficient aircraft operations.

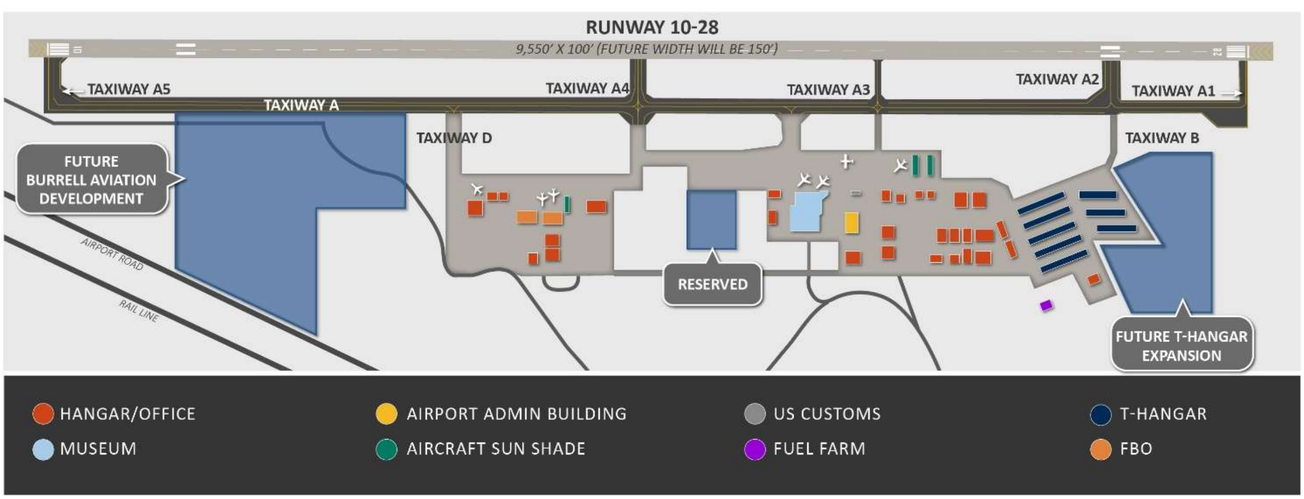
3.1.3 Apron Area and Taxilanes

An air cargo apron, or ramp, is an important component of any air cargo operation. Its role is to provide aircraft parking adjacent to the air cargo terminal building; provide sufficient space for ground handling operations for loading and unloading of cargo aircraft; provide sufficient space for servicing the aircraft; and provide sufficient space for the storage of ground support equipment (GSE) and ULD or pallet storage. An air cargo apron must be the appropriate size and strength for the optimal number of aircraft while also accommodating GSE such as tugs, containers, dollies, trailers, mobile stairs, tail stands, carts, fueling vehicles, and loaders. Different types of cargo carriers have varying needs related to GSE and apron space. Taxilanes are important to provide access from the cargo apron to the airport's taxiway and runway system.

DNA's apron areas include the main apron, west heavy apron, and other apron areas adjacent to various commercial development and hangar lease lots, such as the Airport's FBO. The large contiguous aircraft apron running parallel to Taxiway A on the north side of the building area covers an estimated 65,400 square yards or 588,600 square feet. The main apron for most general aviation aircraft is at the east end, and the heavy aircraft apron is at the west end of the main apron area. The west apron is used by helicopters, which were moved from the apron area near the museum to mitigate the impact of dust kick-up caused by rotor wash. Helicopters use the public apron or their lease lot apron area for operations since a separate public use helipad is not available at the Airport. The west heavy apron is an area designated for future heavy (>100,000-pound) aircraft. The subgrade was constructed for a future overlay to bring it up to the heavy strength. The remaining apron areas strength varies, with most being for 20,000-pound aircraft.

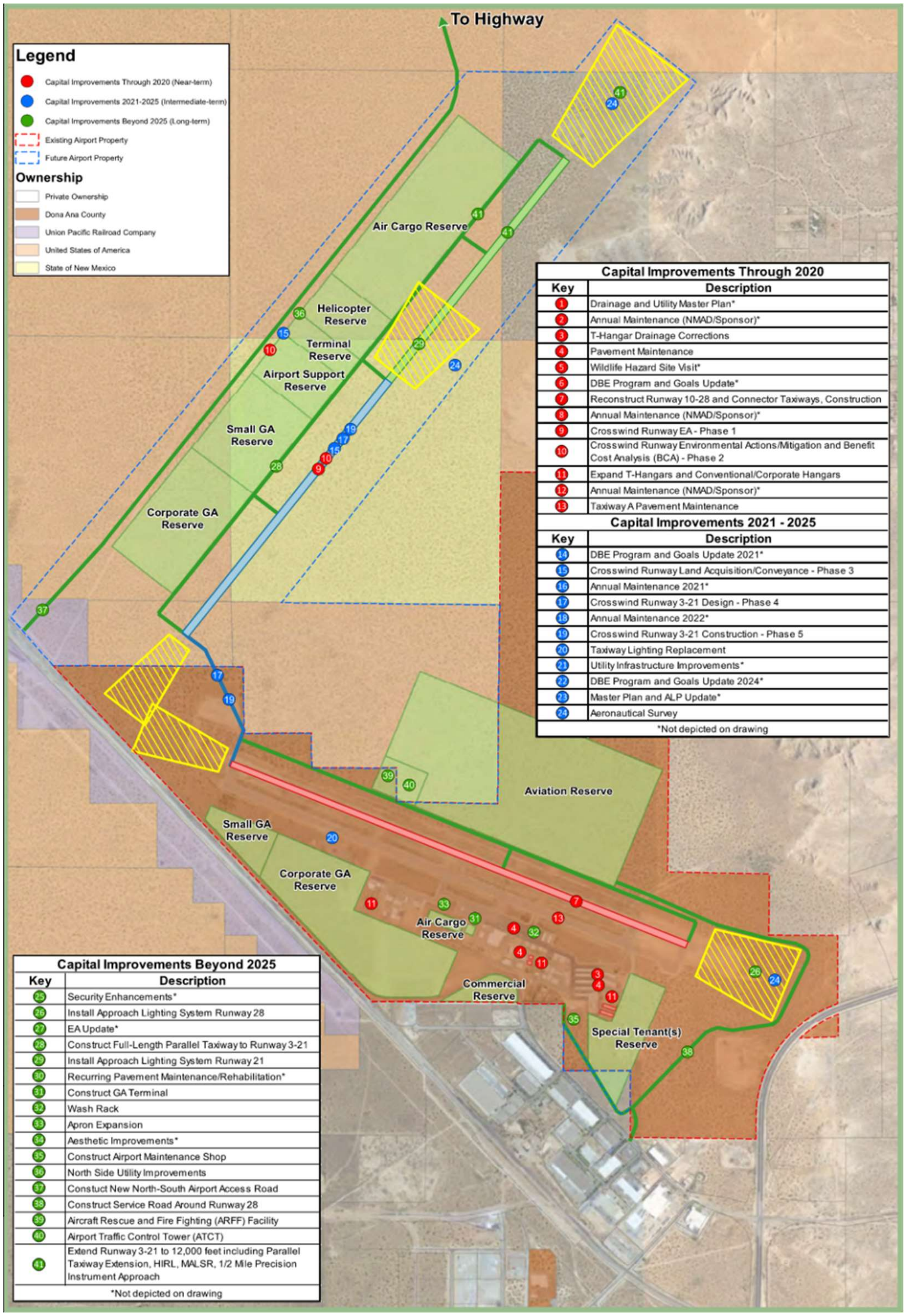
The entire apron area is an estimated 300 feet deep with the main apron an estimated 1,160 feet wide, and the heavy aircraft apron is 800 feet wide. Numerous taxilanes connect the apron and hangar facilities to the parallel taxiway. The *Doña Ana County International Jetport Multi Modal Master Plan 2017* and the current Airport Layout Plan (ALP) Update identified one cargo area for future development, both of which are on undeveloped land within DNA's existing property boundary. Existing and future apron areas, as well as existing taxiways and taxilanes, are presented in **Figure 3-5**. An overview of all preferred alternatives identified as part of the *DNA Multi Modal Master Plan 2017* is presented in **Figure 3-6** to provide additional insight into future airport planning and development.

Figure 3-5: Apron Areas and Taxilanes



Source: Jviation

Figure 3-6: DNA Multi Modal Master Plan 2017 Overview



Capital Improvements Through 2020	
Key	Description
1	Drainage and Utility Master Plan*
2	Annual Maintenance (NMAD/Sponsor)*
3	T-Hangar Drainage Corrections
4	Pavement Maintenance
5	Wildlife Hazard Site Visit*
6	DBE Program and Goals Update*
7	Reconstruct Runway 10-28 and Connector Taxiways, Construction
8	Annual Maintenance (NMAD/Sponsor)*
9	Crosswind Runway EA - Phase 1
10	Crosswind Runway Environmental Actions/Mitigation and Benefit Cost Analysis (BCA) - Phase 2
11	Expand T-Hangars and Conventional/Corporate Hangars
12	Annual Maintenance (NMAD/Sponsor)*
13	Taxiway A Pavement Maintenance

Capital Improvements 2021 - 2025	
Key	Description
14	DBE Program and Goals Update 2021*
15	Crosswind Runway Land Acquisition/Conveyance - Phase 3
16	Annual Maintenance 2021*
17	Crosswind Runway 3-21 Design - Phase 4
18	Annual Maintenance 2022*
19	Crosswind Runway 3-21 Construction - Phase 5
20	Taxiway Lighting Replacement
21	Utility Infrastructure Improvements*
22	DBE Program and Goals Update 2024*
23	Master Plan and ALP Update*
24	Aeronautical Survey
*Not depicted on drawing	

Capital Improvements Beyond 2025	
Key	Description
25	Security Enhancements*
26	Install Approach Lighting System Runway 28
27	EA Update*
28	Construct Full-Length Parallel Taxiway to Runway 3-21
29	Install Approach Lighting System Runway 21
30	Recurring Pavement Maintenance/Rehabilitation*
31	Construct GA Terminal
32	Wash Rack
33	Apron Expansion
34	Aesthetic Improvements*
35	Construct Airport Maintenance Shop
36	North Side Utility Improvements
37	Constuct New North-South Airport Access Road
38	Construct Service Road Around Runway 28
39	Aircraft Rescue and Fire Fighting (ARFF) Facility
40	Airport Traffic Control Tower (ATCT)
41	Extend Runway 3-21 to 12,000 feet including Parallel Taxiway Extension, HIRL, MALSR, 1/2 Mile Precision Instrument Approach
*Not depicted on drawing	

Source: Doña Ana County, Bohannan Huston, WMRenier Consulting, Sara Funk, CDM Smith

3.1.4 Fuel

Aircraft fueling is available from the FBO, Francis Aviation, at two separate locations at DNA. Full-service fueling, both AvGas (100LL) and Jet A, is available at the Francis Aviation building. The FBO building is located at the northwest end of the airport, while self-service AvGas is available at the southeast section of the airport's buildings area in front of the War Eagles Museum. With the exception of smaller piston-engine aircraft that use 100LL, most air cargo aircraft use Jet A fuel. Jet A fueling would be an essential service for a potential air cargo operator. In discussions with Francis Aviation, the FBO would be willing to offer this service to any potential future cargo operators.

It is possible that a future air cargo operator may want their own dedicated fuel system if warranted by the scale of the operation. Hydrant fueling is typically required at cargo areas for airports with significant levels of air cargo aircraft activity, such as at air cargo hubs or international gateways. Hydrant fueling is beneficial as it reduces fuel truck traffic and associated operating costs. However, it is significantly more expensive to install.

3.1.5 Hangars, Terminals, Buildings, and Warehouse Facilities

The air cargo terminal is a critical part of the air cargo supply chain that serves as a platform for interfacing between the land and air modes of transportation. At most airports, air cargo is sorted or processed in a cargo building or warehouse adjacent to the cargo apron before it is enplaned and after it is deplaned. On the landside, a cargo building typically has truck parking/docks with sufficient truck maneuvering areas. To accommodate numerous truck arrivals, space for processing, build up, and storage is usually a required attribute of these facilities, but the duration is to be limited by design and precise timing is ideal. Space requirements vary by carrier type and size of the airport's air cargo market.

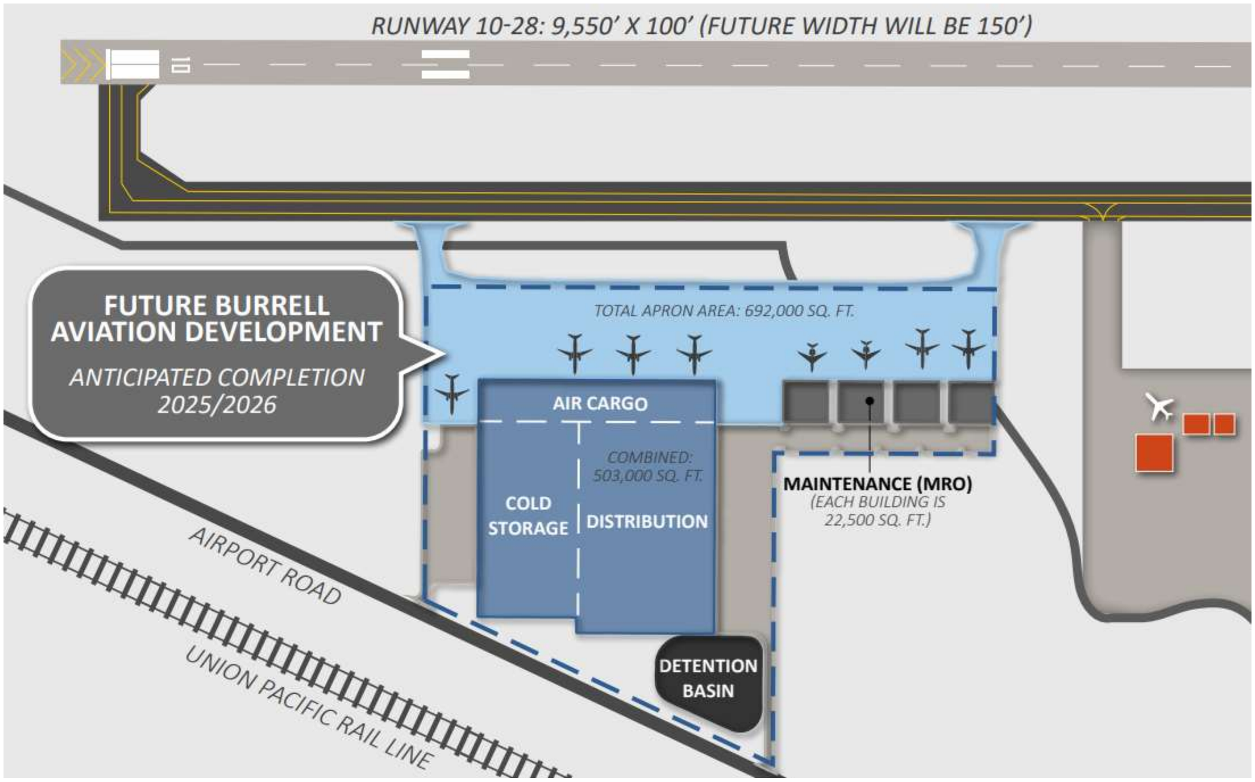
There are many different kinds of cargo terminal buildings, depending on the type of cargo carrier. Integrated express cargo buildings intended for sorting are different than a passenger airline belly cargo building or an all-cargo carrier building. An inadequately size air cargo building that is unable to accommodate peak volumes may result in shipment delays, while a cargo warehouse that is not designed with flexibility in mind to meet demand may become obsolete during its service live. At some airports in areas of the country with dry, warm climates, a cargo building is not required as processing can occur directly on the apron.

Due to the fact that there is not currently air cargo activity at DNA, there is no existing cargo terminal building or warehouse facility. The more than 50 existing buildings at DNA including eight banks of T-hangars, three banks of shade structures, numerous conventional hangars of varying sizes. Other existing structures at DNA include the following:

- Fire and Emergency Hazardous Materials (Hazmat) Response Station
- Airport Administration Building (Located in Hazmat Building)
- Customs and Border Protection Building
- War Eagles Museum
- FBO facilities
- National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) Office

Depending on the type and volume of the cargo activity, a warehouse facility is not always necessary, especially in a warmer, drier climate like that of Doña Ana County. As shown in **Figure 3-6**, the *DNA Mutli Modal Master Plan 2017* designated land northwest of the existing West Heavy Apron for future cargo use, while additional undeveloped northwest of the West Heavy Apron and Francis Aviation was reserved for corporate and small general aviation developments. In August 2022, County Commissioners approved a 45-acre land lease with Burrell Aviation for a portion of DNA property previously reserved as corporate general aviation activity per the 2017 Master Plan. Burrell Aviation intends to invest approximately $72 million to build an air cargo handling facility, cold storage, distribution center, and aircraft maintenance facility at DNA. The contract requires the County to make significant investment to upgrade DNA's runway, several taxiways, apron area, and other infrastructure to accommodate larger and heavier aircraft.[30] A conceptual layout for this future development is presented in **Figure 3-7**.

Figure 3-7: Future Cargo and Warehouse Facilities

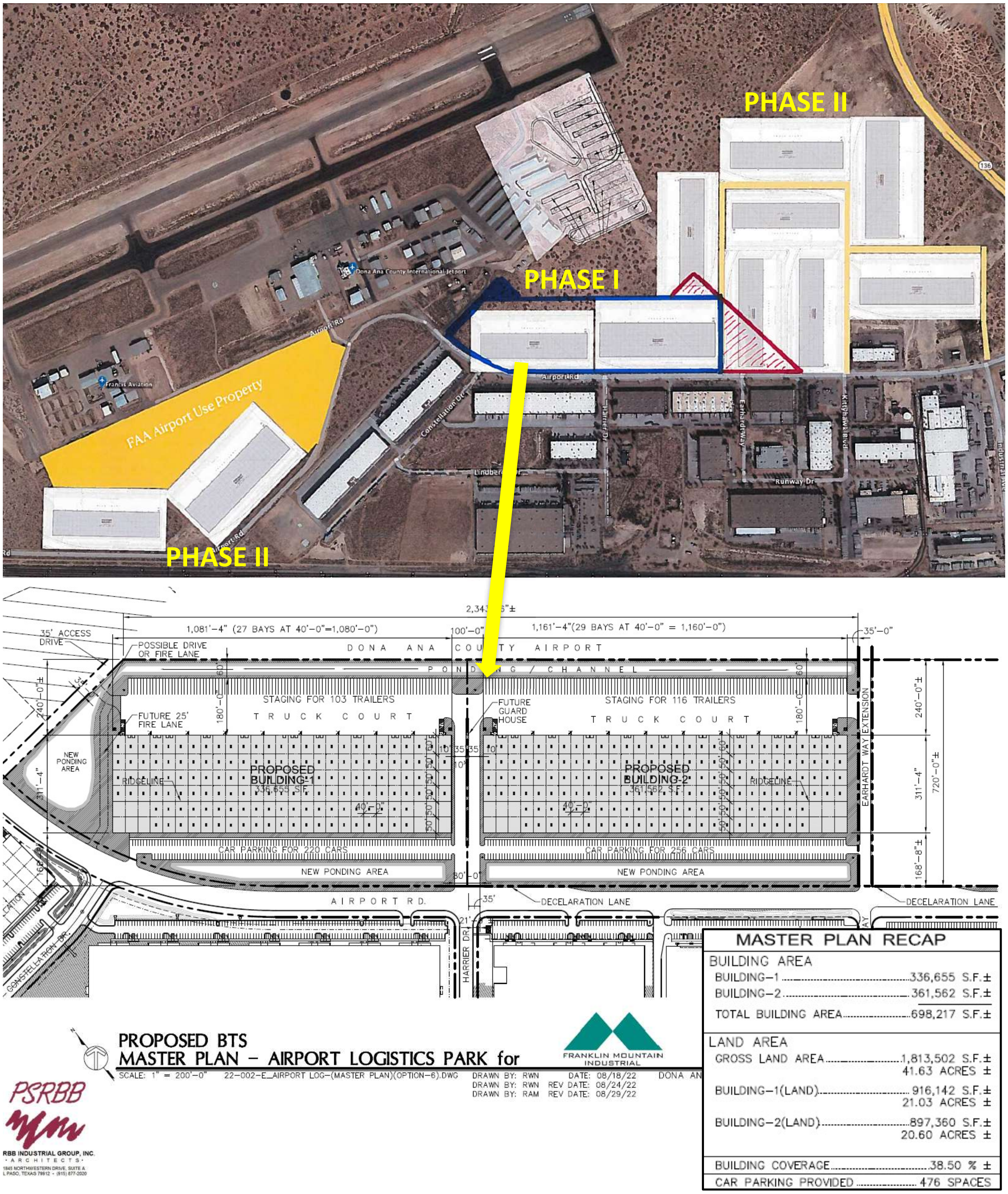


Source: Burrell Aviation

DNA has a significant amount of land available for non-aeronautical development. To build off the success of the adjacent industrial park, the airport has designated much of this land for future development of warehouse and manufacturing facilities. The overall development plan is presented in **Figure 3-8**. Phase I will be developed by Franklin Mountain Industrial, which is the owner of Francis Aviation and is an airport tenant. Phase I will include two buildings that combine for nearly 700,000 square feet. Phase II could include up to nine additional buildings on airport property.

[30] https://www.lcsun-news.com/story/news/local/county/2022/07/12/doa-ana-county-commission-approves-land-lease-with-tenant-at-jetport/65372184007/

Figure 3-8: Future Non-Aeronautical Development Plan



Source: DNA Airport, Franklin Mountain Industrial, PSRBB Industrial Group

3.1.6 Fixed Base Operator

Francis Aviation is the sole Fixed Base Operator (FBO) at DNA. Francis Aviation provides a variety of services at DNA, including:

- Weather and flight planning room
- Ground transportation (taxi and limousine)
- Full and self-service fuel (100 LL and Jet-A)
- Climate-controlled hangar space
- Aircraft parking and small aircraft tie-down
- Oxygen and nitrogen
- Aircraft towing
- Lavatory service
- Refreshments and potable water
- Aircraft ground cooling
- Restrooms
- Ground power
- Forklift
- Baggage handling

FBO operations are supported by their main building, located on the west side of DNA. Francis Aviation is part of Franklin Mountain Development, who owns five buildings at DNA. Francis Aviation has ground service equipment (GSE) which includes electric tugs capable of towing aircraft weighting up to 100,000 pounds. Through discussions with Francis Aviation representatives, the FBO is interested in providing ground handling and loading/offloading services to a potential air cargo user, in addition to standard aircraft line services which would include fueling.

3.1.7 Landside Access

All airport facilities are accessible by ground via Airport Road. The eastern terminus of Airport Road is at the intersection with McNutt Road by Santa Teresa High School. The western terminus is at the Union Pacific Intermodal Rail Terminal facility, immediately west of DNA. Southeast of DNA, Airport Road intersects with State Road 136 (NM 136), designated as Pete V. Domenici International Highway. This Highway is a nine-mile road running from the Santa Teresa Port of Entry, at its southern terminus on the Mexican border, to the Texas state line at its northern terminus. The Highway continues as State Highway 178 (TX 178), or Artcraft Road, for three miles in Texas, connecting to Interstate 10 (I-10) and numerous other surface roads in West El Paso, Texas.

On DNA, vehicle parking is available adjacent to most buildings; however, there is no existing dedicated parking in the future cargo and warehouse areas. DNA's regional roadway access network is shown in is shown in **Figure 3-9**.

Figure 3-9: DNA Regional Location and Roadway Network

Source: Jviation

3.1.8 Safety and Security

Emergency services at DNA are provided by the County Sheriff and local volunteer firefighters as needed; however, these services are not located at the airport. The County recently staffed a structural firefighting station located on the airport. Operators of Part 139 airports must provide Aircraft Rescue and Fire Fighting (ARFF) services during air carrier operations that require a Part 139 certificate. Security fencing is present around most facilities that require security; another restricted access gate is planned to further enhance airfield safety. Apron security lighting is in good condition and provides coverage to a large portion of the apron.

3.2 Current Air Cargo Activity at DNA

Although DNA has had air cargo activity in the past, flight records from recent years indicate it has not had any scheduled or on-demand operations by known air cargo operators. As discussed in the 2016 Air Cargo Study for DNA, Nordstar previously based air cargo aircraft at Doña Ana County International Jetport for approximately 20 years. This air cargo aircraft was based out of DNA but rarely picked up or dropped off cargo at the airport. Most of the time Nordstar ferried empty aircraft from DNA to El Paso International Airport to pick up loads, which is where the air cargo demand and support services exist. This service ceased in 2008.

4 DNA Air Cargo Market Analysis

4.1 Introduction

Airports, like other facilities such as retail shopping malls, compete with other airports for aviation business. Depending upon the location, aviation business tenants may to operate at different airports. With this in mind, it is important for airport management to provide adequate facilities to retain and attract aviation tenants such as air cargo providers. More successful airports are often able to attract passengers and cargo from their immediate market area, as well as from a more extended market area. This section identifies nearby airports that are in competition with DNA for air cargo activity. By the very nature of the cargo industry's ability to utilize a host of modal combinations and routes structures, airports compete for air cargo tenants and activity at a regional level.

Some airports are more successful than others as it relates to attracting air cargo activity. This is a result of a host of factors which impact demand for air cargo services. These factors include:

- airport location in proximity to demand,
- proximity to other nearby airports offering cargo services and facilities,
- airport facilities and their ability to meet current and future air cargo demand,
- truck access to the airport,
- environmental issues, and
- community support of an airport and its cargo-related activity.

This section of the report includes the following subsections:

- Market Area Overview
- Regional Cargo Airports
- Air Cargo Demand

The market area overview highlights DNA's demographic trends, location, economy, and its infrastructure assets. The regional cargo airports section identifies the airports DNA competes with for air cargo activity, their activity levels/trends, and infrastructure in place to support air cargo carrier operations. The air cargo demand section summarizes potential air cargo demand identified for DNA that was identified as part of this study's outreach efforts.

4.2 Market Area Overview

4.2.1 Demographic Trends

The air cargo market area for DNA is roughly defined as the El Paso-Juárez "Borderplex" region. This region consists of El Paso, Texas, southern New Mexico, and Ciudad Juárez in the Mexican state of Chihuahua. On the U.S. side of the market area, the Borderplex includes the counties of El Paso and Hudspeth in Texas and Doña Ana in New Mexico. These three counties combine to make up the El Paso-Las Cruces Combined Statistical Area (CSA). Including Ciudad Juárez, the binational El Paso-Juarez area is a transborder agglomeration that is known as the Borderplex or Paseo del Norte. The region is one of the world's largest border communities with an estimated population of approximately 2.7 million. With an estimated population of 1.56 million in 2020, Ciudad Juárez makes up over half of the Borderplex's total population.

Borderplex assets include:

- a bilingual, business-friendly environment
- 70-plus Fortune 500 companies
- a highly motivated and skilled workforce
- state-of-the-art telecommunications
- international railways
- five international border crossings
- 14 universities or colleges
- 40 industrial parks
- over 300 days of sunshine per year

According to demographic data, the population of the El-Paso Las Cruces CSA grew by approximately 0.9 percent annually from 2010 to 2020. The region's population is projected to grow by 0.8 percent annually through 2040. This rate projected of growth outstrips the U.S. national average population growth rate of 0.7 percent annually over the future period.[31]

Ciudad Juárez population grew at an average annual rate of 1.7 percent from 2010 to 2020 and is projected to grow by approximately 1.1 percent annually from 2020 to 2040. The combined Borderplex region is projected to grow by an average rate of 1.0 percent through 2040, after experiencing an actual average annual growth rate of 1.4 percent from 2010 to 2020. Historic and forecasted population for each municipal components of the Borderplex are presented in **Figure 4-1** and **Figure 4-2**.

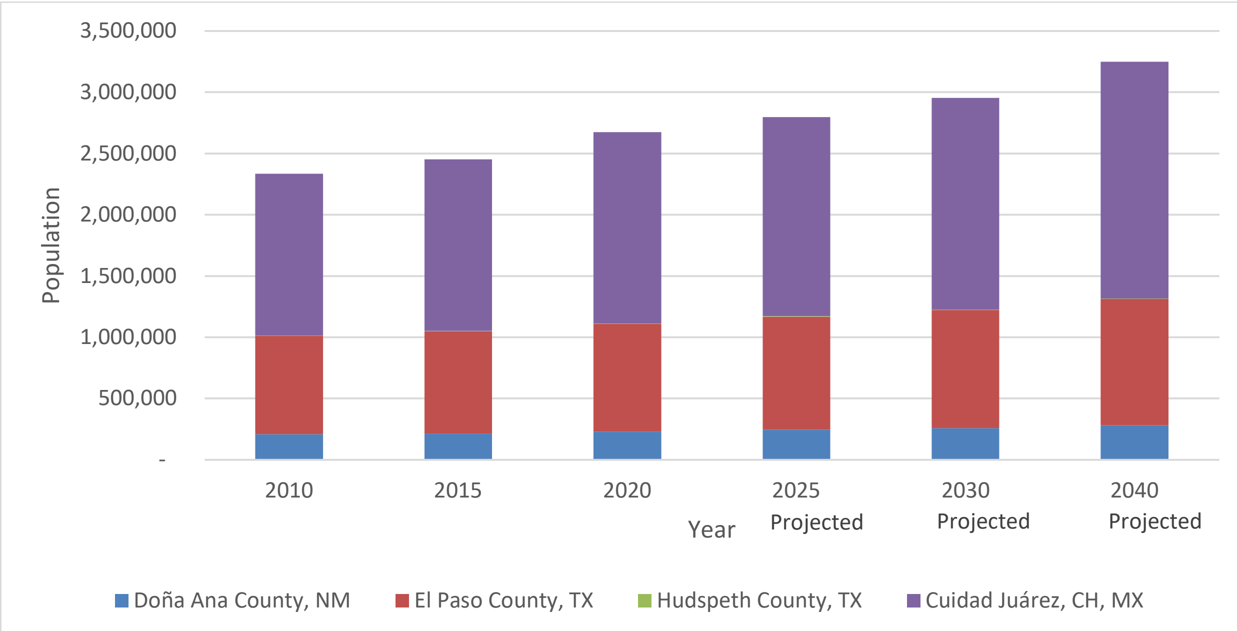
Figure 4-1: DNA Market Area – Historic and Projected Population Growth Detail

Geographic Area	2010	2015	2020	2025	2030	2040	AAGR 2010-2020	AAGR 2020-2040
Doña Ana County, NM	209,241	214,295	229,701	244,554	258,370	282,529	0.9%	1.0%
El Paso County, TX	800,647	835,593	879,568	922,759	962,296	1,029,972	0.9%	0.8%
Hudspeth County, TX	3,476	3,379	3,606	3,819	4,004	4,204	0.4%	0.8%
El Paso-Las Cruces CSA	**1,015,374**	**1,055,282**	**1,114,895**	**1,173,157**	**1,226,700**	**1,318,745**	**0.9%**	**0.8%**
Cuidad Juárez, CH, MX	1,321,004	1,398,400	1,560,821	1,625,985	1,730,337	1,932,226	1.7%	1.1%
Borderplex Region	**2,336,378**	**2,453,682**	**2,675,716**	**2,799,142**	**2,957,037**	**3,250,971**	**1.4%**	**1.0%**

Source: U.S. Census Bureau, New Mexico Economic Development Department, Texas Demographic Center, World Population Review, Jviation

[31]National Population Totals 2010-2020, U.S. Census Bureau, October 2021

Figure 4-2: DNA Market Area – Historic and Projected Population Growth Chart



Note: Hudspeth County is not visible on this chart.
Source: U.S. Census Bureau, New Mexico Economic Development Department, Texas Demographic Center, World Population Review, Jviation

While business-to-business activity is typically the largest driver of air cargo demand, e-commerce has driven recent increases in air cargo demand. Household income is relevant to air cargo demand as higher household income often correlates with more e-commerce purchases and, by extension, air cargo service to transport e-commerce purchases.

In 2016, Amazon reported the average household income for its Prime members was about $70,000 and that 70 percent of households in the U.S. with incomes over $112,000 have a Prime membership. Amazon Prime members receive free expedited shipping (one- or two-day) on most items, and shipments are often transported by Amazon's own growing fleet of aircraft. Many of Amazon's competitors, including Walmart and Target, have paid membership programs which include expedited shipping, furthering increased air cargo demand. **Figure 4-3** presents the historic and projected number of households within each household income range above $75,000 for the El Paso-Las Cruces CSA. As shown, in 2020 the El Paso-Las Cruces CSA had nearly 92,000 households with household incomes above $75,000, representing approximately 23 percent of all households in the area. By 2040, households in this income range are expected to increase to nearly 174,000 households, representing an even greater share of total households at 36 percent.

Figure 4-3: Market Area Households by Income Range (>$75,000) as a Percent of All Households

El Paso-Las Cruces CSA: Households by Income Range	2010		2020		2040	
	Households by Income Range	Percent of All Households	Households by Income Range	Percent of All Households	Households by Income Range	Percent of All Households
$75,000 to $99,999	27,919	8%	40,660	10%	77,024	16%
$100,000 to $124,999	16,663	5%	22,147	6%	42,028	9%
$125,000 to $149,999	8,406	2%	11,610	3%	22,003	5%
$150,000 to $199,999	6,188	2%	9,721	2%	18,422	4%
>$200,000	4,963	2%	7,423	2%	14,073	3%
Sum of all Households >$75,000	**64,139**	**19%**	**91,561**	**23%**	**173,550**	**36%**

Source: Woods and Poole 2021, Jviation

Like household income, per capita personal income and its change over time is a useful indicator of an area's economy and its potential demand for air cargo services. Per capita personal income can also be correlated to air cargo demand for both businesses and households. According to the Bureau of Economic Analysis, per capita personal income for the El Paso-Las Cruces CSA increased by 3.9 percent annually from $30,189 in 2011 to $44,258 in 2021. In comparison, U.S. per capita personal income rose by 4.1 percent annually from 2011 to 2021. This comparison indicates that per capital personal income for the El Paso-Las Cruces CSA is nearly keeping pace with the national average and, in fact, outpaced the U.S. growth by 0.5 percent over the past from 2016 to 2021.

4.2.2 Location and Infrastructure Assets

DNA is owned by Doña Ana County, and the Airport is located in the community of Santa Teresa in the southern portion of Doña Ana County. Doña Ana County borders the City of El Paso and El Paso County to the east and the Mexican state of Chihuahua the south. DNA is approximately three miles west of the Texas border and six miles north of the Mexican border.

DNA is a key part of a burgeoning multimodal logistics hub designed to serve not only the El Paso-Las Cruces CSA, but also a large and growing manufacturing sector located in nearby Juárez, Mexico. DNA is adjacent to important transportation and industrial infrastructure assets which include a major Union Pacific Intermodal Terminal, the Santa Teresa Port of Entry (POE), three separate industrial parks, and a major state highway that carries significant levels of cross-border trade to and from Mexico to the U.S. Interstate 10, which is a major east-west artery for the southern U.S., is also within close proximity to the Airport. Maps of the Borderplex region and local Santa Teresa area are presented in **Figure 4-4**, while some of the assets surrounding DNA are graphically depicted on **Figure 4-5** and are discussed in the following sections.

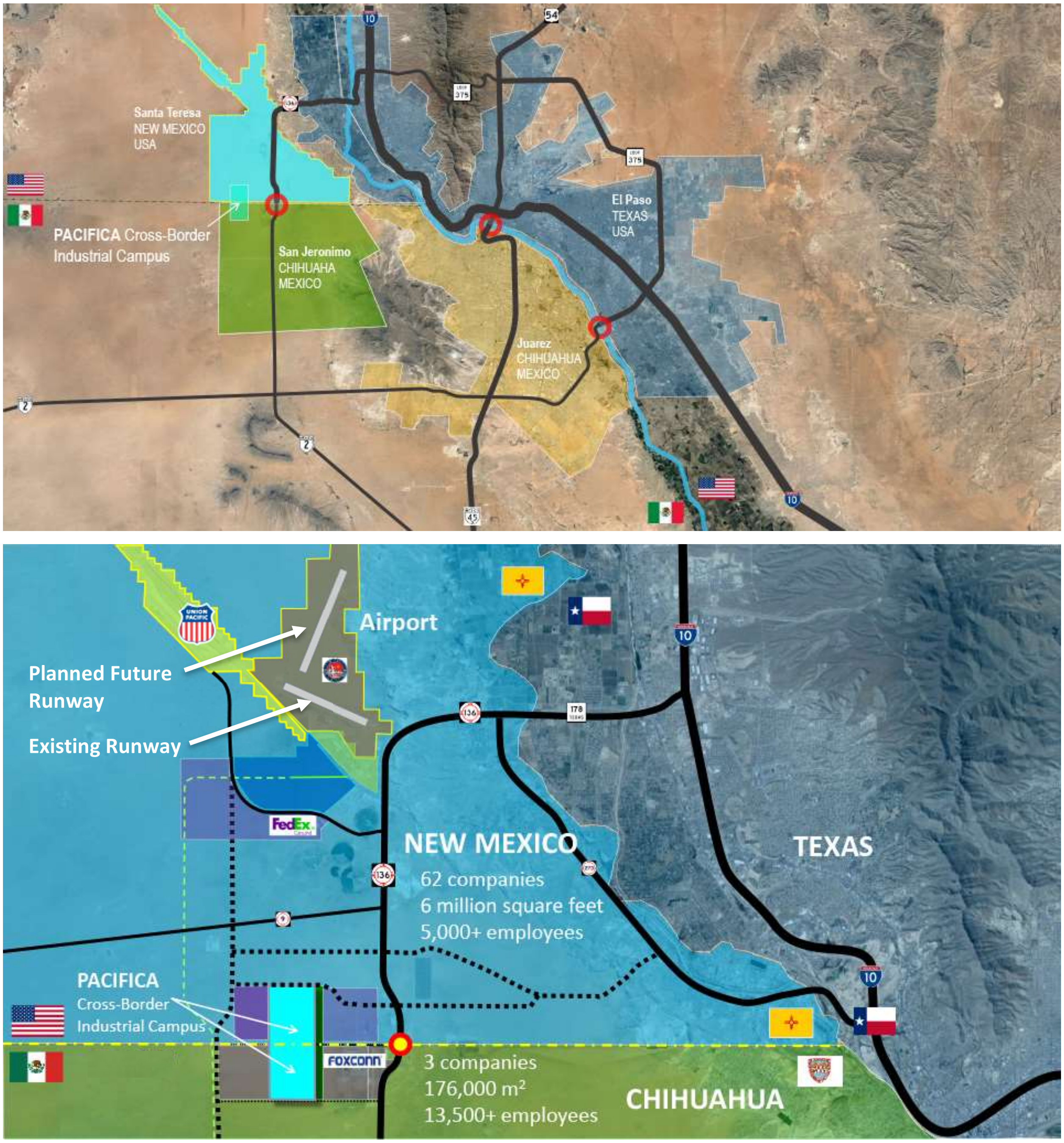
Santa Teresa Port of Entry

The Santa Teresa Port of Entry (STPOE) is located less than eight miles from DNA. The STPOE is the easternmost land crossing (as opposed to river or bridge crossing) between the U.S. and Mexico. As a result, it accommodates significant volumes of truck traffic, and it is the catalyst for extensive logistics development which has occurred around the Airport. The western terminus of Airport Road is at the Union Pacific Intermodal Rail Terminal facility which is immediately west of DNA. Southeast of DNA, Airport Road intersects with New Mexico State Road 136 (NM 136), designated as the Pete V. Domenici International Highway. This Highway is a nine-mile road that runs from the STPOE, at its southern terminus on the Mexican border, to the Texas state line at its northern terminus. The Highway continues as Texas State Highway 178 (TX 178), or Artcraft Road, for three miles in Texas. This Highway connects with Interstate 10 (I-10) and numerous other roads in West El Paso, Texas.

NM 136 carries high volumes of daily truck traffic due to its location between Interstate 10 and the Santa Teresa POE. The STPOE was originally built in 1992 to relieve pressure from the busy El Paso Bridge of the Americas Port of Entry. With recent expansion of STPOE facilities and new legislation that allows oversized and overweight cargo near the border, truck traffic on NM 136 has increased significantly. **Figure 4-6** shows the growth in truck crossings at the STPOE from 1996 to 2021. Traffic has increased by over 50 percent since 2015 alone and at a rate of 8.9 percent annually since 1996. As a result, NM 136 pavement was recently upgraded to enhance its condition to support activity along this important economic corridor.

Average wait times for commercial trucks heading northbound from Mexico to the U.S. via the STPOE are typically less than 30 minutes. The two alternate commercial POEs in the El Paso area are Bridge of the Americas and Ysleta-Zaragoza. Wait times at these POEs for northbound commercial trucks is often two to four hours. For maquilas seeking to ship materials by air out of El Paso International Airport (ELP), they often have to adhere to a 3 P.M. manufacturing cutoff time in order to make timely departures out of ELP. Despite being farther, by mileage, for most maquilas, the STPOE is often the fastest route to ELP due to its short wait times compared to the other two POEs in El Paso.

Figure 4-4: Maps of Borderplex Region and Santa Teresa Area

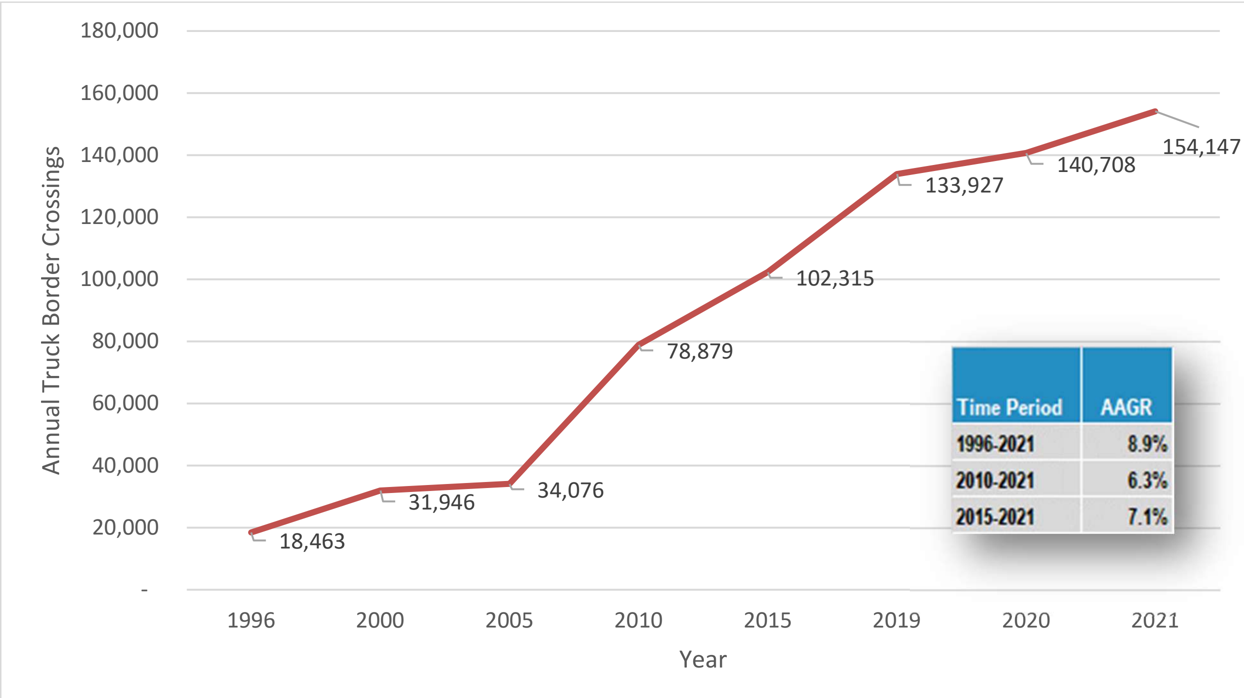


Source: Reshore North America

Figure 4-5: Aerial Images of DNA and Other Area Infrastructure Assets

Source: Union Pacific, Border Industrial Association, Ironhorse Resources

Figure 4-6: Santa Teresa POE Annual Truck Border Crossings, 1996-2021



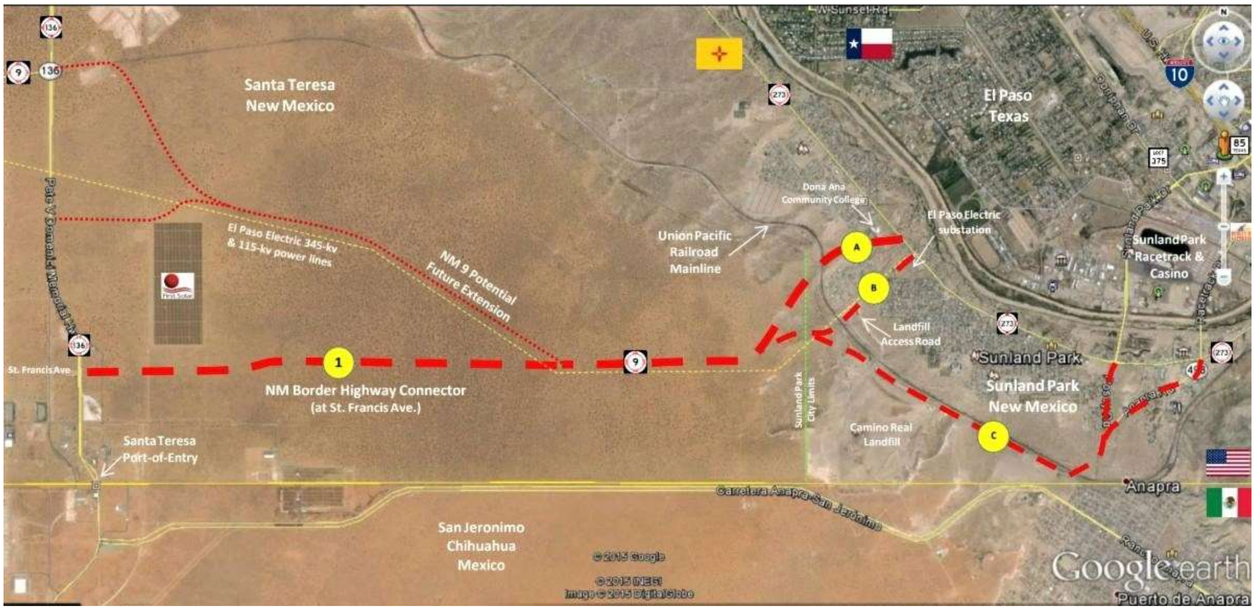
Source: U.S. DOT, Bureau of Transportation Statistics

Each day, upwards of 650 trucks cross the border at the Santa Teresa Port of Entry and drive the 13-mile stretch of NM 136 and TX 178 from the border to Interstate 10. Both westbound and eastbound truck traffic currently uses this route. However, a new road called the "New Mexico Border Highway Connector" is proposed to help enhance efficiency for eastbound traffic to both El Paso's Border West Expressway (U.S. 85) and I-10 East. The proposed roadway improvement would also enhance safety. The proposed enhancement would give vehicles an alternate access route instead needing to travel by Santa Teresa High School via Airport Road to reach McNutt Road. The exact alignment for the new road is yet to be determined, but the goal is to make it an efficient loop connecting all Ports of Entry in the region.[32] With increasing border crossings and planned investments on both sides of border around the Santa Teresa Port of Entry, this proposed roadway, along with existing NM 136, will remain vital arteries for the movement of freight between the U.S. and Mexico.

Proposed routes for the new highway connector are presented in **Figure 4-7**.

[32] https://www.borderreport.com/regions/new-mexico/border-highway-connector-a-game-changer-for-industry-official-says/

Figure 4-7: Draft Routes for Proposed Border Highway Connector



Source: New Mexico Border Authority via Border Report, September 2022

Industrial Parks

The Santa Teresa Industrial Park is located across from DNA and was established in the late 1990s specifically to compete with El Paso's numerous industrial parks. It was intended to capitalize on growing volumes of truck traffic crossing the U.S.-Mexico border at the Santa Teresa POE, which is located less than 8 miles south of the airport. The Santa Teresa POE opened in 1992 to alleviate congestion at the busier El Paso Bridge of the Americas Port of Entry between El Paso, Texas and Juárez, Mexico.

Over the past two decades, warehouse space at the Santa Teresa Industrial Park has been steadily filling up as many businesses are relocating from other areas in Texas and California due to the more economical lease rates and quick access to Mexico and Interstate 10. The strong growth is attributed to New Mexico's overweight zone for commercial cargo. This zone is a 12-mile radius around the Santa Teresa POE that is approved for shipments of up to 96,000 pounds, an increase over the normal limit of 80,000 pounds. This allows heavier shipments to move from Chihuahua north through the less congested Santa Teresa POE and into warehouse facilities in Santa Teresa. At area warehouses the loads are reduced, sorted, and distributed across the U.S. Many businesses in area industrial parks specialize in this form of logistics. Examples of industries represented by industrial park tenants include:

- Automotive Components
- Computers and Components
- Concrete and Quarry Materials
- Confections
- Foam Manufacturing
- Glass Supplier
- Industrial Cable (Copper, Steel, Fiber Optic)
- Livestock and Meat Packaging
- Logistics
- Metal Fabrication, Stamping, Recycling
- Packaging Products
- Produce Importing
- Refrigerated Warehousing
- Semi-Truck Trailer Manufacturing
- Telecommunications Equipment
- Wind Turbine Blades

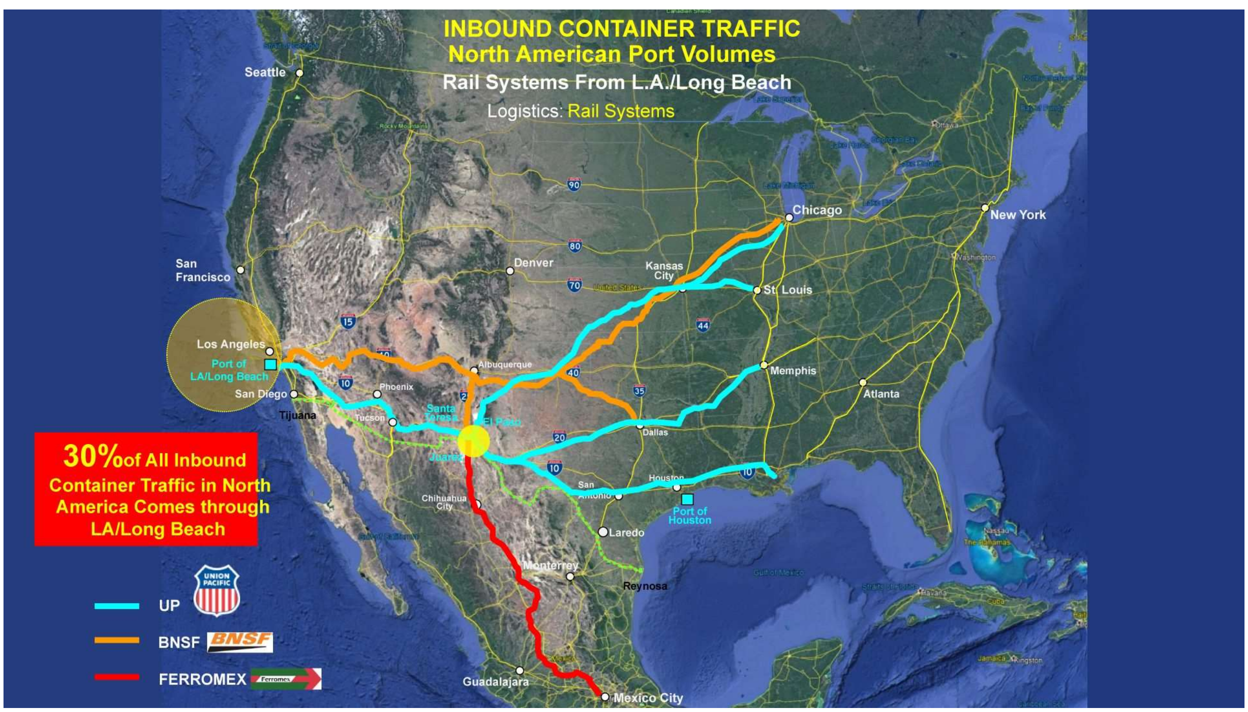
Major logistics firms in the adjacent industrial parks include Expeditors, JH Rose Logistics, Aries Worldwide, and Pedraza Customhouse Brokers. The latter two businesses opened their Santa Teresa facilities in November 2022. Houston-based Aries Worldwide expanded to Santa Teresa to better serve its customers in the high-growth Borderplex with its warehousing, packing, and brokerage solutions via trucking, rail, maritime, and airfreight modes. Similarly, Pedraza Customhouse Brokers selected Santa Teresa due to the need for customs brokerage and warehousing services to meet sustained growth of the STPOE.[33] As previously discussed, Expeditors is one of the world's largest freight forwarders and is the primary forwarder for the Foxconn plant. These types of businesses use air cargo services and could potentially benefit from the availability of such service at DNA.

Additionally, Doña Ana County is eligible to establish a free-trade zone anywhere within the County under Foreign Trade Zone (FTZ) 197. Adjacent industrial parks, south of the rail corridor, are still growing and have significant expansion potential. These include Gateway Rail Park and Westpark.

Rail

In 2014, Union Pacific Railroad opened its $500 million Santa Teresa Intermodal Facility adjacent to DNA. This intermodal facility serves as an inland port. The 2,200 acre-site is a major transshipment hub for container shipments between the Ports of Los Angeles, Long Beach, Houston, and the rest of the US. It is the cutoff point for a double track rail corridor that originates in Los Angeles; this is one of the largest rail corridors in the U.S. by volume. A planned customs station at this intermodal facility will allow processing of containers that arrive initially by ship in Santa Teresa instead of at the ocean ports. According to the Border Industrial Association, 30 percent of all inbound container traffic in North America comes through the Ports of Los Angeles and Long Beach. **Figure 4-8** identifies several major existing freight railroads that connect through the DNA market area.

Figure 4-8: Major Existing Freight Railroads Connecting through Santa Teresa or El Paso



Source: Border Industrial Association

In May 2022, Mexican officials announced plans for the T-MEC rail corridor to run through Santa Teresa, New Mexico instead of through Laredo, Texas as originally planned. The T-MEC Corridor will connect the newly

[33] Two Texas-based businesses expand into Santa Teresa (yahoo.com)

expanded Port of Mazatlán in the Mexican state of Sinaloa with Winnipeg, Canada.[34] The Port of Mazatlán is expected to have a capacity of 4 to 8 million containers per year. It is intended to alleviate congestion at other Pacific ports, namely the Ports of Los Angeles and Long Beach.[35]

Although rail freight is not typically associated with air cargo, the presence of the Union Pacific facility, coupled with recent commitments for additional rail lines from Mexico, speak to the locational advantages of Santa Teresa to serve cargo. The major rail investments have already spurred development in industrial parks adjacent to the Airport, and the investments are expected to continue to support logistics growth on both sides of the border. This represents a prime example of Santa Teresa's strong position as a growing intermodal logistics hub.

4.2.3 Maquiladoras

Ciudad Juárez and Chihuahua are home to hundreds of manufacturing plants that are known as "maquiladoras" or simply "maquilas." Maquilas in Mexico are factories that operate under preferential tariff programs. These programs are established and administered by Mexico and the U.S. Foreign companies that produce eligible goods receive special tax breaks on certain imported supplies and raw materials from Mexico's government when they establish a maquiladora. In other words, assembly components, materials, machinery, and equipment for production purposes used in maquiladoras are allowed to enter Mexico duty-free.

The maquila industry has seen tremendous growth in recent years as a result of the "nearshoring" trend. Nearshoring is the outsourcing of business processes, such as manufacturing, to a nearby country. In this case, corporations located in the U.S. are bringing manufacturing processes to Mexico instead of more distant locations commonly seen in traditional outsourcing, such as in Asia. Today, the Maquiladora Program, formally known as IMMEX, is the second largest industry in Mexico, surpassing tourism and second only to the petroleum industry. Across Mexico, there are approximately one million people working at over 3,000 maquilas.[36]

When compared to other industrial locations in Mexico, Ciudad Juarez offers an important competitive advantage in that its central location borders Texas and New Mexico. In addition, it has an efficient transportation infrastructure that includes several efficient international truck and rail crossings. Because of the availability of plentiful, skilled, and high-quality labor at a reasonable cost, Juárez is home to diversified and developed manufacturing clusters.

Juarez has two industries that favor operating out of maquiladoras as a result of the weight of the goods being transported; these industries are heavy metal manufacturing and automotive manufacturing. These two industries account for more than 60 percent of the maquiladoras in Juárez. However, companies from virtually all industries are investing in manufacturing through maquiladoras in Juárez.[37]

In total, Juárez is home to over 330 maquilas, of which more than 70 are Fortune 500 companies. Some of the major manufacturing sectors represented in Juárez include appliances, pharmaceuticals, industrial machinery, automotive and transportation equipment, aerospace components, communications equipment, semiconductors and electronics, medical equipment, metal fabrication, plastics, audio and video equipment, and computer equipment. Notable firms include Philips, Epson, Toshiba, Electrolux, Bosch, Ford, Goodyear,

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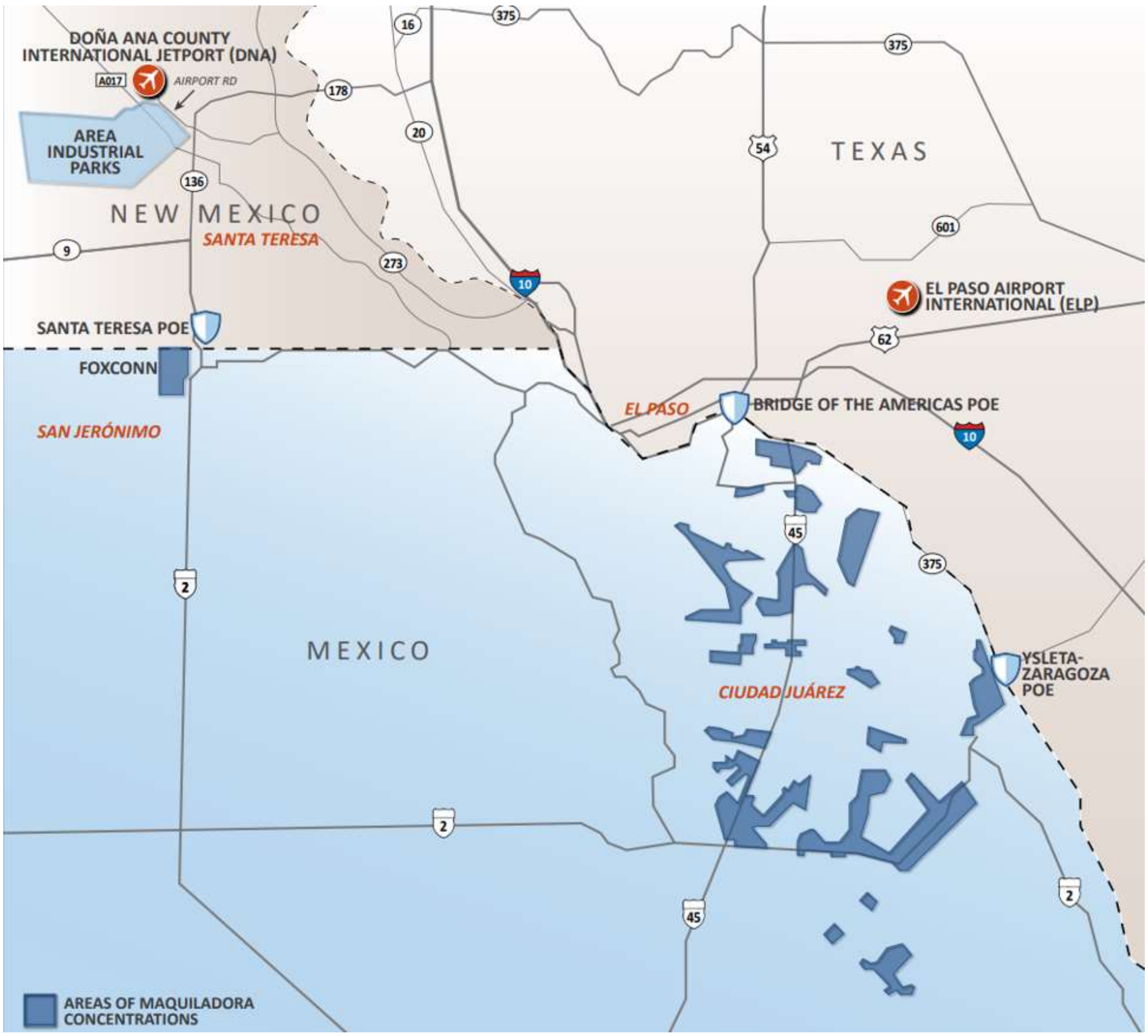
[34] Mexico Shifts Trade Railway from Texas to New Mexico over Abbott's Enhanced Border Checks (yahoo.com)
[35] Mazatlan's T-MEC Corridor new port and railroad are "imminent" says Ministry of Economy - The Mazatlan Post (mexicodailypost.com)
[36] North American Product Sharing, Inc.
[37] TECMA

Johnson & Johnson, Foxconn, Flextronics, Lexmark, Delphi, Visteon, Johnson Controls, Lear, Boeing, Cardinal Health, Yazaki, Sumitomo, and Siemens.

Notably, one of the largest maquilas in the area is Foxconn. Foxconn's main facility is in San Jerónimo adjacent to the Santa Teresa POE, less than 10 miles from DNA. This facility assembles computers for Dell and HP. The footprint of this facility has doubled to approximately 2 million square feet to consolidate production capacity from other plants. Centralizing production helps Foxconn exploit economies of scale for logistics, employee transport, and dining services. **Figure 4-9** identifies the areas in Juarez and Chihuahua with maquila facilities. As shown, extensive swaths of land area are dedicated to manufacturing. The Foxconn facility is visible along the U.S.-Mexico border in the upper-left corner of the image depicted in **Figure 4-9**.

Figure 4-9: Maquiladoras in the Juárez Area



Source: Jviation

Beyond Juárez, Chihuahua is a major automotive manufacturing hub. The state ranks 4th in Mexico as the largest exporter of auto parts. Their average annual exports, of over $12 billion, represent 20 percent of all automotive exports from Mexico. Over 18 percent of all employees in Chihuahua are associated with the automotive manufacturing industry.[38] Maps of major automotive and aerospace manufacturing locations in Mexico are presented in **Figure 4-10**.

Figure 4-10: Map of Automotive and Aerospace Industry Clusters in Mexico

Source: American Industries Group, Entrada Group

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[38] [Chihuahua ranks first in automotive industry jobs - MEXICONOW (mexico-now.com)]

4.2.4 Summary

Situated approximately 35 to 60 minutes, depending on traffic, from the El Paso International Airport (ELP), and roughly equidistant between the ports of Long Beach and Houston, Santa Teresa is a unique multimodal logistics hub. It is located on the edge of a growing binational community and serves an ever-increasing level of cross-border trade and investment from entities around the world.

With much of the land within the El Paso city limits nearly fully developed, planners and developers are expecting the trend of growth around the Santa Teresa area to continue. The Santa Teresa area makes up the majority of the region's remaining flat land suitable for commercial and industrial development. The proximity to the relatively uncongested Santa Teresa POE only enhances the strategic value of this area for development. Future development plans in the area call for industrial, residential, commercial, and solar-energy land uses. It is a unique area in that, with its existing infrastructure assets combined with available land, is poised for explosive growth and many development opportunities. The area provides opportunities for air cargo users to capitalize on the logistics assets of the market area. As the area grows, the air cargo market potential for DNA will increase.

4.3 Regional Airports – Cargo Trends and Facilities

The air cargo market area for DNA can be roughly defined as the El Paso-Juárez "Borderplex" region, which consists of Doña Ana County in New Mexico, El Paso and Hudspeth Counties in Texas, and portions of the Mexican state of Chihuahua around Juárez. While DNA does not currently support any regularly scheduled or on-demand air cargo activity by known cargo carriers, there are airports in its extended market area that do support cargo activity. There are airports with air cargo service within both the primary market area for DNA as well as the Airport's secondary or adjacent market areas. For the purposes of this analysis, the primary market area is considered a 60-minute drive time, or approximately 100-mile radius. The secondary market area is not exact but roughly extends by a one-to-two-day truck drive beyond primary market.

Within DNA's primary market area there are two nearby airports:

- El Paso International (ELP)
- Las Cruces International (LRU)

In secondary or adjacent market areas to DNA, there are five airports with significant air cargo activity. These airports include:

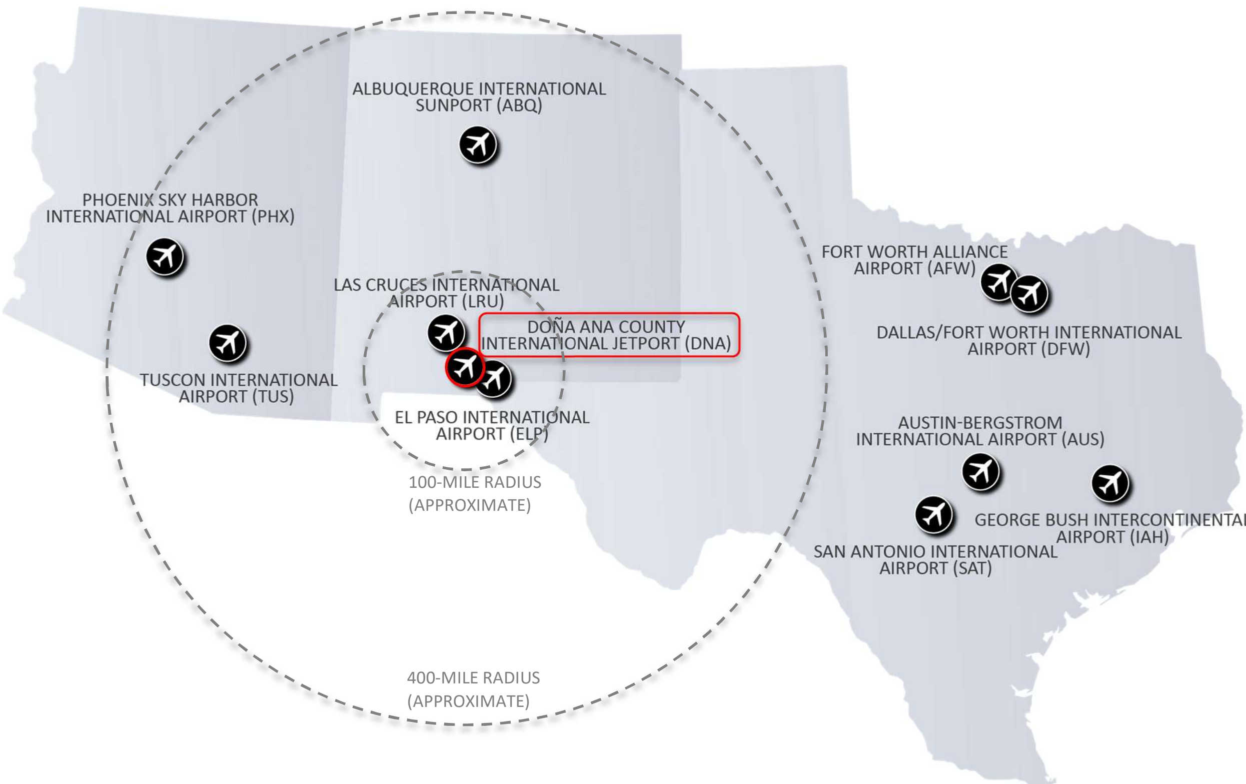
- Albuquerque International Sunport (ABQ)
- Dallas/Fort Worth International (DFW)
- Perot Field Fort Worth Alliance Airport (AFW)
- George Bush Intercontinental (IAH)
- Phoenix Sky Harbor International (PHX)

Three other airports in secondary or adjacent market areas are also included in the study area since each serve market areas comparable in size and growth to the El Paso-Las Cruces Combined Statistical Area (CSA). Each of these airports serve metro areas with populations of between 1 to 2 million residents.

- Austin-Bergstrom International Airport (AUS)
- San Antonio International Airport (SAT)
- Tucson International (TUS)

Each of these airports, in addition to DNA, are presented in **Figure 4-11** and the sections that follow describe each airport's air cargo infrastructure, carriers, and activity trends.

Figure 4-11: Regional Cargo Airports



Source: Jviation

4.3.1 El Paso International Airport (ELP)

El Paso International Airport (ELP) is the primary commercial airport for the El Paso-Las Cruces CSA, serving the same geographic market area as DNA. ELP supports seven passenger airlines, robust general aviation activity, and dozens of air cargo carriers. ELP facilities include three runways, the longest of which is over 12,000 feet in length. ELP has over 144,000 square feet of combined air cargo building space and over 34 acres of aircraft parking. Located approximately four miles northeast of downtown El Paso, it is the largest civil airport in West Texas as measured by passenger enplanements, aircraft operations, and air cargo tonnage. In 2021, ELP recorded over 1.4 million passenger enplanements.

ELP's main air cargo complex was built in the early 2000s for approximately $60 million. According to the airport, is the largest air cargo facility on the U.S.-Mexico border. The main air cargo complex, at the north end of the airfield, is where FedEx Express, DHL, UPS, and Amazon operate. The air cargo facilities in this area are approximately 70 percent occupied but the airport has significant expansion potential. A secondary air cargo area on the south side of the airport near Atlantic Aviation is where most other cargo activity takes place. The majority of the air cargo activity that takes place in this area is conducted by ad hoc/on-demand cargo charters that use smaller aircraft. Dozens of narrow-body jets and small or mid-size turboprop aircraft can be seen parked on this apron each day. These aircraft are either actively loading/unloading or awaiting their next payload to arrive at the airport. ELP also has a 60,000 square-foot airline cargo building at the southwestern corner of the airport. This facility handles freight that is carried in the belly compartments of passenger airlines that operate at this airport.

ELP's three cargo areas are illustrated in **Figure 4-12**. The airport is also part of Foreign Trade Zone (FTZ #68). The FTZ provides several advantages for users including deferred or reduced customs duties on goods shipped within the zone. This is particularly useful for international trade between businesses in El Paso and Ciudad Juárez, Mexico. It is important to note that DNA is also within a Foreign Trade Zone—Doña Ana County FTZ #197.

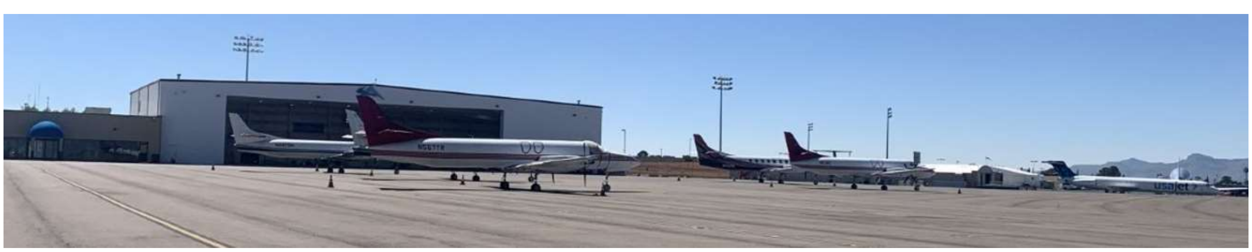


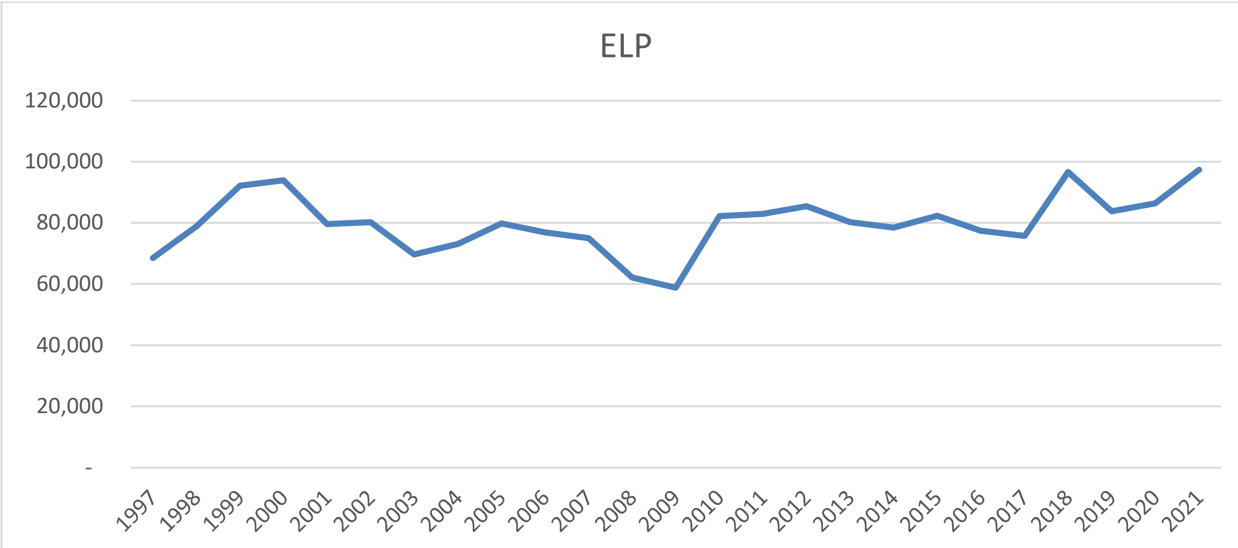
Figure 4-12: ELP Cargo Areas

Source: Google Earth

Regularly scheduled air cargo carriers at ELP include integrators FedEx Express, DHL, and UPS. In October 2022, Amazon Air started service at El Paso to serve its growing network of fulfillment centers. These carriers primarily operate domestic routes to their hubs within the U.S. ELP also serves significant levels of ad hoc, or on-demand, air cargo activity. An analysis of 54 months of FAA flight record data, spanning from January 2018 through June 2022, revealed that 41 known air cargo ad hoc carriers conducted over 40,000 operations out of ELP to over 330 markets, including numerous international destinations. ELP's top air cargo markets by number of operations include Memphis, Louisville, Lubbock, Albuquerque, Cincinnati, Chihuahua (Mexico), Indianapolis, Ontario (CA), Ypsilanti, and Laredo. ELP's top cargo carriers by operations include UPS, FedEx Express, GTA Air, Contract Air Cargo, Royal Air Freight, Kalitta Air, Berry Aviation, Atlas Air, USA Jet Airlines, McNeely Charter Service, Aeronaves, and Ameriflight.

In 2021, air cargo volumes at ELP reached over 97,000 metric tons, which is the highest level on record dating back to 1997. The prior peak was in 2018 at over 96,000 metric tons. In 2019, ELP saw cargo tonnage drop by 12 percent. Since 2019 however, cargo activity at ELP has continued its upward climb, increasing by 13 percent in 2021 alone. Historic air cargo tonnage trends for ELP from 1997 to 2021 are presented in **Figure 4-13**. Through 2021, ELP has seen average annual growth rates of 1.5 percent since 1997, 1.6 percent since 2011, and 4.7 percent since 2016.

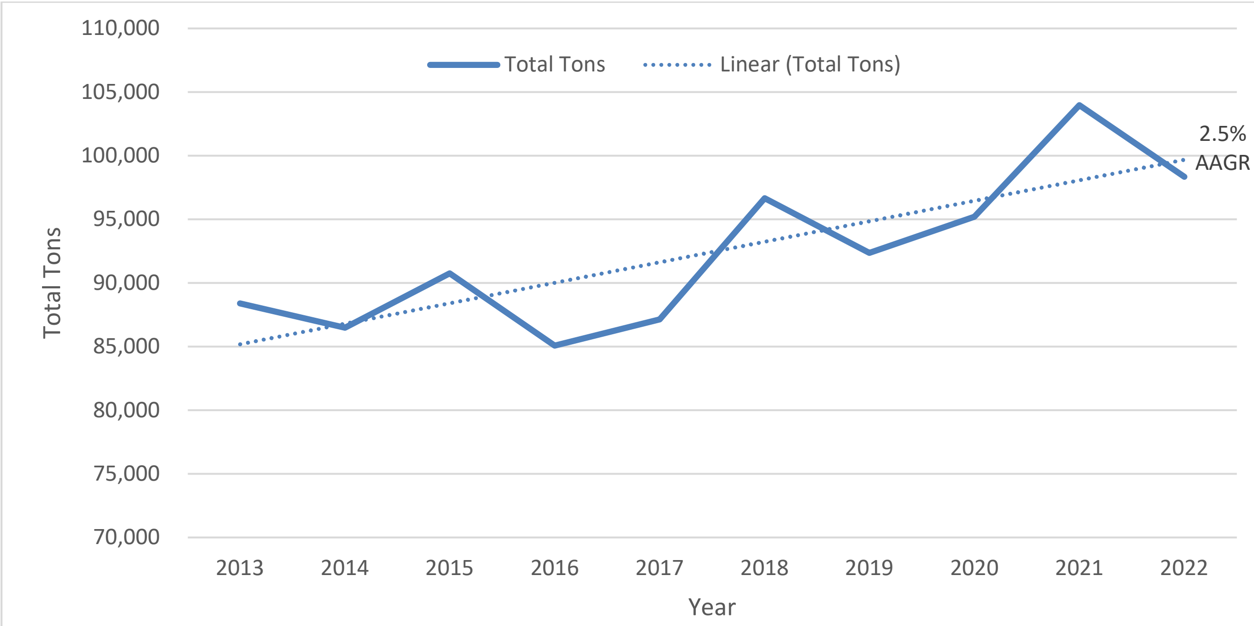
Figure 4-13: ELP Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

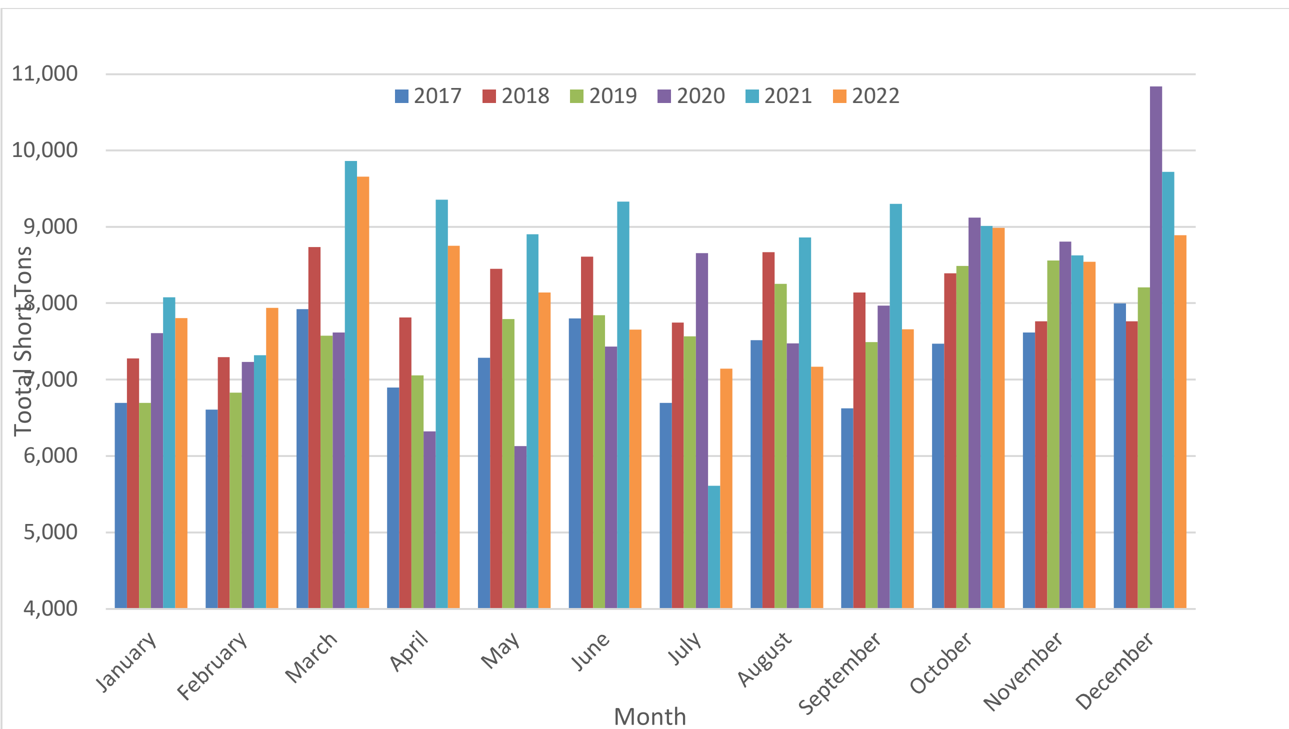
Recent tonnage trends for ELP from 2017 to 2022 are illustrated in **Figure 4-14** and **Figure 4-15**. As shown, average annual growth in total tonnage at ELP was 2.5 percent over this time period. By examining both annual and monthly trends, relatively large surges in air cargo volume can be observed in 2020 and 2021. Volumes for 2022 are generally lower than those observed in 2020 and 2021; however, 2022 volumes are still better than in 2019, and trends are in-line with those observed pre-COVID-19.

Figure 4-14: ELP Annual Tonnage Trends (2013-2022)



Note: November and December 2022 estimated based on historic month-over-month trends
Source: El Paso International Airport – Monthly Activity Report, November 2022; Jviation

Figure 4-15: ELP Monthly Cargo Trends (2017-2022)



Note: November and December 2022 estimated based on historic month-over-month trends
Source: El Paso International Airport – Monthly Activity Report, November 2022; Jviation

Aeronaves and Contract Air Cargo (two of the previously identified air cargo carriers operating at ELP) are notable in that they operate many international flights to and from ELP. Over a dozen air cargo carriers operate international flights out of ELP; however, these two carriers by far have the most international operations. International flights out of ELP are mostly related to the automotive and aerospace industries. These flights are a critical part of supply chain management for many businesses, distributing parts manufactured in Mexico to assembly plants throughout North America. This supply chain is essential to keep assembly lines moving – particularly for major suppliers such as BorgWarner/Delphi that supplies parts used by many manufacturers in the automotive industry. The cost of a production downtime at an automotive assembly plant can approach $22,000 per minute. Airports in Mexico with the highest number of operations to/from ELP include Chihuahua (MMCU), Hermosillo (MMHO), Saltillo (MMIO), and Querétaro (MMQT). The busiest Canadian market served by ELP is London, Ontario (CYXU), which is home to GM, Toyota, and Ford automotive assembly plants.

Globally, Mexico is the 4th largest supplier of auto parts, and it is the 7th largest vehicle producer. Mexico is also a major manufacturer for medical devices, electronics, appliances, and apparel. Although ELP's cargo flights may support these industries, it assumed that the highest percent of the airport's air cargo flights are related to the automotive and aerospace industries. This assumption is based on the presence of clusters of these industries in Mexico, their known correlation as air cargo demand generators, and through interviews conducted as part of this study. Many manufacturers in the Juárez area that fly goods out of ELP need to stop production early (3 P.M or earlier) to make timely departures out of ELP. This is due to total ground transit time and lengthy wait times for commercial vehicles at the two El Paso area Ports of Entry.

4.3.2 Las Cruces International Airport (LRU)

Las Cruces International is a general aviation airport situated off Interstate 10 in Las Cruces, approximately 50 miles north of DNA in Doña Ana County. LRU has three runways, the longest of which is over 7,500 feet in length. LRU has had scheduled commercial airline service on and off, with new service provided by Advanced Air starting in 2023. LRU supports the general aviation needs of the Las Cruces area, with the largest aircraft served typically being the occasional university athletic team that arrives via a chartered plane.

The air cargo needs of the Las Cruces area are primarily served through the integrated express carriers that operate at El Paso International (ELP). ELP is a 55 to 75-minute drive from downtown Las Cruces, depending on traffic. LRU previously had scheduled air cargo service by regional carrier Ameriflight who provided daily service to Albuquerque using a twin-engine piston Piper Navajo (PA31) aircraft. This Ameriflight service was a feeder flight for a larger UPS aircraft serving ABQ; however, this route ceased sometime around 2017.

An analysis of 54 months of FAA flight record data revealed that 10 known ad hoc air cargo carriers conducted 34 operations out of LRU from January 2018 through June 2022. Most operations were to ELP, suggesting that the airport's cargo role remains as an ad hoc/on demand cargo support facility. No historic or current air cargo tonnage data is available for Las Cruces International. The LRU airfield and its main apron area where cargo aircraft could park is presented in **Figure 4-16**.

Figure 4-16: LRU Apron Area

Source: Google Earth

4.3.3 Albuquerque International Sunport (ABQ)

Albuquerque International Sunport (ABQ) is the primary international airport serving New Mexico and the larger Albuquerque-Santa Fe-Las Vegas CSA. It is the busiest airport in New Mexico as measured by passenger enplanements and aircraft operations. ABQ is served by 10 passenger airlines with nonstop service to more than 20 destinations. In 2021, ABQ accommodated nearly 1.7 million passenger enplanements. ABQ is a joint civilian-military airport. It shares its three runways with Kirtland Air Force Base, one of the largest U.S. Air Force installations in the U.S. ABQ's longest runway is nearly 13,800 feet in length. Given the Albuquerque metropolitan area's sizable population of nearly 1 million residents, its relative isolation, and its distance to the next closest large metro area, ABQ serves as an important regional hub for air cargo.

The air cargo needs of the Central New Mexico market area are served by ABQ through scheduled service provided by integrated express operators FedEx Express and UPS. These integrators operate flights to their large hubs throughout the U.S. on a daily basis using narrow-body and wide-body jet aircraft. South Aero and Ameriflight operate as contracted feeder airlines for UPS, connecting many smaller market cities around New Mexico and in Colorado. These carriers use small turboprop aircraft. Similarly, Empire Airlines serves as a contracted feeder for FedEx Express serving smaller communities in the region from ABQ. From ABQ, FedEx Express operates to Lubbock and Memphis, while UPS operates to Dallas/Fort Worth, El Paso, Louisville, Ontario (CA), Phoenix, and Salt Lake City. South Aero and CSI Aviation, an on-demand charter service with cargo capabilities, are based at ABQ. In October 2022, Amazon Air started service between ABQ and Forth Worth Alliance Airport (AFW) to serve its growing network of fulfillment centers.

ABQ also serves significant levels of ad hoc, or on-demand, air cargo activity. An analysis of 54 months of FAA flight record data, spanning from January 2018 through June 2022, revealed that 43 known air cargo carriers conducted nearly 28,000 operations out of ABQ to over 180 markets, including a handful of international locations in Mexico. ABQ's top markets by number of air cargo operations include Phoenix, El Paso, Ontario (CA), Memphis, Louisville, Lubbock, Alamogordo, Clovis, Hobbs, and Roswell. ABQ's top cargo carriers by operations include UPS, Ameriflight, FedEx Express, Berry Aviation, Thunder Air, Royal Air Freight, Kalitta Charters, Ameristar Jet Charter, IFL Group, and Southern Air.

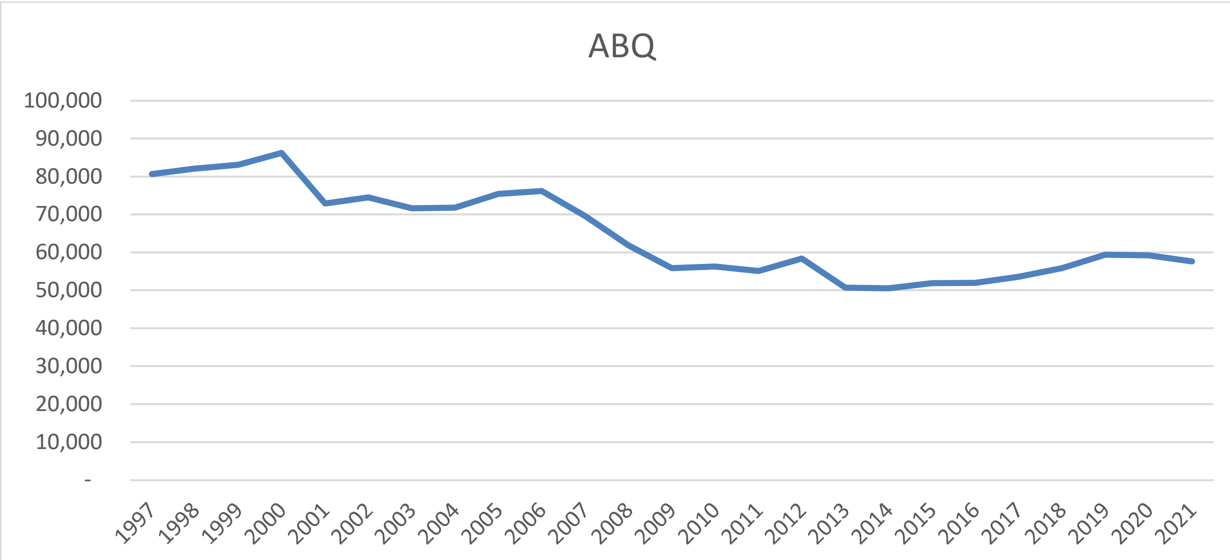
Historic air cargo tonnage trends for ABQ from 1997 to 2021 are presented in **Figure 4-18**. As shown, ABQ's air cargo volumes have declined since they peaked in 2000 at over 86,000 metric tons. Between 1997 and 2021, ABQ has seen volumes decline at an annual rate of -1.4 percent.

ABQ's main cargo area where Amazon, FedEx Express, UPS, and their feeder carriers operate is at the southwestern corner of the airport. This cargo complex includes a 50,000 square-foot cargo building and an 800,000 square-foot apron with eight parking positions for mainline jets and several feeder aircraft parking positions. ABQ also has a 40,000 square-foot commercial airline air cargo facility next to the passenger terminal to serve belly freight. These facilities are identified in **Figure 4-17**.

Figure 4-17: ABQ Cargo Areas

Source: Google Earth

Figure 4-18: ABQ Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

4.3.4 Dallas/Fort Worth International Airport (DFW)

Dallas/Fort Worth International Airport (DFW) is a large hub primary commercial service airport that serves North Texas and the Dallas-Fort Worth metroplex. Dallas is the fourth largest MSA in the U.S. with over 7.6 million residents. In 2021, DFW ranked as the 2nd busiest airport in the world by passenger volumes and the 3rd busiest for aircraft operations. By total cargo throughput, DFW ranked 10th in the U.S. and 32nd in the world in 2021.[39]

DFW is the largest hub for American Airlines and is a focus city for many other commercial passenger airlines. DFW is served by nearly 30 commercial passenger airlines with nonstop service to over 250 destinations in more than 30 countries. On the air cargo side, DFW serves as a major international gateway airport with over 25 air cargo carriers operating scheduled service. DFW's peer airports in terms of volume include Los Angeles (LAX), Chicago-O'Hare (ORD), Miami (MIA), New York (JFK), and Atlanta (ATL).

Carriers benefit from many of DFW's competitive advantages such as direct highway access, central location in the Americas, 2 million square feet of cargo warehouse space, 24-hour customs clearance, seven runways, and continual investment in its infrastructure. The airport is also designated as a Foreign Trade Zone (FTZ #39). This provides several advantages such as direct airside access, convenient rail access, and deferred or eliminated customs tariffs.

DFW is also one of two airports in the U.S. to achieve IATA CEIV Pharma Community status. This designation involves rigorous testing and facility audits to ensure the safe and efficient handling of pharmaceuticals and bio-life science goods. These industries are major industrial clusters in the North Texas area.[40] DFW's cold chain abilities and facilities to handle other perishable products such as flowers, fish, and vegetables enable the airport to serve routes to both Asia and South America.[41] E-commerce is also playing role in development

[39] Airports Council International – North America (ACI-NA), 2021
[40] DFW International Airport | Official Website (dfwairport.com)
[41] DFW facility upgrades to benefit Americas-Asia trade - AIR CARGO WEEK

at the airport. A 2.4 million square foot e-commerce logistics park is being constructed on airport-owned property, across Texas Highway 161.[42]

DFW is home to a major regional hub for UPS. This includes a 340,000-square foot building capable of handling 46,000 parcels per hour on a state-of-the-art conveyor and sorting system. The facility is designed to accommodate 19 jet aircraft including Boeing 757s, 767s and 747s. FedEx Express and Amazon also maintain sizable air cargo operations at the airport. Ameriflight and Empire Airlines serve as contract feeder airlines for UPS and FedEx Express, respectively. In 2014 Ameriflight relocated its headquarters from the Bob Hope Burbank Airport to DFW to serve its customers more effectively.

Other dedicated cargo carriers at DFW include Air China Cargo, Ameriflight, Amerijet, Asiana Cargo, Cargolux, Cathay Pacific Cargo, China Airlines Cargo, DHL, Eva Air Cargo, FedEx Express, Korean Air Cargo, Lufthansa Cargo, Martinaire, Nippon Cargo Airlines, Qantas Freight, Qatar Air Cargo, Silkway West Airlines, and Singapore Airlines Cargo. These carriers have over 80 cargo flights per day from DFW to markets throughout North America, South America, Europe, and Asia. International cargo represents approximately 35 percent of DFW's total air cargo activity. International destinations for air cargo transported from DFW include Beijing, Hong Kong, Hanoi, Shanghai, Taipei, Seoul, Hanoi, Mumbai, Singapore, Mexico City, Manchester, Brussels, Frankfurt, Copenhagen, and Sharjah.

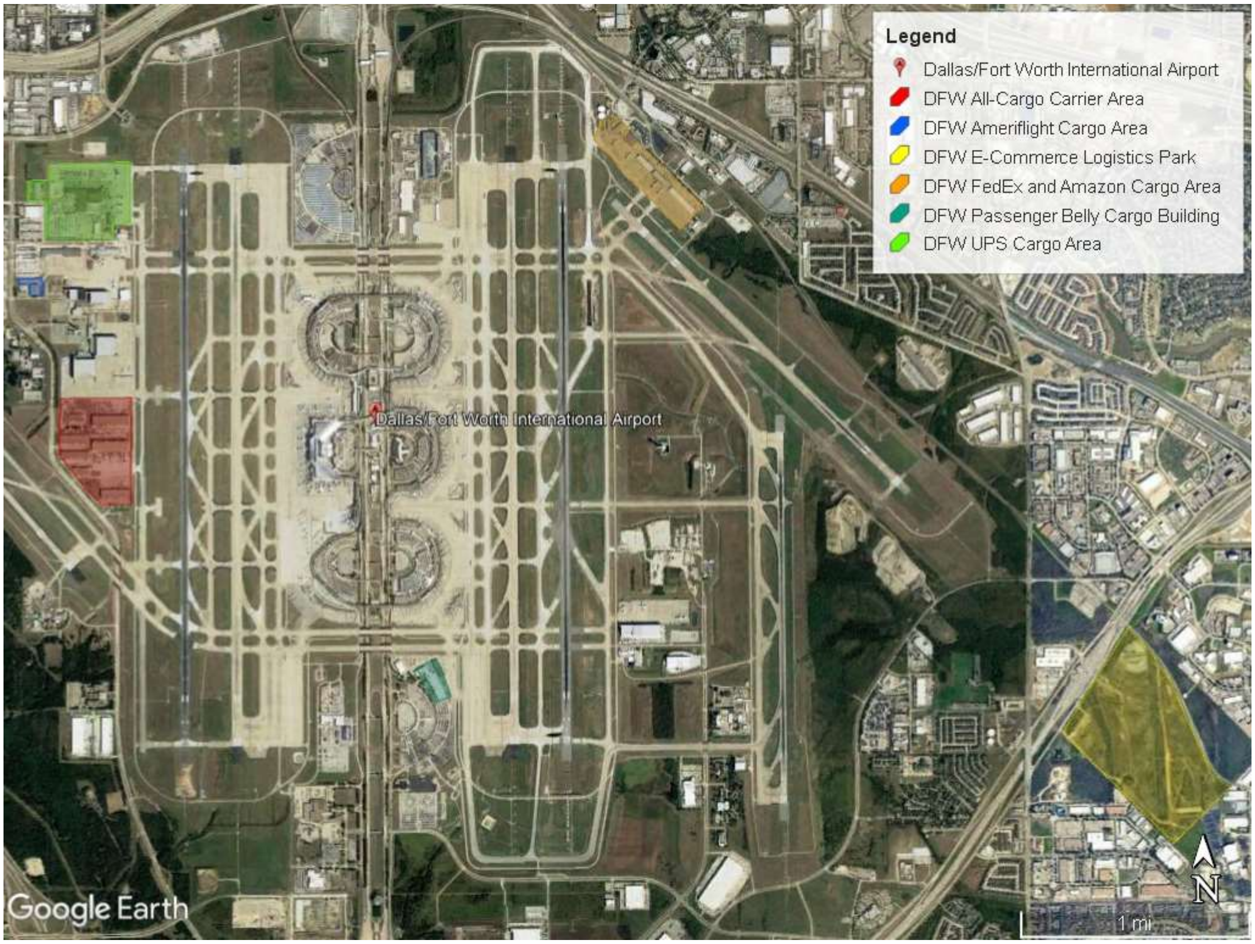
In addition to the dedicated cargo carriers at DFW, numerous commercial passenger airlines provide cargo lift capacity on routes operated with wide-body passenger aircraft. These aircraft have space designed to hold cargo containers in the belly of the aircraft. Commercial airlines serve many international destinations from DFW to airports in Europe, Latin America, Asia, and Australia. Information from the airport indicates that DFW is one of the largest inland global distribution centers in the U.S., encompassing 18,076 acres of land.

DFW's cargo facilities offer direct airside access within an interior airport roadway system that connects to four major interstate highways. DFW's marketing material indicates the airport has designated more than 2,000 acres (existing and future) of airport land for air cargo facility development. DFW's cargo areas are represented in **Figure 4-11**.

Historic air cargo tonnage trends for DFW from 1997 to 2021 are presented in **Figure 4-20**. In 2021, DFW handled over 910,000 metric tons of air cargo, which is the highest on record since 1997. This represents an average annual growth rate of 0.5 percent since 1997, 3.4 percent since 2011, and 3.9 percent since 2016. DFW saw a 12 percent decrease in cargo tonnage from 2019 to 2020 due to the COVID-19 pandemic but rebounded by over 15 percent from 2020 to 2021. Even prior to the COVID-19 pandemic, air cargo tonnage at DFW was growing rapidly, with an average annual growth rate of 7.2 percent observed from 2013 to 2019. This can be partially attributed to rapid growth in e-commerce and continued population growth of the metroplex region.

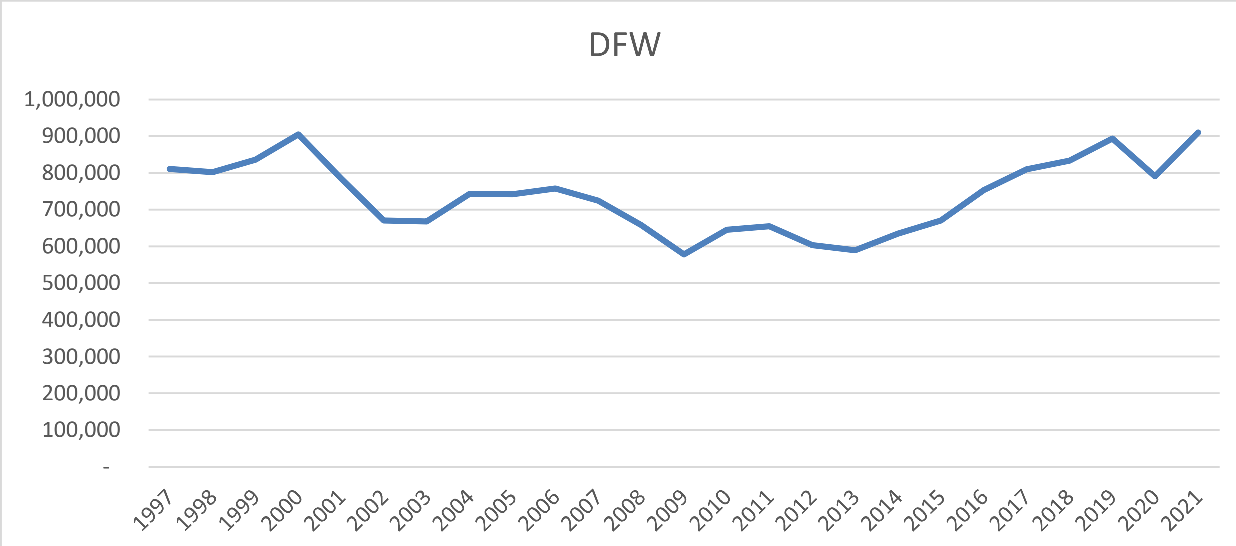
[42] E-commerce logistics park going up next to DFW airport - FreightWaves

Figure 4-19: DFW Cargo Areas



Source: Google Earth

Figure 4-20: DFW Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

Despite being over 600 miles and an eight-to-nine-hour drive by road from El Paso, DFW is relevant to the DNA air cargo market and larger Borderplex region. Because of its role as an international gateway airport, DFW accommodates significant volumes of international air freight that both originate in and are destined to the Borderplex region.

The Maquiladora's in and around Juárez, Mexico, produce countless goods including electronics, pharmaceuticals, automotive parts, aerospace parts, and apparel. Through discussions with Expeditors, one of the world's largest freight forwarders, it was determined that multiple truckloads worth of air freight pallets arrive at DFW and are trucked to the Borderplex region. Conversely, finished goods are also trucked from the Borderplex to DFW where they are put on freighter aircraft bound for Europe. This is a prime example of how large of a geographic catchment area from which an international gateway airport can draw demand. Since Expeditors is just one freight forwarder that reported this sort of activity, it can be assumed that DFW serves even greater volumes of Borderplex air freight.

4.3.5 Perot Field Fort Worth Alliance Airport (AFW)

Perot Field Fort Worth Alliance Airport (AFW) is a cargo-focused airport that is one of the fastest growing airports as measured by total air cargo tonnage. Situated on 1,198 acres of land, AFW is located 16 miles north of downtown Fort Worth and 20 miles northwest of DFW airport. AFW features two parallel runways that are 11,000 feet in length. These two runways and their taxiways were extended from their previous lengths of 8,200-feet and 9,600-feet. A $260 million in investment projects were completed in 2018. The runway projects were specifically undertaken to accommodate the requirements of large cargo aircraft in hot weather conditions so the planes can fly non-stop to Europe without a refueling stop.

AFW serves as a regional air cargo hub for both FedEx Express and Amazon. These are airport's two main scheduled air cargo carriers and have both exhibited substantial growth in recent years. FedEx Express is an integrated express carrier, while Amazon Air is the air transportation arm that serves the growing fulfillment network for the e-commerce giant.

FedEx Express operates its southwest regional hub at AFW where it operates mainline freighter aircraft to airports across the U.S. From AFW, FedEx Express flies to Atlanta (ATL), Chicago-O'Hare (ORD), Denver (DEN), Houston (IAH), Los Angeles (LAX), Memphis (MEM), Newark (EWR), San Antonio (SAT), Ontario (ONT), and Oakland (OAK). FedEx Express also contracts with carriers such as Empire Airways, Mountain Air Cargo, and Baron Aviation to operate feeder routes to smaller cities such as Midland (MAF), Shreveport (SHV), Wichita (ICT), Lubbock (LBB), and Austin (AUS) using turboprop aircraft. Cargo is flown by the feeder carriers to AFW for consolidation to be transported larger air cargo planes that operate at the airport.

As of September 2022, Amazon Air operated about 30 daily flights out of AFW to airports including Atlanta (ATL), Toledo (TOL), Chicago-O'Hare (ORD), San Francisco (SFO), Tampa (TPA), Wichita (ICT), Omaha (OMA), and Des Moines (DSM). Amazon Air flights are operated by contracted partners such as Atlas Air, Air Transport International, Silver Airways, and Sun Country Airlines using a wide-body Boeing 767s, narrow-body Boeing 737s, and turboprop ATR 42/72 aircraft.

AFW is part of a growing global logistics hub that includes many adjacent transportation assets. These transportation assets include a BNSF rail facility, Interstate 35W, and numerous distribution centers. These distribution centers include many household names such as Kraft Foods, JCPenney, Dickies, Amazon, Michael's, Cargill, Walmart, Harbor Freight, Sally Beauty, and Verizon. The airport is also part of Foreign Trade Zone (FTZ #196).

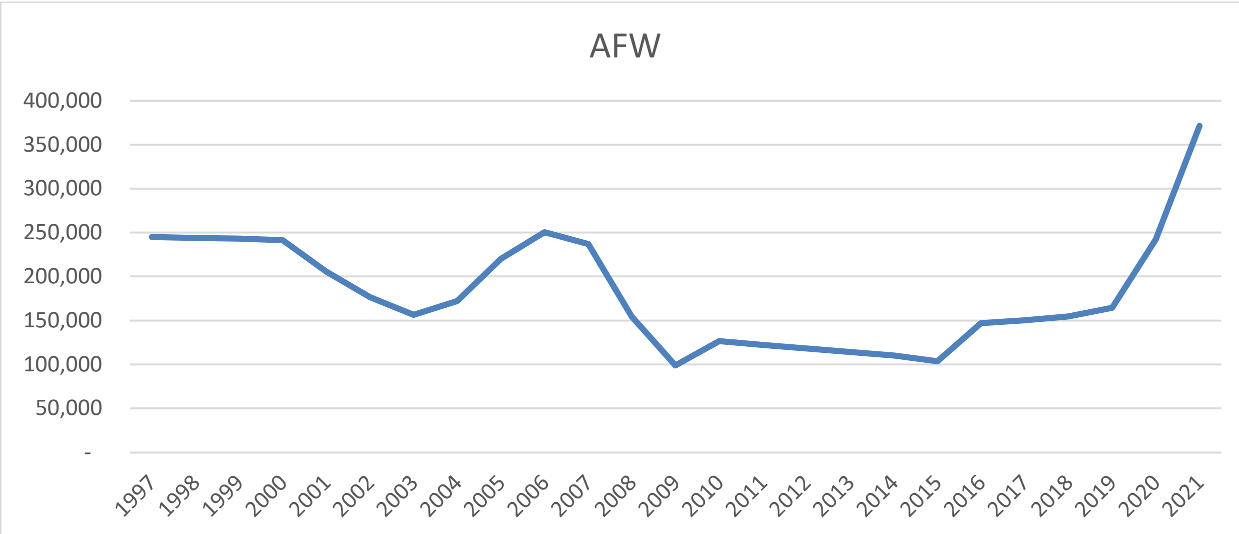
Amazon Air's AFW hub facility was built in 2019 and includes approximately 570,000 square-feet of building space and over one million square feet of apron area, including 12 aircraft parking positions. The FedEx Express hub was opened in 1997 and includes a 600,000 square foot sort facility, a 66,000 square foot administration building, and a 300,000 square foot ground distribution building. AFW's on-airport cargo areas are highlighted in **Figure 4-21**.

Historic air cargo tonnage trends for AFW from 1997 to 2021 are presented in **Figure 4-22** In 2021, AFW as the 23rd busiest cargo airport in North America. In 2021, the airport handled over 371,000 total metric tons of air cargo, which is an 85 percent increase over 2019. This sharp increase in air cargo tonnage is a result of Amazon Air establishing a regional hub at the airport and FedEx Express increasing service levels as well. Recent growth can be mainly attributed to the increases in e-commerce demand. Between 1997 and 2021, tonnage at AFW grew at an average annual rate of 1.7 percent.

Figure 4-21: AFW Cargo Areas

Source: Google Earth

Figure 4-22: AFW Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

4.3.6 George Bush Intercontinental Airport (IAH)

George Bush Intercontinental Airport (IAH) is a large hub primary commercial service airport that serves the Greater Houston metro area. Houston is the fifth most populous MSA in the U.S. Located approximately 23 miles north of downtown Houston, IAH is situated on 10,000 acres of land; this airport has five runways, the longest of which measures 12,000 feet in length. IAH ranks as the country's 12th busiest airport by passenger volume, 10th busiest by aircraft operations, and 18th busiest by total cargo tonnage.[43] IAH serves as an international passenger and cargo gateway to the south-central United States and as a primary gateway to Latin America.

Nearly 30 commercial passenger airlines serve IAH with non-stop service to approximately 120 domestic and 70 international destinations across six continents. IAH is a major southern U.S. hub for United Airlines, and it is one of the fastest growing airports for international passenger traffic. Significant levels of air cargo are transported by commercial passenger aircraft as belly freight out of IAH, specifically due to the large amount of belly capacity available on international commercial passenger wide-body flights.

Regularly scheduled air cargo service at IAH is provided by 14 cargo airlines to over 50 destinations. Freighter operators include integrated express carriers such as FedEx Express, UPS, and DHL. In addition, all-cargo carriers such as Air France Cargo, Atlas Air, CAL Cargo, Cargolux, Cathay Pacific Cargo, China Airlines Cargo, Emirates SkyCargo, Lufthansa Cargo, Qatar Airways Cargo, and Turkish Airlines Cargo serve the airport. Amazon Air operates a handful of flights out of IAH to serve its growing network of fulfilment centers. Numerous other ad hoc, or on-demand, carriers also frequently operate at IAH.

The Houston Airport System (HAS) has made significant investments in its air cargo facilities at IAH. These facilities include two cargo centers: Central Cargo and IAH Cargo Center (East Cargo). These cargo areas have state-of-the-art facilities covering 120 acres and providing parking for 20 wide-body aircraft. The two air cargo centers at IAH serve 14 scheduled cargo carriers, several commercial passenger airlines that carry belly freight, and charter cargo airlines supporting several different industries. IAH's special cargo capabilities include

[43] Airports Council International – North America, 2021

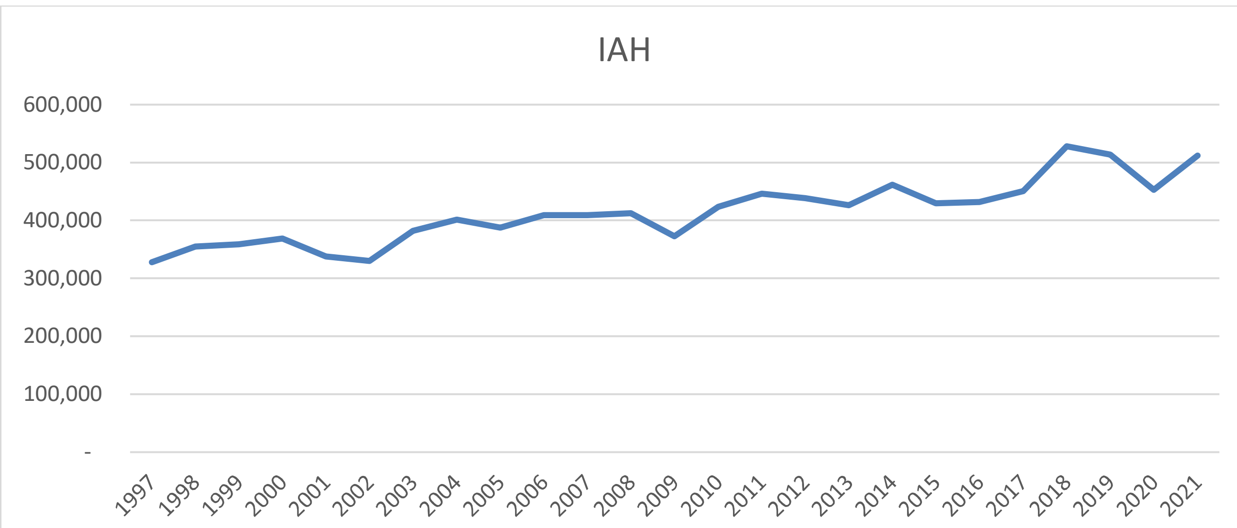
refrigerated storage for handling perishables, a state-of-the-art fumigation facility, and Federal Inspection Services for expedited customs clearance.[44]

IAH specializes in the handling of large or heavy machinery and equipment for the energy, aerospace, medical, and construction industries. Houston is a strategic hub for these industrial sectors. As one of the most diverse cities in the country, Houston has growing demand for international products. It also has a large global manufacturing base for industrial machinery, equipment, and chemicals. According to ACI-NA, IAH ranks 14th in North America for international cargo tonnage. Examples of perishable products shipped through IAH are Chilean and Norwegian salmon, Peruvian asparagus, U.S. beef, and Mexican produce such as avocadoes, mangoes, and key limes.

IAH is exploring options for expansion as both existing cargo areas are at or near capacity. New facilities with innovative technologies would allow IAH to handle more specialized, higher value commodities such as pharmaceuticals, perishables, auto parts, aerospace, and e-commerce purchases.[45] Each of IAH's cargo areas are highlighted in **Figure 4-24**.

Figure 4-23 illustrates historic annual air cargo tonnage at IAH. From 1997 until 2021, tonnage has grown steadily. The steepest increase in annual tonnage occurred in 2018 with a 17 percent increase from the previous year. Despite a 12 percent decrease in 2020 due to the COVID-19 pandemic, tonnage rebounded 13 percent in 2021. Between 1997 and 2021, tonnage at IAH grew at an average annual rate of 1.9 percent.

Figure 4-23: IAH Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

[44] Houston Airports, 2022
[45] A look at Houston's three-hub airport system - Payload Asia

Figure 4-24: IAH Cargo Areas

Source: Google Earth

4.3.7 Phoenix Sky Harbor International Airport (PHX)

Phoenix Sky Harbor International Airport (PHX) is a large hub primary commercial service airport that serves the Phoenix metro area, which is the 11th most populous MSA in the country. Located approximately three miles east of downtown, PHX has three runways, the longest of which measures nearly 11,500 feet in length. PHX ranks as North America's 9th busiest airport as measured by passenger volume, the 8th busiest by total annual aircraft operations, and 22nd busiest by total cargo tonnage.[46] PHX serves as a major hub for American Airlines and a focus city for both Southwest Airlines and Frontier Airlines.

PHX serves as a local market station for several air cargo carriers, including Air Cargo Carriers, Amazon Air, Ameriflight, DHL, FedEx Express, and UPS. Combined, these carriers operate to over 30 markets from PHX. Numerous ad hoc, or on-demand, carriers also operate at PHX as needed basis.

PHX has two cargo complexes: the South Air Cargo and the West Air Cargo. The South Air Cargo area is fully occupied and is home to integrated express carriers such as UPS and FedEx Express, while the West Cargo is just over 80 percent occupied and houses all other cargo activity including cargo facilities for commercial passenger airlines. Future cargo plans at PHX include the development of a new North Air Cargo area to allow

[46] Airports Council International – North America, 2021

for greater facility efficiency and capacity. Under this plan, cargo carriers currently operating from the South and West Air Cargo facilities would be relocated to the new North Air Cargo area.[47] These cargo areas are illustrated in **Figure 4-25**

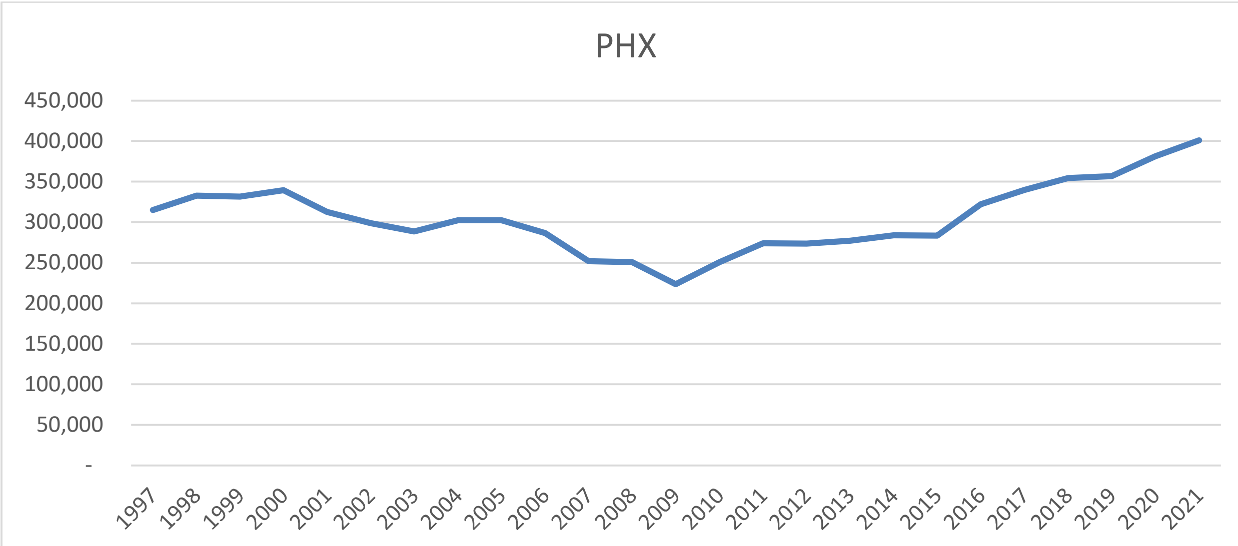
Figure 4-25: PHX Cargo Areas

Source: Google Earth

Historic air cargo tonnage trends for PHX from 1997 to 2021 are presented in **Figure 4-26**. As shown, air cargo volumes reach a high of approximately 340,000 metric tons in 2000 and then declined steadily to around 223,000 metric tons in 2009. Since then, tonnages have increased steadily to a new all-time high of 401,000 metric tons in 2021. Interestingly, PHX did not see a major drop in tonnage because of COVID-19. Between 1997 and 2021, tonnage at PHX grew at an average annual rate of 1.0 percent.

[47] Phoenix Sky Harbor International Airport Cargo Opportunities, November 2022

Figure 4-26: PHX Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

4.3.8 Austin-Bergstrom International Airport (AUS)

Austin-Bergstrom International Airport (AUS) is a medium hub primary commercial service airport located on the site of the former Bergstrom Air Force Base, about 5 miles southeast of downtown Austin. Since its opening in the late 1990s, scheduled commercial airline service at AUS has been increasing in-step with the population and economic growth in the Austin area. AUS has two runways, the longest of which measures 12,250 feet in length. AUS ranks as North America's 30th busiest airport as measured by passenger volumes, 35th busiest by total annual aircraft operations, and 48th busiest by total cargo tonnage.[48] AUS is served by 18 commercial passenger airlines with non-stop service to nearly 100 destinations, including several international cities.

Air cargo operations commenced at AUS on June 30, 1997. Scheduled air cargo service is provided by integrated express carriers DHL, FedEx Express, and UPS to their regional and national hub airports across the U.S. Other cargo carriers operating at AUS include Amazon Air, Atlas Air, and Baron Aviation. Several ad hoc, or on-demand, carriers also operate at AUS on an as needed basis. DHL moved its air cargo operation to AUS from San Antonio International to be in closer proximity to Austin's high-tech industry. Although San Antonio is a larger market, DHL chose to locate their cargo operations in Austin to meet the early delivery needs of high-tech customers.

The Austin area is home to one of the fastest growing high-tech markets in the U.S. and is commonly referred to as the "Silicon Hills." Business activity in the Austin area is similar to California's "Silicon Valley" high tech industry clusters. Major tech firms with a presence in Austin include AMD, Amazon, Apple, Cisco, eBay, Facebook, IBM, Intel, PayPay, NXP Semiconductors, Texas Instruments, Oracle, Visa, and numerous others. Notably, Tesla is headquartered in Austin and its "Gigafactory Texas" electric vehicle manufacturing facility, which is the second-largest building by volume in the U.S., is near AUS.[49] As of November 2022, battery manufacturers for Tesla are currently scouting sites for battery factories across North America. Some of these potential sites are in Mexico, potentially near DNA in the state of Chihuahua.[50]

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[48] Airports Council International – North America, 2021
[49] The Top 100 Digital Tech Employers in Austin (builtinaustin.com)
[50] Exclusive: China's CATL slows battery investment plan for U.S., Mexico | Reuters

The airport's cargo facilities are located at the northern end of airport property, allowing for quick access to Interstate 35 via State Highway 71. More than $25 million in private capital was invested in these air cargo facilities, which included substantial infrastructure improvements such as a portion of the aircraft parking ramp, roads, and storm water drainage. AUS is a good example of a successful public-private real estate and infrastructure development partnership with Lynxs, a locally based air cargo facility real estate firm. In 2021, AUS announced the construction of a new $23.3 million cargo facility. This expansion is intended to accommodate the rapid growth of e-commerce and includes a 90,000 square foot building and a new apron with parking positions for three wide-body aircraft. Expanded air cargo facilities at AUS will help make the region more attractive to large manufacturers like Samsung, Tesla, and other air cargo-dependent industries.[51] This cargo area and its location at AUS are highlighted in **Figure 4-27**.

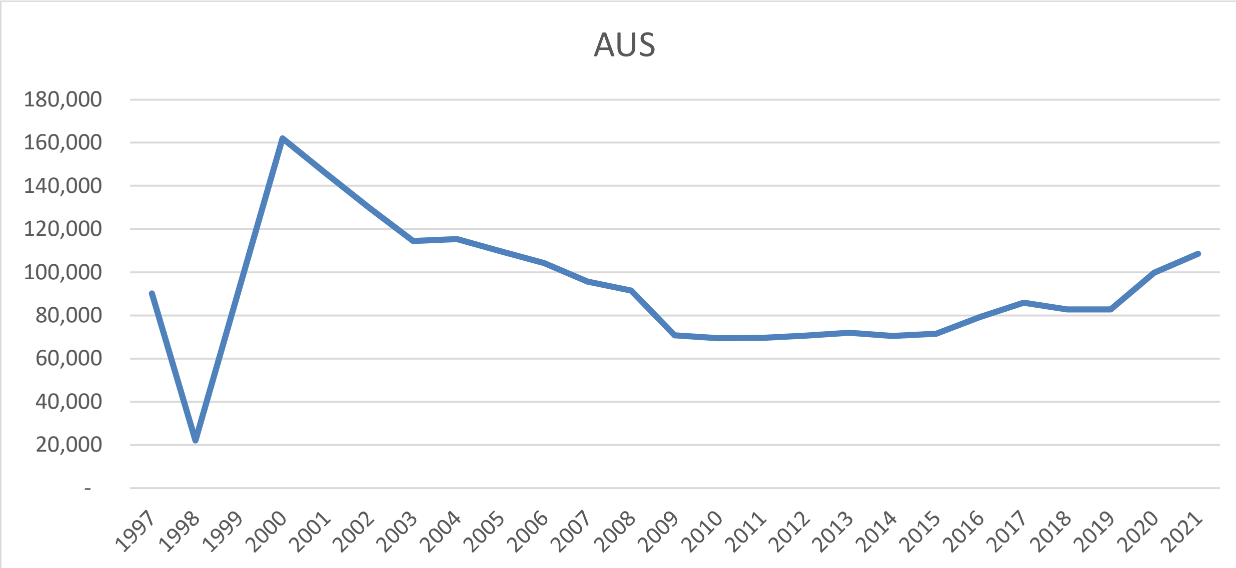
Historic air cargo tonnage trends for AUS from 1997 to 2021 are presented in **Figure 4-28**. As shown, air cargo tonnage at AUS peaked in 2000 at over 162,000 metric tons because of the internet boom and air shipment of high-tech commodities. Since the 2000 peak, air cargo tonnage declined steadily until it bottomed out in 2010. During the boom, large volumes of computers, monitors, cables, modems, and other equipment were being shipped to meet demand in the high-tech sector. Since 2010, tonnage has since increased to nearly 109,000 metric tons. Between 1997 and 2021, total air cargo tonnage at AUS grew at an average annual rate of 0.8 percent. AUS tonnage actually jumped by 21 percent from 2019 to 2020, coinciding with the arrival of Amazon Air at the airport. This also points to behavioral shifts of consumers with increased reliance on e-commerce during the COVID-19 pandemic.

[51] Austin Airport Plans $23 Million Cargo Facility as E-Commerce Booms During Pandemic | KUT Radio, Austin's NPR Station

Figure 4-27: AUS Cargo Area

Source: Google Earth

Figure 4-28: AUS Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

4.3.9 San Antonio International Airport (SAT)

San Antonio International Airport (SAT) is a medium hub primary commercial air service airport serving the San Antonio metropolitan area. San Antonio is one of the fastest growing cities in the U.S. SAT is located approximately 8 miles north of downtown San Antonio. The airport has three runways, two of which measure greater than 8,500 feet in length. SAT ranks as North America's 45th busiest airport as measured by passenger volumes, the 61st busiest by total annual aircraft operations, and the 43rd busiest by total cargo tonnage.[52] SAT is served by 13 scheduled commercial passenger airlines with non-stop service to over 40 destinations, including several cities in Mexico.

The cargo needs of the San Antonio market are served by integrated express carriers FedEx Express and UPS, who both operate flights to their respective national and regional hubs and to other locations throughout Texas. Martinaire and Ameriflight serve as contract feeder airlines for UPS and FedEx Express, connecting many smaller Texas markets to San Antonio. Several ad hoc, or on-demand, carriers also operate at SAT on an as needed basis. These include Royal Air Freight, McNeely Charter Service, Kalitta Charters, IFL Group, and Priority Air Charter.

The main cargo area at SAT is on the east side of the airport. This area includes over 1.5 million square feet of apron area and nearly 900,000 square feet of combined building space. These facilities are used by FedEx and UPS. DHL no longer operates flights at SAT but does still lease a portion of the main cargo area. The airport air cargo area is shown on **Figure 4-29**. A commercial airline passenger belly cargo facility is located north of the passenger terminal. USDA and U. S. Customs Services are located at the airport; agents go to the cargo facilities for inspections as needed. Other attributes include two Foreign Trade Zones (FTZs), designated air cargo facilities, and multimodal (highway and rail) access.

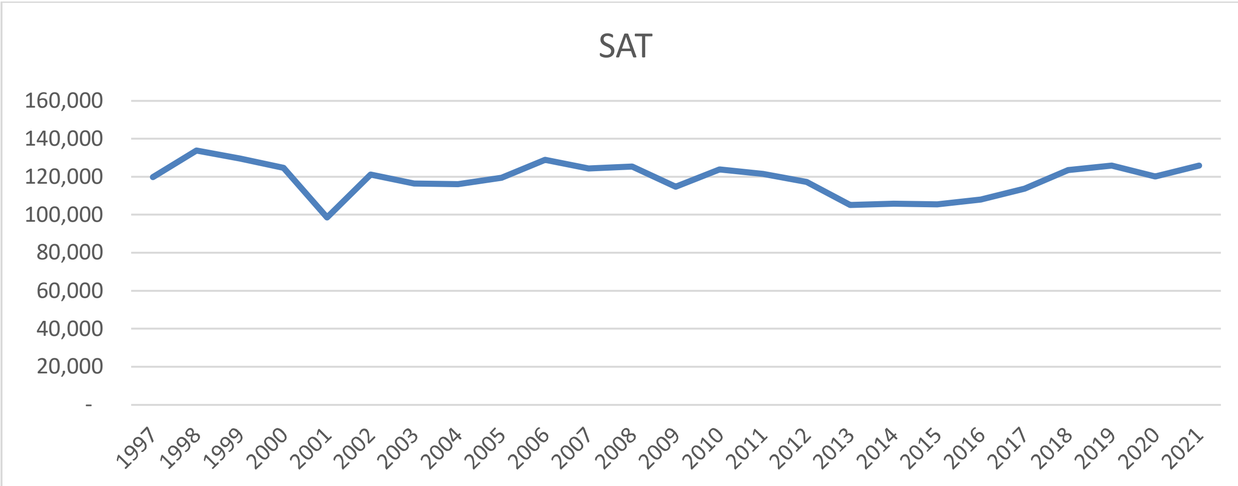
[52] Airports Council International – North America, 2021

Figure 4-29: SAT Cargo Areas

Source: Google Earth

Since 1997, SAT's overall growth in annual air cargo tonnage has been relatively flat, fluctuating between 100,000 and 125,000 annual metric tons. **Figure 4-30** illustrates the annual tonnage trends at SAT from 1997 to 2021. Average annual change in SAT tonnage was 0.2 percent from 1997 to 2021. Air cargo growth at SAT may be dampened by the availability of nearby Kelly Field which also accommodates air cargo activity.

Figure 4-30: SAT Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

SAT competes locally with Kelly Field (SKF) for air cargo activity. Kelly Field is located on the former Kelly Air Force Base. Operated by the Port Authority of San Antonio, Kelly Field Airport was established to serve as an aerospace complex. SKF is a 1,900-acre industrial complex that is home to over 70 private and public organizations. The complex employs 12,000 workers associated with companies in aerospace, logistics/manufacturing, and government/military sectors. Amazon Air is the only air cargo carrier with regularly schedule operations at SKF. As of September 2022, Amazon Air had four daily departures. Major aerospace firms operating at SKF include Boeing and Lockheed Martin. Kelly Field has a FTZ designation, a U.S. Customs Federal Inspection Service, and access to railroads and interstate highways

4.3.10 Tucson International Airport (TUS)

Tucson International Airport (TUS) is a small hub primary commercial service airport located 8 miles south of downtown Tucson. After PHX, it is the second busiest commercial service airport in Arizona. The airport has three runways, the longest measuring nearly 11,000 feet in length. TUS ranks as North America's 82nd busiest airport as measured by passenger volumes, the 63rd busiest by total annual aircraft operations, and 93rd busiest by total cargo tonnage. SAT is served by seven scheduled commercial passenger airlines with non-stop service to over 20 destinations.

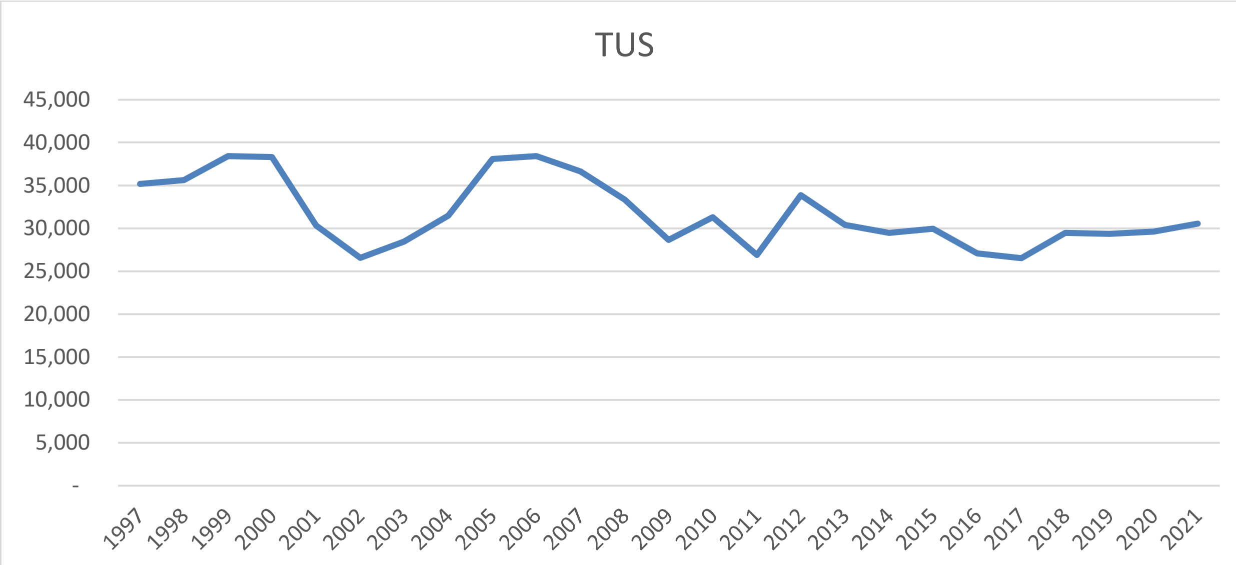
For cargo, TUS serves as a local market station for integrators FedEx Express and DHL; each carrier operates flights to their respective hubs from TUS. Contracted feeder carrier Ameriflight also operates at TUS, feeding mainline jet aircraft for UPS in PHX. Several ad hoc, or on-demand, carriers also operate at TUS on an as needed basis. There are two cargo buildings at TUS, Cargo 1, and Cargo 2. These buildings and their associated apron areas are located just south of the passenger terminal building. The cargo areas are identified on **Figure 4-31**

Historic air cargo tonnage trends for TUS from 1997 to 2021 are presented in **Figure 4-31**. As shown, air cargo tonnage at TUS peaked in 2000 at over 38,000 metric tons. Since the 2000 peak, air cargo tonnage declined to 26,500 metric tons in 2002, and volumes have fluctuated since. Between 1997 and 2021, tonnage at TUS declined at an average annual rate of -0.6 percent since 1997.

Figure 4-31: TUS Cargo Areas

Source: Google Earth

Figure 4-32: TUS Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

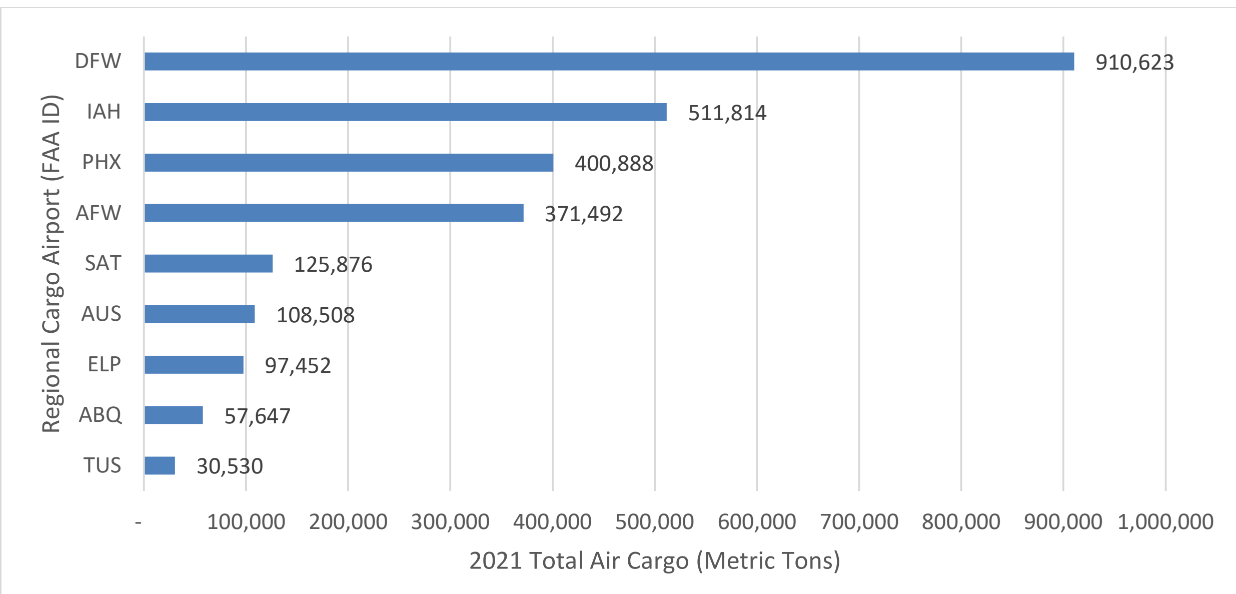
4.3.11 Summary of Regional Cargo Airports

The regional cargo airports discussed in the previous sections vary substantially in their roles as cargo airports. They range from major international gateways like DFW and IAH that serve wide-body cargo aircraft from all over the world, to smaller local facilities like LRU that strictly serve ad hoc, or on-demand air cargo activity transported by regional feeder carriers operating turboprop aircraft. The air cargo makeup of other airports in the Southwest varies greatly in terms of the number of air cargo carriers, types of carriers, aircraft used, frequency of operations, destinations served, cargo facility size and type, total tonnage volume, and trends over time.

Non-aviation factors such as area population, average household income, and industrial makeup play a major role in affecting the variables for each airport's air cargo market. Whether in the primary or secondary market area, each impacts the potential air cargo market for DNA. As shown, the majority of air cargo needs of the Borderplex region are currently served by local airports such as ELP; however, local air cargo demand is also served by airports as far away as DFW, which is over 640 miles away from DNA by road.

To provide a sense of comparative scale, total air cargo tonnage that each airport discussed in this section accommodated in 2021 is presented in **Figure 4-33**. As shown, DFW is, by far, the largest regional cargo airport by cargo volume with over 900,000 annual metric tons. IAH is second at around 500,000 annual metric tons of cargo throughput, followed by PHX, and AFW. SAT, AUS, and ELP all hovering around 100,000 annual metric tons of air cargo, while ABQ and TUS see between 30,000 and 60,000 annual metric tons, respectively.

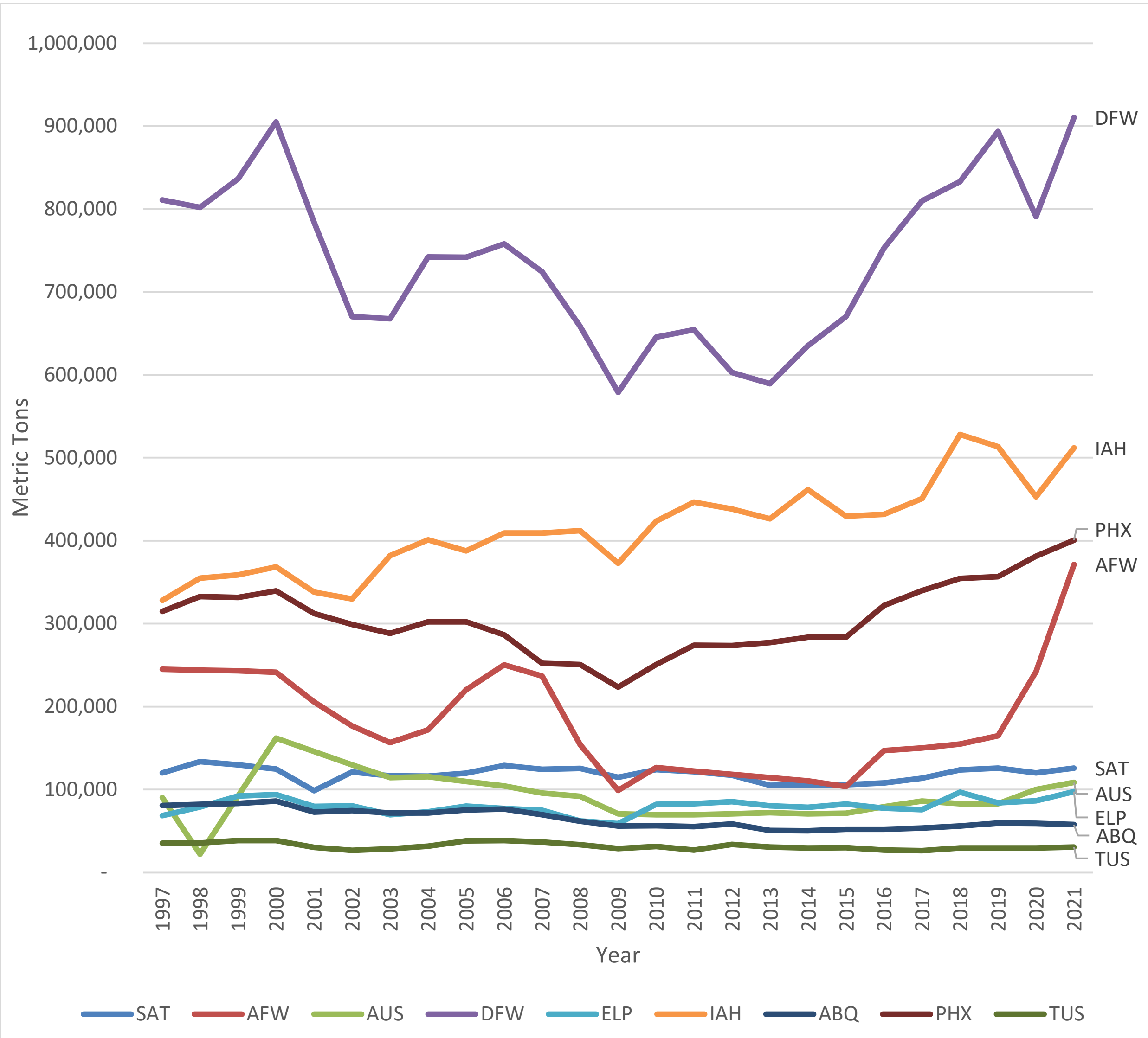
Figure 4-33: Regional Cargo Airports – Current Tonnage (Metric Tons, 2021)



Source: Airports Council International – North America, Jviation

To provide more perspective, **Figure 4-34** comparatively charts air cargo tonnage from 1997 to 2021 for each airport discussed above. As implied in the trends reflected in this figure, several major events had measurable impacts on air cargo demand around 2001, 2009, and 2020. These events include the September 11 attacks of 2001, the Great Recession of 2007 to 2009, and the COVID-19 pandemic in 2020. It is also evident which airports benefitted from the rapid growth of e-commerce and its impacts on air cargo expansion. The general air cargo role each airport plays is also evident in its trendline. For example, airports like TUS and ABQ serve as local market stations for integrated express carries and have relatively stable air cargo tonnage levels. On the other hand, airports such as AFW, AUS, and PHX have seen rapid growth in recent years due to entrants of new air cargo carriers such as Amazon Air, which exists strictly to serve its e-commerce network.

Figure 4-34: Regional Cargo Airports – Historic Tonnage Trends (Metric Tons, 1997-2021)



Source: Airports Council International – North America, Jviation

The historic air cargo tonnages for each regional cargo airport and their average annual growth rates for three specific time periods from 1997 to 2021 are presented in **Figure 4-35**.

Figure 4-35: Regional Cargo Airports – Total Air Cargo Tonnage by Year (Metric Tons, 1997-2021)

Year	ABQ	AUS	DFW	ELP	AFW	IAH	PHX	SAT	TUS
1997	80,667	90,179	810,961	68,487	245,000	328,270	314,858	119,869	35,178
1998	82,044	22,098	801,968	78,825	243,814	354,961	332,688	133,896	35,629
1999	83,085	92,151	836,182	92,157	243,027	358,927	331,548	129,644	38,446
2000	86,208	162,053	904,994	93,938	241,460	368,498	339,367	124,653	38,289
2001	72,876	145,702	784,085	79,631	205,618	337,842	312,389	98,699	30,331
2002	74,460	129,654	670,310	80,219	176,429	329,788	298,945	121,055	26,546
2003	71,599	114,407	667,574	69,669	156,367	381,926	288,350	116,433	28,461
2004	71,789	115,383	742,289	73,077	172,046	401,136	302,270	116,017	31,470
2005	75,439	109,662	741,805	79,819	220,133	387,790	302,197	119,484	38,061
2006	76,181	104,196	757,856	76,891	250,478	409,122	286,618	128,854	38,397
2007	69,598	95,587	724,140	74,963	236,875	409,193	251,925	124,390	36,634
2008	61,788	91,553	658,544	62,165	154,118	412,217	250,491	125,320	33,350
2009	55,799	70,781	578,906	58,833	98,989	372,662	223,664	114,713	28,658
2010	56,264	69,397	645,426	82,190	126,577	423,483	250,704	123,788	31,297
2011	55,063	69,556	654,415	82,903	122,303	446,328	274,046	121,516	26,870
2012	58,386	70,573	603,050	85,408	118,174	438,375	273,605	117,178	33,877
2013	50,690	71,906	589,320	80,170	114,184	426,384	277,009	105,136	30,408
2014	50,524	70,492	634,997	78,435	110,329	461,492	283,739	105,839	29,450
2015	51,868	71,421	670,029	82,351	103,632	429,785	283,465	105,546	29,932
2016	51,988	79,247	752,784	77,447	146,964	431,908	321,895	107,979	27,077
2017	53,598	85,878	809,929	75,713	150,139	450,842	339,822	113,692	26,538
2018	55,803	82,784	832,913	96,657	154,675	528,122	354,541	123,478	29,478
2019	59,418	82,673	893,441	83,773	164,654	513,378	356,565	125,908	29,334
2020	59,240	99,830	790,696	86,358	242,218	453,043	381,319	120,077	29,617
2021	57,647	108,508	910,623	97,452	371,492	511,814	400,888	125,876	30,530
AAGR 1997-2021	**-1.4%**	**0.8%**	**0.5%**	**1.5%**	**1.7%**	**1.9%**	**1.0%**	**0.2%**	**-0.6%**
AAGR 2011-2021	**0.5%**	**4.5%**	**3.4%**	**1.6%**	**11.8%**	**1.4%**	**3.9%**	**0.4%**	**1.3%**
AAGR 2016-2021	**2.1%**	**6.5%**	**3.9%**	**4.7%**	**20.4%**	**3.5%**	**4.5%**	**3.1%**	**2.4%**

Note: AAGR = Average Annual Growth Rate
Source: Airports Council International – North America, Jviation

Total air cargo tonnage throughput trends alone are not sufficient to understand an airport's role in facilitating air cargo. A comparison of these regional cargo airports in terms of their primary air cargo airport type/role served is presented in **Figure 4-36**, along with a listing of air cargo carriers known to be operating at each airport and the approximately number of scheduled markets served.

Figure 4-36: Regional Cargo Airports by Air Cargo Airport Role, Known Carriers, and Markets Served

Airport	Airport Air Cargo Type/Role	Types of Air Cargo Carriers Served	Sampling of Known Air Cargo Carrier Operators (Jan '18-June '22)	Scheduled Air Cargo Markets Served
Albuquerque International Sunport (ABQ)	Local Market Station	All-Cargo Carriers Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo Specialty Cargo Carriers On-Demand / Ad Hoc / Charter	Amazon Air, Ameriflight, FedEx Express, Empire Airlines, UPS +18 On-Demand Carriers	25
Austin-Bergstrom International (AUS)	Local Market Station	Integrated Express Carriers Passenger Airline Belly Cargo On-Demand / Ad Hoc / Charter	DHL, FedEx Express, UPS +8 On-Demand Carriers	11
Dallas/Fort Worth International (DFW)	International Gateway	All-Cargo Carriers Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo Specialty Cargo Carriers On-Demand / Ad Hoc / Charter	Air China Cargo, Amazon Air, Ameriflight, Amerijet, Asiana, Cargolux, Cathay Pacific Cargo, China Airlines Cargo, DHL, EVA Air Cargo, FedEx Express, Korean Air Cargo, Lufthansa Cargo, Martinaire, Nippon Cargo Airlines, Quantas Freight, Qatar Air Cargo, Silkway West Airlines, Singapore Airlines Cargo, UPS +Many On-Demand Carriers	>75
El Paso International (ELP)	Local Market Station	Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo Specialty Cargo Carriers On-Demand / Ad Hoc / Charter	Aeronaves, Ameriflight, Ameristar Jet Charter, Atlas Air, Berry Aviation, Contract Air Cargo, DHL, Encore Air Cargo, FedEx Express, Freight Runners Express, GTA Air, IFL Group, Kalitta Air / Kalitta Charters / Kalitta II, McNeely Charter, Priority Air Charter, Royal Air Freight, UPS USA Jet Airlines +25 Other On-Demand Carriers	17
Perot Field Fort Worth Alliance (AFW)	Regional Hub	Integrated Express Carriers Specialty Cargo Carriers	Amazon Air, FedEx Express +10 On-Demand Carriers	39

Airport	Airport Air Cargo Type/Role	Types of Air Cargo Carriers Served	Sampling of Known Air Cargo Carrier Operators (Jan '18-June '22)	Scheduled Air Cargo Markets Served
George Bush Intercontinental (IAH)	International Gateway	All-Cargo Carriers Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo Specialty Cargo Carriers On-Demand / Ad Hoc / Charter	AeroLogic, Amazon Air, Ameristar Air Cargo, Air France Cargo, Atlas Air, CAL Cargo, Cargolux, Cathay Pacific Cargo, China Airlines Cargo, DHL, Emirates SkyCargo, FedEx Express, Kalitta Air, Lufthansa Cargo, Martinaire, Qatar Airways Cargo, Turkish Cargo, UPS +Many On Demand Carriers	>55
Las Cruces International (LRU)	N/A	On-Demand / Ad Hoc / Charter	Contract Air Cargo, Key Lime Air, GTA Air, McNeely Charter Service, Ameriflight, Kalitta Charters +5 Other On-Demand Carriers	
Phoenix Sky Harbor International (PHX)	Local Market Station	All-Cargo Carriers Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo Specialty Cargo Carriers On-Demand / Ad Hoc / Charter	Air Cargo Carriers, Amazon Air, Ameriflight, DHL, FedEx Express, UPS +On-Demand Carriers	>36
San Antonio International (SAT)	Local Market Station	Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo On-Demand / Ad Hoc / Charter	Ameriflight, FedEx Express, Martinaire, UPS +16 On-Demand Carriers	19
Tucson International (TUS)	Local Market Station	Integrated Express Carriers Regional / Contract / Feeder Carriers Passenger Airline Belly Cargo On-Demand / Ad Hoc / Charter	Ameriflight, DHL, FedEx Express +On-Demand Carriers	5

Source: Jviation

Figure 4-36 above provides a high-level overview of each airport's air cargo role. This information summarizes each airport's capabilities in terms of the scale of their air cargo operations. **Figure 4-37** below provides a more detailed comparison of the airport infrastructure at each regional cargo airport. When considered in conjunction with the air cargo tonnage trends, all this information clarifies which airport facilities are generally required to support what types and volumes of air cargo.

Figure 4-37: Regional Cargo Airports – Detailed Facilities/Infrastructure

Regional Cargo Airport Facilities	New Mexico			Texas						Arizona	
	DNA	ABQ	LRU	ELP	DFW	AFW	IAH	AUS	SAT	PHX	TUS
Air Cargo Role	N/A	Local Market Station	Ad Hoc	Local Market Station	Int'l Gateway	Regional Hub	Int'l Gateway	Local Market Station	Local Market Station	Local Market Station	Local Market Station
Scheduled Jet Service	**No**	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Scheduled Air Cargo Jet Service	**No**	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Elevation	**4,113**	5,355	4,457	3,962	606	723	96	542	809	1,135	2,643
Average Number of Days >90F	**108**	62	108	108	97	97	99	108	113	168	143
Number of Runways	**1**	3	3	3	7	2	5	2	3	3	3
Primary Runway	**10-28**	8-26	12-30	4-22	18L-36R & 17R-35L	16-34 (R&L)	15L-33R	18R-36L	13R-31L	8-26	11L-29R
Primary Runway Length (feet)	**9,550**	13,793	7,506	12,020	13,400	11,010	12,001	12,250	8,502	11,489	10,996
Primary Runway Width (feet)	**100**	150	100	150	200	150	150	150	150	150	150
PCN	**90 F/A/X/R\T**	71 R/B/W/T	41 R/B/W/T	64 F/B/X/T	83 R/B/W/T	82 R/B/W/T	72 R/A/W/T	98 R/B/W/T	61 F/C/W/T	74 R/B/W/T	81 R/B/W/T
Single Wheel	**50**	100	70	100	120	N/A	100	75	59	30	160
Double Wheel	**90**	210	120	180	250	200	200	210	120	200	200
Double Tandem	**N/A**	360	N/A	350	550	400	400	618	N/A	455	350
Dual Double Tandem	**N/A**	720	N/A	N/A	1066	870	800	913	N/A	965	585
Secondary Runway	**NA**	3-21	4-22	8R-26L	Remaining	Tandem	Remaining	18L-36R	4-22	7L-25R	3-21
Secondary Runway Length (feet)	**NA**	10,000	7,501	9,025	Up to 13,400	Tandem	Up to 10,000 ft	9000	8,505	10,300	7,000
Secondary Runway Width (feet)	**NA**	150	105	150	150 (200 for 13L-31R)	Tandem	150	150	150	150	150
Parallel Taxiway all Runways	**Yes**	Yes	No	Yes	Yes	Yes (tandem RWs)	Yes	Yes	Yes	Yes	Yes
Airport Reference Code	**C-II**	D-V	C-II	D-V	D-VI	D-V	D-V	D-IV	D-V	D-V	D-V

Regional Cargo Airport Facilities	New Mexico			Texas						Arizona	
	DNA	ABQ	LRU	ELP	DFW	AFW	IAH	AUS	SAT	PHX	TUS
Air Cargo Role	N/A	Local Market Station	Ad Hoc	Local Market Station	Int'l Gateway	Regional Hub	Int'l Gateway	Local Market Station	Local Market Station	Local Market Station	Local Market Station
Instrument Approach Minimums	**600-1 3/4**	200 – ½	200 – ½	200 – ½	CAT III	CAT III	CAT III	CAT III	CAT II	200 – ½	200 – ½
Control Tower	**No**	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ARFF	**No**	Index C	Index A	Index C	Index E	Index A	Index E	Index D	Index C	Index D	Index C
Dedicated Cargo Aircraft Parking Positions	**None**	8	None	11	35	46	28	11	14	25	13
Cargo Apron Area (Sq. ft.)	**None**	830,000	FBO ramp	1,975,000	3,230,000	3,600,000	3,400,000	1,430,000	1,835,000	3,200,000	850,000
Cargo Warehouse (Sq. ft.)	**None**	55,000	None	290,000	1,690,000	1,430,000	910,000	260,000	175,000	395,000	65,000
Acres	**2,113**	2,039	2,193	6,670	17,207	1,198	10,000	4,242	2,305	3,400	7,938
Annual Operations	**41,500**	134,024	36,825	83,438	620,831	106,536	403,125	208,864	165,548	434,901	127,092
% Commercial	**0%**	29%	0%	34%	87%	21%	80%	66%	59%	88%	29%
% Air Taxi	**0%**	20%	10%	19%	12%	10%	18%	10%	12%	6%	11%
% GA Local	**65%**	9%	33%	7%	0%	25%	0%	0%	0%	0%	19%
% GA Itinerant	**31%**	27%	29%	28%	1%	33%	2%	21%	26%	5%	30%
% Military	**3%**	15%	28%	12%	0%	11%	0%	2%	3%	1%	11%

Source: FAA Records, Airport Websites, National Oceanic and Atmospheric Administration, Google Earth, Jviation

As shown in **Figure 4-37**, each of DNA's regional cargo airports have multiple runways with the average primary runway length being over 11,000 feet, meaning they can accommodate most large aircraft. Not including LRU, all regional cargo airports are designed for aircraft in ARC category of D-V or larger and, when combined, average over 2.2 million square-feet of cargo apron area and 580,000 square-feet of cargo building/warehouse space. All, including LRU, have Aircraft Rescue and Fire Fighting (ARFF) service and all, except LRU, have an Airport Traffic Control Tower (ATCT).

The information presented in this section demonstrates that DNA's regional cargo airports have significant infrastructure assets that enables them to serve in a variety of roles and types of air cargo activities. While there are many air cargo airports in the primary/secondary market areas around DNA and in the Southwestern U.S., they are not located to serve the immediate air cargo needs of the DNA market. Some airports are large international gateways, while some are integrated express hubs, and others are strictly local market stations. Despite being over 600 miles from DNA, international gateways such as DFW and IAH are serving some of the air cargo needs of the Borderplex. Due to their robust international air cargo service, freight is trucked long distances to and from these international gateway airports. Most other regional cargo airports discussed in this section primarily serve the air cargo needs of their local metropolitan areas. Since ELP and LRU are the only regional cargo airports within the primary DNA market area – approximately a 100-mile radius or 60-minute drive time around the airport – they are the only two airports that effectively compete to serve air cargo demand in DNA's primary market area.

LRU's relatively smaller size, distance from the population center of the Borderplex, and lower local population render it less attractive for a potential cargo operator seeking to expand air cargo operations in the Borderplex region. This leaves ELP as the main regional cargo airport in the immediate vicinity of DNA. ELP has a robust airport infrastructure, existing cargo services, and is close to the core of the Borderplex's air cargo demand generators. According to the ELP website, the airport's main cargo facility where the air cargo integrators operate is approximately 70 percent occupied.[1] However, discussions with local fixed base operators indicate that ELP needs additional apron area dedicated to ad hoc, or on-demand, cargo activity. At present, this type of activity stages on the Atlantic Aviation apron. This apron is often at capacity with dozens of turboprop and narrow-body cargo aircraft operated by ad hoc carriers parked simultaneously.

Due to its location near the STPOE and abundance of available land, DNA is a viable candidate for expanded air cargo service. Its location within a burgeoning multimodal transportation and logistics cluster only strengthens its air cargo potential. Forthcoming sections detail the process and findings of this study's efforts to identify demand for air cargo at DNA.

4.4 Demand for Air Cargo Services at DNA

As demonstrated in the preceding discussions, the Borderplex region is a major center for manufacturing and international trade. Because of Santa Teresa's robust infrastructure assets, a substantial amount of transportation and logistics activity associated with this manufacturing occurs in the immediate vicinity of DNA. To capitalize on this activity, DNA and its stakeholders, Doña Ana County, and the State of New Mexico, want to further enhance the Jetport's potential as an air cargo airport to serve the Borderplex region.

In March 2022, the State of New Mexico committed $20 million specifically for airport infrastructure enhancements at DNA. These enhancements are earmarked for projects to accommodate air cargo aircraft transporting goods and materials manufactured in the area. To determine the best course for maximizing the benefits from this investment, the potential demand for air cargo services at DNA must be determined. From this demand, the design or critical aircraft can then be identified for current and future years. The design aircraft is the largest aircraft to have at least 500 combined annual takeoffs and landings at an airport. Air cargo facility requirements can then be determined based on the design aircraft's characteristics and operating requirements.

Since this study is focused on identifying air cargo demand for both the short-term and long-term development timeframes, any potential demand is classified within the context of those two timeframes. Consideration is given to whether potential demand is relevant to existing Runway 10-28 or the planned future Runway 3-21. In both scenarios, demand must be justified with precise details on the anticipated air cargo operators, aircraft type(s), ferry range, and annual operations. This section discusses the process and findings of the data collection efforts undertaken to identify potential air cargo demand that can be used in support of airport improvements.

4.4.1 Data Collection Effort

To identify potential air cargo demand, data collection efforts were undertaken to identify businesses in the Borderplex, their current logistics needs, and whether potential air cargo services at DNA would be of benefit. In the previous 2016 Air Cargo Study for DNA, outreach efforts focused on the adjacent industrial park tenants

[1] Air Cargo (elpasointernationalairport.com)

to identify their current logistics needs and whether potential air cargo services at DNA would be of benefit to their operations. In contrast, this Air Cargo Study Update, which started in the fall of 2022, has a narrower focus. To avoid unnecessary duplication with the previous study's outreach effort, interviews focused on those entities surveyed as part of the previous study found to have a higher likelihood for potential air cargo demand. In addition, new business entities that are known to have a strong interest in or potential need for air cargo services were also interviewed.

New interview candidates were identified with assistance from DNA staff, Bohannan-Huston, Doña Ana County, the New Mexico Economic Development Department, the New Mexico Border Authority, and the Border Industrial Association (BIA). Through this collaboration, a list of nearly 30 entities were identified as suitable interview candidates. This list includes a cross-section of entities from the following groups:

- Major businesses (shippers/receivers) in key industries (manufacturers and suppliers) that rely on the region's transportation system
- Major integrated express and trucking carriers
- Warehouse and distribution facilities
- Economic development officials
- Industry trade association representatives
- Airport and FBO management representatives

From this list, outreach was conducted to assess the area's current air cargo market and its potential for growth. In-person interviews took place from September 27th- 29th of 2022. Additional interviews and follow-up efforts were conducted by phone and email through the end of November of 2022. The interviews with both public and private transportation representatives also centered on identifying competitive factors, current dependence on air cargo, the sufficiency of air cargo in the area, and obstacles to or facilitators of air cargo growth in the area.

From the list of nearly 30 suitable interview candidates, discussions were ultimately held with roughly half. The remainder were either unresponsive or declined to participate. Additionally, over 50 tenants of the adjacent industrial parks were emailed an online survey to determine their level of dependence on air cargo. This survey effort did not result in any additional businesses with measurable air cargo needs, beyond those previously identified. **Figure 4-38** lists the candidates targeted for an interview, a description of their business/organization, a point of contact, and whether they participated in the outreach effort.

Figure 4-38: Interview Candidates and Participation

Participation	Business/Organization	Business Description	Contact
Yes	Border Industrial Association	Regional Economic Development Organization	Jerry Pacheco
Yes	Borderplex Alliance	Regional Economic Development Organization	John Barela Carlos Delgado
Yes	Burrell Aviation	Cargo Developer	Ben Fierstein
Yes	CommScope	Telecommunications equipment	Jesus Cervantes
Yes	Expeditors	3PL logistics services	Agustin Bengochea Renee Espino
Yes	F&G Scheduling INNOVA	Broker for Air Cargo	Fred Fernandez
Yes	FedEx Express	Integrated Express Carrier	David Fiore
Yes	Francis Aviation DNA / Million Air ELP	Fixed Base Operator	Armando Ceja

Participation	Business/Organization	Business Description	Contact
Yes	Franklin Mountain Industrial	Spec building developer	Brent Harris
Yes	Hunt Companies	Developer	Steve Foster
Yes	NM Border Authority	State Agency	Marco Grajeda
Yes	NM Economic Development	State Agency	Alicia Keyes
Yes	Omega Trucking / TECMA	Logistics	Miriam Baca Alan Russell
Yes	Paseo del Norte Ltd. Partnership	Developer	Christopher Lyons
Yes	Santa Teresa POE U.S. Customs and Border Protection	Federal Agency	Tony Hall
Yes	N/A	Former County Manager	Chuck McMahon
No	American Institute in Taiwan	*de facto* U.S. Embassy in Taiwan	Jason Chang
No	Binational Affairs for Government of Juárez		Juan Acereto
No	Foxconn/Dell/HP	Computers	Francisco Uranga
No	Importers and Exporters Association of Taipei	Trade Organization	Michael Tsung
No	J H Rose Logistics	3PL logistics services	James Robinson
No	Taipei Economic and Cultural Office in LA	*de facto* Embassy/Consulate for Taiwan in U.S.	David Chen
No	Taiwan Electrical and Electronic Manufacturers Association	Trade Organization	Tony Yuan
No	Terry Nord	Former cargo operator with hangar at DNA; lives in Pembina ND	Terry Nord
No	Trans-Oceanic	3PL logistics services/forwarder	
No	UPS	Integrated Express Carrier	Jeff Matz

Source: Jviation

The following section summarizes key findings from the data collection effort with regard to long-term and near-term demand.

4.4.2 Findings

Long-Term – Asian Potential for Cargo Remains Strong

Of the interview candidates that participated in study outreach efforts, several indicated their business could potentially benefit from the availability of air cargo services at DNA. Most of this interest was considered as long-term potential as air cargo services would be dependent on future development of the proposed 12,000-foot crosswind Runway 3-21. This runway is needed to serve long-range, heavy freighter aircraft in order to serve long domestic and international routes. For example, local representatives for Expeditors stated that nonstop cargo charter flights into DNA from Asia are a viable long-term concept that would be of interest to their operations. Expeditors is one of the world’s largest freight forwarders and is one of the primary forwarders for the nearby Foxconn plant.

Multiple economic development officials at the state, local, and regional levels indicated that there is ongoing and rapidly evolving interest in the Borderplex region as a potential location for major investments by businesses. These businesses include multinational corporations in a variety of growing industries, most notably in the computer chip and electric vehicle battery manufacturing sectors. Due to the highly competitive nature of these industries and their need for confidentiality during strategic negotiations and positioning, economic development officials were not able to disclose the names of specific businesses. Research conducted during this study indicates business interests in these sectors likely includes companies from Taiwan and China.

In July 2022, a Taiwanese delegation of business executives visited the New Mexico Borderplex region to explore potential opportunities. The delegation consisted mostly of executives involved in the electric vehicle industry and representatives from the Taiwanese Electronic, Electrical, and Mechanical Association. The Borderplex was one of only three regions in the U.S. that the delegation visited. The visit was designed to gain an understanding of the region's automobile supply chain and to identify potential investment opportunities in Santa Teresa.[53]

Research also indicates that Chinese battery giant CATL has been looking into potential development sites in the U.S. and Mexico for new manufacturing plants. With a 35 percent market share, CATL is the world's largest battery cell manufacturer. They are the sole supplier for Volkswagen. They are also one of the most important suppliers for Tesla and Ford. Juárez, Mexico is reportedly one of the potential sites for a new CATL plant. This location is viewed as advantageous as a result of its proximity to the Santa Teresa Port of Entry (POE). The POE provides a route around the more congested Texas border crossings.[54] According to Caixin Media, as of November 2022, CATL finalized plans for a new factory in Mexico.[55] As of December 2022, the location of this potential $5 billion factory remains unknown. The Borderplex region is suitable for this plant with its existing workforce, manufacturing base, transportation infrastructure, and proximity to major population centers of the U.S.

The previous Air Cargo Study that was conducted as part of the *DNA Multi Modal Master Plan 2017* identified nearby Foxconn as a likely user for potential air cargo service at DNA due to its proximity to the Jetport and its demonstrated existing demand for air cargo services. Air Cargo demand is anticipated to increase as Foxconn is in the process of doubling the size of its San Jerónimo plant; this plant is where most Dell/HP computers built for the North America market are assembled. This study's outreach efforts confirmed that Foxconn is still interested in the prospect of air cargo services at DNA to enhance the efficiency of its Asia-to-North America supply chain. However, this is still a longer-term potential to support air cargo service at DNA.

Although specific details associated with these potential business interests remain scarce, economic development officials interviewed as part of this study are optimistic on the long-term potential for leveraging DNA as a cargo airport. In fact, DNA's potential as an air cargo airport is one of the main assets used as a selling point when touting the area to prospective businesses. Many interview subjects echoed that the New Mexico Borderplex region is unparalleled in terms of its level of interest for business growth and potential investment activity. Investment in infrastructure improvements and economic development in the Borderplex remains one of the top economic development priorities for the State of New Mexico. At this time, specific justification for constructing a proposed 12,000-foot crosswind runway at DNA is not available, but study research indicates that interest in this project remains strong.

Near-Term – Burrell Aviation Demand for Air Cargo

Only one business, Burrell Aviation, has both the interest in using DNA for air cargo purposes *and* concrete plans to do so. In late-2022, Burrell Aviation received County approval to build a $72-million cargo aviation

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[53] Taiwanese delegation's visit keeps Santa Teresa profile high in Asia | Las Cruces Bulletin
[54] Electric Battery News: CATL Seeks Mexico Site for Tesla, Ford EVs - Bloomberg
[55] The World's Biggest EV Battery Producer Is About to Get Even Bigger (yahoo.com)

facility at DNA. This facility will include an air cargo handling facility, cold storage, distribution center, and aircraft maintenance hangars. The lease contract for these facilities is 30 years with a 10-year extension option. As part of the agreement, the County is required to upgrade the runway, taxiways, and construct aprons to accommodate narrow-body cargo jet aircraft.[56]

As shown in **Figure 4-39**, Burrell Aviation's conceptual development plans for cargo facilities at DNA include a 300,000 square-foot building that includes dedicated space for air cargo, cold storage, and a distribution facility with cross-dock capabilities. Four separate 22,500 square-foot hangars are also planned for aircraft maintenance purposes. Burrell's plans encompass 43-acres of Jetport property under the noted ground lease agreement.

Figure 4-39: Burrell Aviation Conceptual Development Plan for DNA

Source: Burrell Aviation, Armstrong Consultants

Burrell Aviation (Burrell) is a division of The Burrell Group, an Aspen, Colorado-based holding company for a consortium of business interests. Burrell Aviation was formed in 2019 to meet growing demand for air cargo, freight, and logistics solutions in North America. Burrell's business model involves using public-private partnerships to develop smaller regional or secondary airports around larger metropolitan areas. Facilities where they develop are most often underutilized and not involved in supply chain logistics.

Burrell's goal is to offer a convenient, flexible, and cost-efficient alternative to major hub airports where most air cargo carriers operate today. Currently, at many large hub airports, air cargo carriers are experiencing

[56] Governor, Burrell Aviation announce cargo flight expansion at Doña Ana County Jetport | Office of the Governor - Michelle Lujan Grisham (state.nm.us)

rapidly escalating price structures and congestion, delayed delivery times, as well as other operational inefficiencies. Burrell enters long-term, 30-to-50-years, lease agreements with municipally owned airports, who agree to improve airport infrastructure. Burrell identifies, attracts, and accommodates air cargo tenants to operate at their facilities.[57] In addition to their cargo facility plans at DNA, Burrell has also entered into agreements for similar air cargo facilities at Baton Rouge Metropolitan Airport (BTR), Tallahassee International Airport (TLH), Colorado Springs Airport (COS), and Brooksville-Tampa Bay Regional Airport (BKV).

Burrell has a long-standing interest in the Borderplex region due to the high volume of trade between New Mexico, Texas, and Mexico. Burrell indicates that the Borderplex is like nowhere else in country with its growing binational border community, workforce, and a large manufacturing base. While ELP is constrained in terms of available aircraft parking positions, DNA has some heavy infrastructure in place, has lots of available land, and is basically a blank slate. For these reasons Burrell has focused on developing DNA into a cargo airport to serve unmet demand in the area.

Although exact details are not disclosed and are still subject to change, Burrell reported that they are in discussions with prospective cargo carriers to operate at DNA to serve manufacturers in the electronics, lubricants, pharmaceuticals, and apparel sectors. A cold storage facility at DNA is viewed as a development that would generate air cargo demand. Having a cold storage facility would create further opportunities and generate air cargo demand. Daily inbound air cargo flights are anticipated to take place between DNA and Anchorage (ANC), Baton Rouge (BTR), Mobile (MOB), Portland (PDX), and Los Angeles (LAX). Inbound flights will bring in raw materials for assembly of products in Mexico, while outbound flights will carry the assembled commodities.

Anticipated air cargo service will benefit manufacturers through both time and cost savings. When compared to trucking, flying offers a time savings of one full day from LAX, two-to-three full days from MOB, and three-to-four full days from PDX. Cost savings at DNA when compared to other established air cargo locations, like ABQ or ELP, are flight time, landing fees, and fuel costs. Another important competitive factor for DNA is its availability of aircraft parking positions and landside access. ELP is limited in available capacity for aircraft parking positions; its apron area in front of Atlantic Aviation is often full of turboprop and narrow-body cargo aircraft.

Once service is established and the business model proves to be viable, the level of activity and cargo volumes at DNA will likely increase. In the longer-term, if Burrell's cargo carrier tenants have a viable cargo operation up and running and they see that DNA has plans to further develop airport infrastructure, this makes it more likely that air cargo service at the Jetport will grow. As operations associated with prospective cargo carriers mature at DNA, other carriers may view DNA as a viable cargo airport and relocate or establish service.

As noted earlier in the ELP description, ELP accommodated over 40,000 operations by 42 known cargo carriers from January 2018 to June 2022. Many of these operations are associated with ad hoc or on demand carriers. This level of activity supports the importance of the Borderplex as an origin point for high-value, time-sensitive air cargo. Some of the carriers, currently operating at ELP, could relocate operations to DNA, given the right opportunities, operating environment, and facilities. Lower cost of operating would be a primary incentive for a cargo carrier to relocate to DNA.

Baseline Demand

Burrell sees a need for additional air cargo facilities in the Borderplex region to meet the demand curve and views DNA as an ideal location to do so. Initial cargo demand at DNA is quantified at 8,000 to 10,000 total annual tons of air cargo, carried both inbound and outbound. This demand was established through Burrell's

[57] About Us - Burrell Aviation

discussions with shippers and manufacturers with supply chain logistics needs in the area. Based on the cargo capacity and performance characteristics of several common narrow-body cargo aircraft, this demand can be translated into the number of annual operations required to meet demand. Calculations of annual operations to meet projected demand must consider available payload, volume, and performance characteristics of each aircraft type specific to DNA's elevation and climate. These factors determine runway length, width, and pavement strength requirements. These calculations are shown in **Figure 4-40**.

Figure 4-40: Baseline Demand and Annual Operations (Takeoffs and Landings)

Aircraft Make and Model	ARC*	Approximate Cargo Payload by Weight to Reflect 80% Bulk-Out by Volume (Lbs.)**	Maximum Takeoff Weight (MTOW) (Lbs.)	Maximum Annual Tons @ 5 Weekly Rotations	Percent of MTOW Available on Hot Day @ DNA (4,000' MSL, 9,550' Runway Length)	MTOW Available on Hot Day @ DNA (4,000' MSL, 9,550' RW) (Lbs.)	Maximum Annual Tons @ 5 Weekly Rotations	Annual Operations to Meet 8,000 Tons of Demand	Annual Operations to Meet 10,000 Tons of Demand
Boeing 757-200F	C-IV	56,000	240,000	14,560	97%	231,910	14,069	296	370
Boeing 737-800F	D-III	42,240	174,200	10,982	95%	165,000	10,402	400	500
Boeing 737-400F	C-III	36,000	150,000	9,360	90%	135,000	8,424	494	617
Boeing 737-300F	C-III	34,000	138,500	8,840	94%	130,000	8,297	501	627
Boeing 737-700F	C-III	32,000	154,500	8,320	94%	146,000	7,862	529	661

*Note: ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on an airport.

**Note: Assumes 80% of maximum aircraft payload due to "bulking out" by volume. Actual cargo payload may vary depending on aircraft operator

Source: Manufacturer specifications (aircraft characteristic manuals), aircraft flight planning manuals, Jviation

As shown, the annual operations would vary depending on the aircraft type. A Boeing 757-200 has a 43 percent larger payload than a Boeing 737-700 and can therefore accommodate the same amount of air cargo tonnage on fewer flights. In the lower Burrell demand scenario, 8,000 total annual air cargo tons can be accommodated by approximately 296 operations on a Boeing 757-200 or 529 operations on a Boeing 737-700. In the high demand scenario, 10,000 total annual tons can be accommodated on approximately 370 operations on Boeing 757-200 operations or 661 operations on a Boeing 737-700. These calculations are comparative and are intended to be used for planning purposes.

The next section (Section 4) of this report inventories existing airport infrastructure at DNA, while Section 5 projects how this baseline demand is expected to change in the future. Section 6 evaluates the airport facility requirements to accommodate existing and forecast air cargo demand.

5 Air Cargo Forecast

5.1 Introduction

Forecasts of air cargo demand help determine what development an airport should undertake to fully meet projected demand. To provide context for the forecasts developed in this section, it is important to remember that air cargo demand is market driven. In the real-world operating environment, air cargo demand is determined by the decisions of air cargo providers which are influenced by time, cost, and service. Decisions to provide air cargo related services are made by individual air cargo carriers and are dependent upon both the needs of the local market and the carrier's larger operational networks. Existing and supporting airport infrastructure also both contribute to the decision-making process of air cargo carriers when evaluating their need and opportunities to expand.

Forecasts developed in this section are unconstrained—as such, they do not consider any limiting factors. Forecasts consider underlying market forces, including recent market disruptions from COVID-19 and the significant increase in e-commerce activity that escalated air cargo demand in the most recent years. This forecasting effort considers the best business practices for the carriers themselves, along with more traditional planning metrics.

Air cargo demand is driven by time, cost, and service. Similarly, it is important to consider that past trends do not necessarily portend future performance. This forecasting exercise relies not only on past and current air cargo activity but also on projections of air cargo demand generated by several reputable agencies/sources. Because future demand can be higher or lower than adopted projections, this forecasting effort considers low, average, and high ranges for future demand.

The most reliable and available data is used to support this study's forecasting effort. All forecasts, including those presented here, require some level of judgment. Current issues and events influencing near- and longer-term demand are considered as part of the process. The level of detail provided in the air cargo forecast, presented in this section, is driven by available data. Forecasts are rarely able to predict exactly when or in which specific year future demand levels will be achieved. Forecasts discussed in this section are most useful for predicting future trends. It is often more useful to consider what facilities or improvements might be needed to address future demand levels without tying them to a specific year.

Air cargo demand, like most facets of aviation, is almost always influenced by the economy, and in particular, by oil prices. Air cargo in the U.S. and North America is a mature industry; the most rapidly growing and largest air cargo markets are in regions beyond North America. That does not mean that there are no opportunities for air cargo growth at DNA. Rapidly expanding e-commerce markets have led companies such as Amazon, Target, and Walmart to increase shipping by air in response to customer needs. Since the onset of COVID-19 pandemic, reliance on air cargo services has grown as supply chain issues and port congestion have bogged down the traditional flow of goods. In late 2022, however, air cargo demand indicators show that cargo demand plateaued after record gains in 2021. Factors leading to this plateau include lower consumer spending, a shift in discretionary spending toward travel and services instead of goods, high inventory levels as retailers moved a lot of products to the front of the year to avoid a repeat of shipping delays, contraction in new export orders, and a marked improvement in ocean shipping reliability.[58]

[58] Air cargo market stuck in doldrums during normal busy season - FreightWaves

Air cargo demand is influenced by a variety of factors:

- The shipment's origination and destination
- The commodity being shipped
- The shipper's desired level of service
- The size (volume) of the shipment

Subsequent sections use various approaches to project future air cargo demand, and a preferred forecast is identified for DNA. The preferred forecasts identified in this section are important to identifying air cargo facilities for DNA.

5.2 Forecast Approach

Projecting future aviation demand is part of the planning process. Even though DNA does not currently accommodate scheduled air cargo activity, baseline demand has been identified as outlined in the air cargo market assessment section of this document. Based on this identified baseline demand, air cargo tonnage and air cargo aircraft operations are forecasted. It must be recognized, however, that there are always short-term fluctuations in an airport's activity due to a variety of factors that cannot be anticipated.

Projections for DNA are prepared using 2022 as the base year. The forecasts, however, incorporate a lagged-start in baseline air cargo demand that coincides with airport improvements being made by Burrell Aviation. An anticipated start of air cargo activity by 2025 is assumed since facilities should be completed by then. Projections are developed for the near-term (2027), mid-term (2032), and long-term (2042) forecasting horizons. These projections assume that DNA will be able to accommodate future increases in air cargo activity. In other words, forecasts presented in this chapter are not constrained.

5.3 Forecast Scenarios

Forecasting for DNA includes projections for cargo volume in short tons, as well as the number of annual dedicated cargo aircraft operations needed to support the estimated cargo tonnage. Two forecasting methodologies are investigated and compared in this chapter:

- **Growth Rate** – considers growth rates from several aviation-related industry sources.
- **Econometric** – uses past relationships among variables to forecast how changes in variables may affect future change in other variables.

A variety of organizations, such as Airbus, Boeing, and the FAA, prepare air cargo forecasts. There are also several indicators that generally correlate with air cargo demand. These indicators include household income and gross domestic product (GDP). Additionally, any estimates of future growth obtained during the outreach portion of this study are considered in the forecasting process. Growth rates from each of the following sources are considered in the development of this study's air cargo projections:

- *Airbus Global Market Forecast (2022-2041)*
- *Airbus Global Market Forecast (2022-2041)* – North American Freighter Aircraft
- *Boeing World Air Cargo Forecast (2022-2041)* – Total Revenue-Ton-Miles (RTMs) Asia-North America
- ***Boeing World Air Cargo Forecast (2022-2041)* – Total RTMs Intra-North America**
- *Boeing World Air Cargo Forecast (2022-2041)* – Total RTMs World
- ***FAA Aerospace Forecast (FY 2022-2042)* – All Cargo Carrier Domestic RTMs**
- *FAA Aerospace Forecast (FY 2022-2042)* – All Cargo Carrier International RTMs
- *FAA Aerospace Forecast (FY 2022-2042)* – All Cargo Carrier Total RTMs

- Historic Population Growth of the El Paso-Las Cruces Combined Statistical Area (CSA)
- Future Population Growth Projection for the El Paso-Las Cruces CSA
- Historic Per Capita Income Growth for the El Paso-Las Cruces CSA
- Future Household Income Projection for El-Paso-Las Cruces CSA
- **Historic Air Cargo Tonnage Growth for El Paso International Airport**
- Historic Air Cargo Tonnage Growth for Albuquerque International Sunport
- Historic Tonnage for 9 Regional Cargo Airports
- Forecast of Air Cargo Growth for El Paso International Airport
- Forecast of Air Cargo Growth for Albuquerque International Sunport

A wide variety of growth rates from a variety of sources helps to provide context and can help validate chosen growth rates when industry-related sources closely align with other socio-economic indicators. After a review of all available air cargo growth rates, the bolded sources shown above were selected to support the forecasting effort. The selected sources were used based on their relevance to the air cargo industry and/or the geography of the study area.

Selected growth rates are from the noted sources are incorporated into various forecast scenarios for tonnage and aircraft operations. Ultimately, one preferred forecast for tonnage and one preferred forecast for air cargo operations is selected. The preferred forecast supports the forthcoming facility requirements analysis.

Since DNA does not currently have air cargo activity, one challenge is establishing baseline tonnage. Since this forecast revolves around ongoing development at DNA by Burrell Aviation, baseline tonnage is estimated using information provided by Burrell Aviation. The year 2025 was selected as the baseline for commencing air cargo activity at DNA. Using 2025 allows for any requisite facility enhancements to be constructed prior to the start of air cargo service. From estimated baseline tonnage, future growth is projected using various growth rate scenarios. Once preferred forecasts are identified, projected air cargo tonnage and aircraft operations are considered to determine facility requirements.

5.3.1 Annual Tonnage Forecast Scenarios

As discussed in the air cargo market assessment section, air cargo demand to be served by Burrell Aviation at DNA primarily revolves around trans-border shipments between the U.S. and Mexico. These shipments serve demand associated with the numerous maquiladoras, including automotive plants located in Mexico. Air cargo demand identified for DNA is tied primarily to U.S. trends for the consumption of goods produced in Mexico. Baseline demand was previously identified at 8,000 to 10,000 total annual tons to be flown in and out of DNA by 2025. This is the first the Burrell facilities are expected to be fully operational. Two approaches were considered to develop projections of future air cargo demand. Growth rate and econometric forecasts are presented below.

Growth Rate Forecast

Growth rates for air cargo in the Boeing World Air Cargo Forecast 2022-2041, the FAA Aerospace Forecast (FY 2021-2042), and ELP's 10-Year Historic Air Cargo Growth from ACI-NA data were used to generate high, medium, and low forecasts for the baseline annual tonnage at DNA from 2025 through 2042. Since Burrell Aviation provided a range of baseline air cargo demand for DNA, the low, high, and average demand scenarios are each presented for each forecast growth rate scenario. **Figure 5-1** displays the resultant projections of air cargo tonnage, considering the average annual rates of growth obtained from the three sources noted here.

Figure 5-1: Low, Medium, High Air Cargo Tonnage Growth Rates

Year	Low Forecast Scenario: ELP 10-Year Historic Tonnage (2011-2022)			Medium Forecast Scenario: FAA Aerospace Forecast - All Cargo Carrier Domestic RTMs (2022-2042)			High Forecast Scenario: Boeing World Air Cargo Forecast - US Domestic RTKs (2022-2041)		
	Low	High	Average	Low	High	Average	Low	High	Average
2022	-	-	-	-	-	-	-	-	-
2025*	8,000	10,000	9,000	8,000	10,000	9,000	8,000	10,000	9,000
2027	8,260	10,330	9,300	8,400	10,500	9,450	8,470	10,590	9,530
2032	8,960	11,200	10,080	9,500	11,870	10,680	9,770	12,220	10,990
2042	10,530	13,160	11,850	12,130	15,160	13,640	13,010	16,260	14,630
AAGR	**1.6%**			**2.5%**			**2.9%**		

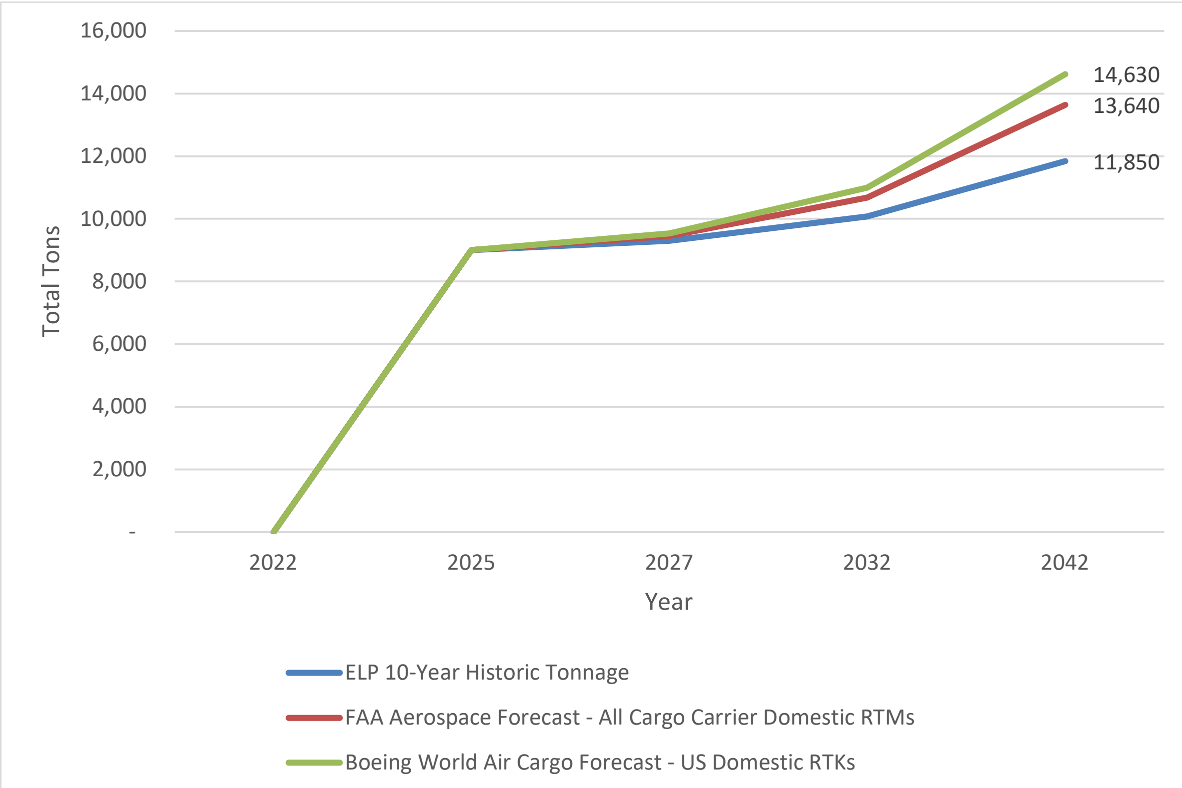
*Note: Lagged start of service; 2025 is anticipated first fully operational year
Source: ACI-NA, FAA, Boeing, Burrell Aviation, Jviation

As shown in **Figure 5-1**, the three forecast scenarios resulted in air cargo tonnage forecast ranges as follows:

- 10,530-13,160 tons in the ELP 10-Year Historic Air Cargo Growth scenario
- 12,130-15,160 tons in the FAA All Cargo Carrier Domestic RTMs scenario
- 13,010-16,260 tons in the Boeing Intra-North America RTKs scenario

For each of the three forecast scenarios, the average annual growth rates range from 1.6 percent to 2.9 percent. Figure 5-2 graphically depicts a comparison of just the average forecast for the three-air cargo tonnage forecast scenarios. Average projections of demand shown below are associated with the ranges of air cargo demand provided by Burrell Aviation.

Figure 5-2: Comparison of Average Annual Air Cargo Tonnage for DNA



Source: Source: ACI-NA, FAA, Boeing, Burrell Aviation, Jviation

Econometric Forecast

GDP, the market value of goods and services produced by labor and property, is a measure of U.S. economic output. Various industry sources, including the FAA and Transportation Research Board (TRB), indicate a high correlation between demand for air cargo and GDP. As shown in **Figure 5-3**, the U.S. GDP grew at an average annual rate of 4.1 percent from 2011 to 2021. Over that same period, the GDP for the El Paso-Las Cruces CSA grew at a rate of 3.5 percent annually. According to the Congressional Budget Office, U.S. GDP is projected to grow at an average annual rate of 1.8 percent. Assuming that the rate of growth for GDP in the El Paso-Las Cruces CSA in relationship to U.S. GDP continues, the AAGR for GDP in the El Paso-Las Cruces CSA will be 1.2 percent.

Figure 5-3: Historic and Projected GDP Rate of Growth for U.S. and El Paso-Las Cruces CSA

Geography	2011	2021	AAGR 2011-2021	Projected AAGR
El Paso-Las Cruces CSA	$32,598,203	$45,847,296	3.5%	1.2%
United States	$15,599,731,000	$23,315,081,000	4.1%	1.8%

Source: Bureau of Economic Analysis, Congressional Budget Office, Jviation

Section 3 discussed how household income, often indicative of the demand for e-commerce moved by air, is relevant to air cargo projections. **Figure 5-4** identifies projected growth of household income ranges for the El Paso-Las Cruces CSA. Income levels more than $75,000 most often correspond to e-commerce demand. From 2020 to 2040, the number of households above $75,000 in the El Paso-Las Cruces CSA is projected to grow at an average annual rate of 3.2 percent.

Figure 5-4: Projections of El Paso-Las Cruces CSA Household Income by Range

El Paso-Las Cruces CSA: Households by Income Range	2010 Households by Income Range	2020 Households by Income Range	2040 Households by Income Range	AAGR 2020-2040
$75,000 to $99,999	27,919	40,660	77,024	3.2%
$100,000 to $124,999	16,663	22,147	42,028	3.3%
$125,000 to $149,999	8,406	11,610	22,003	3.2%
$150,000 to $199,999	6,188	9,721	18,422	3.2%
>$200,000	4,963	7,423	14,073	3.3%
Sum of all Households >$75,000	**64,139**	**91,561**	**173,550**	**3.2%**

Source: Woods & Poole 2021, Jviation

Within the geography of El Paso-Las Cruces CSA, both the projected growth rate of 1.2 percent for GDP and the projected rate of growth for household incomes over $75,000 of 3.2 percent are applied to the previously identified baseline tonnage to produce econometric forecasts.

Considering the GDP growth rate of 1.2 percent, air cargo tonnage at DNA would increase from 8,000-10,000 tons in 2025 to between 9,800-12,250 tons in 2042. Considering the projected rate of growth for household incomes over $75,000 of 3.2 percent, air cargo tonnage at DNA would increase from 8,000-10,000 tons in 2025 to between 13,670-17,080 tons in 2042. These projections are shown in **Figure 5-5**.

Figure 5-5: GDP and Household Income Projection of Annual Air Cargo Tonnage

Year	GDP Projection for El Paso-Las Cruces CSA			Household Income Projection for El Paso-Las Cruces CSA		
	Low	High	Average	Low	High	Average
2022	-	-	-	-	-	-
2025*	8,000	10,000	9,000	8,000	10,000	9,000
2027	8,190	10,240	9,215	8,520	10,650	9,585
2032	8,700	10,870	9,785	9,970	12,470	11,220
2042	9,800	12,250	11,025	13,670	17,080	15,375
AAGR	**1.2%**			**3.2%**		

*Note: Lagged start of service; 2025 is anticipated first fully operational year
Source: Bureau of Economic Analysis, Congressional Budget Office, Woods & Poole 2021, Burrell Aviation, Jviation

Preferred Air Cargo Tonnage Forecast Scenario

The three-growth rate and two econometric methodologies identified average annual rates of growth ranging from a low of 1.2 percent to a high of 3.2 percent. This represents a spread of two percentage points between the lowest and highest growth rates. Examining growth rates implied in the two forecasting approaches, there is a relative high level of consistency between the correlated indicators of air cargo demand. When combined, all five growth rates average 2.3 percent. Of the dozen other growth rate sources considered for this analysis (but not presented in this report), seven were 3.3 percent or higher, and six were less than one percent. The highest average annual growth rate was ELP's five-year historic growth rate of 4.7 percent from 2016-2021. The lowest growth rate identified was ABQ's 10-year historic tonnage of 0.5 percent from 2011-2021.

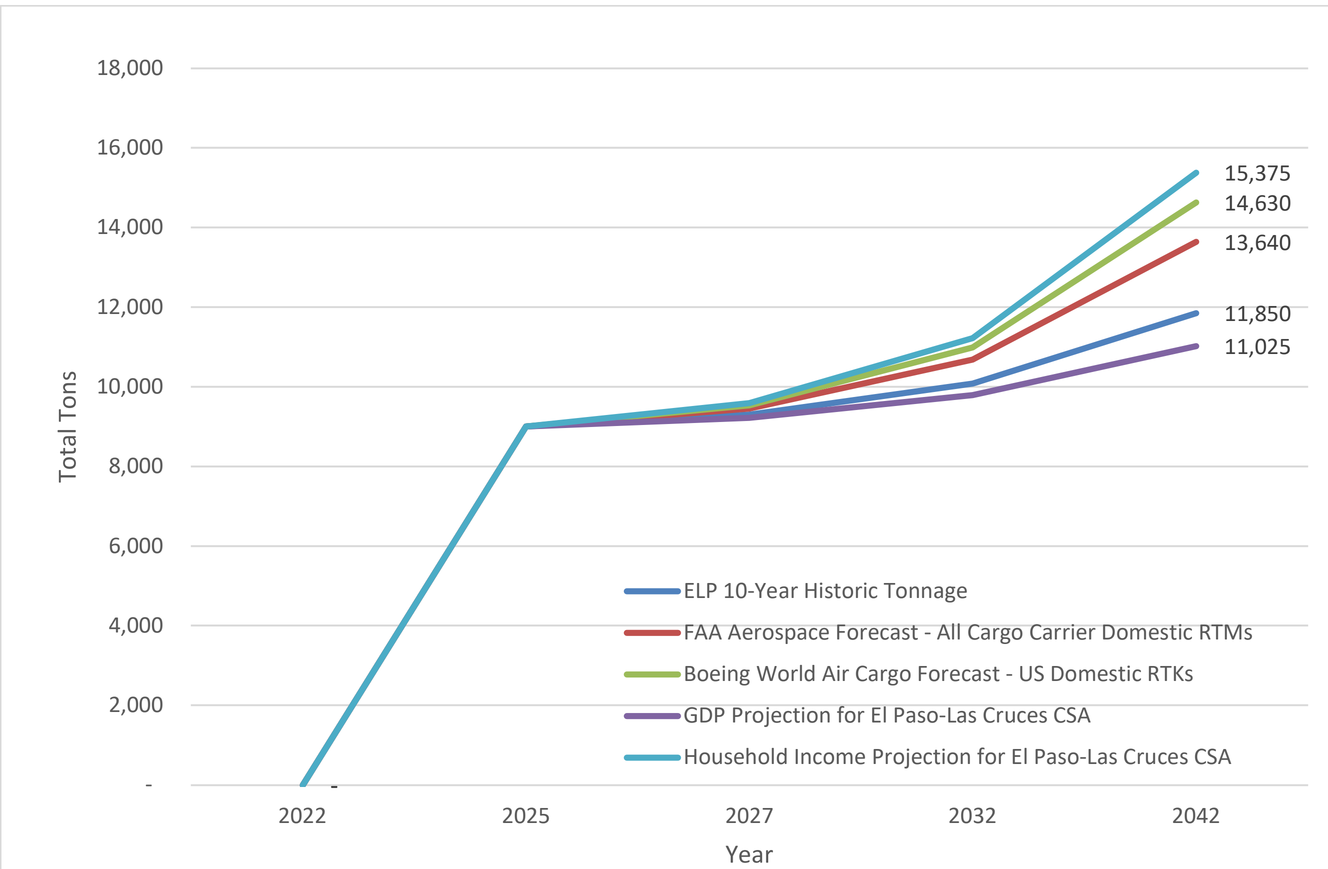
A comparison of the five previously reported forecast scenarios is presented in **Figure 5-6** and **Figure 5-7**.

Figure 5-6: Summary of Tonnage Growth Rates and Projections

Year	GDP Projection for El Paso-Las Cruces CSA			ELP 10-Year Historic Tonnage			FAA Aerospace Forecast - All Cargo Carrier Domestic RTMs			Boeing World Air Cargo Forecast - US Domestic RTKs			Household Income Projection for El Paso-Las Cruces CSA		
	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2025*	8,000	10,000	9,000	8,000	10,000	9,000	8,000	10,000	9,000	8,000	10,000	9,000	8,000	10,000	9,000
2027	8,190	10,240	9,215	8,260	10,330	9,300	8,400	10,500	9,450	8,470	10,590	9,530	8,520	10,650	9,585
2032	8,700	10,870	9,785	8,960	11,200	10,080	9,500	11,870	10,680	9,770	12,220	10,990	9,970	12,470	11,220
2042	9,800	12,250	11,025	10,530	13,160	11,850	12,130	15,160	13,640	13,010	16,260	14,630	13,670	17,080	15,375
AAGR		**1.2%**			**1.6%**			**2.5%**			**2.9%**			**3.2%**	

*Note: Lagged start of service; 2025 is anticipated first fully operational year
Source: Bureau of Economic Analysis, Congressional Budget Office, Woods & Poole 2021, Burrell Aviation, Jviation

Figure 5-7: Summary of Average Annual Air Cargo Tonnage for DNA



Source: ELP, Boeing, FAA, Woods & Poole, Bureau of Economic Analysis, Congressional Budget Office, Burrell Aviation, Jviation

Preferred Air Cargo Tonnage Forecast

Using baseline estimates of annual air cargo tonnage provided by Burrell, the preferred air cargo tonnage projection, for an anticipated air cargo operator at DNA, is based on the *FAA Aerospace Forecast 2022-2042* scenario which has an average annual implied rate of growth of 2.5 percent. This growth rate was selected since it is reasonable, conservative, and is specific to the domestic air cargo market. The selected average annual rate of growth is reflective of a future demand scenario that is between the low and high ranges considered in this analysis.

The preferred rate of 2.5 percent annually is also identical to the most recently available air cargo tonnage data for ELP from 2017 to 2022. Using estimated monthly totals for November and December 2022, ELP saw average annual growth of 2.5 percent from 2017 through 2022, as shown in **Figure 4-14**. This rate represents actual historic air cargo activity for the local air cargo market that DNA could serve.

Figure 5-8 presents the preferred forecast of air cargo tonnage at DNA. As noted, the implied average annual rate of growth, which is 2.5 percent annually, corresponds to the FAA's forecast of U.S. Domestic RTMs

Figure 5-8: Preferred Forecast of Annual Air Cargo Tonnage

	FAA Aerospace Forecast - All Cargo Carrier Domestic RTMs & ELP Historic Tonnage 2017-2022**		
Year	Low	High	Average
2022	-	-	-
2025*	8,000	10,000	9,000
2027	8,400	10,500	9,450
2032	9,500	11,870	10,680
2042	12,130	15,160	13,640
AAGR	**2.5%**		

*Note: Lagged start of service; 2025 is anticipated first fully operational year
**Note: Actual ELP tonnage from January to October 2022 used; November and December 2022 totals estimated based on past month-over-month change
Source: ACI-NA, Jviation

5.3.2 Annual Operations Forecast

When considering future air cargo aircraft operations, it is important to consider how carriers transport air cargo. When determining how many operations are needed, carriers divide annual tons into peak daily one-way pounds. The tonnage estimate determines the aircraft type/size required and frequency of aircraft operations.

For the operators themselves, peak daily one-way demand considers both inbound and outbound flights. It is rare for a carrier to experience equal utilization of air cargo capacity on both inbound and outbound flights. This is because air cargo markets typically lean towards being "consumer" (generally inbound) or "producer" (more frequently outbound) markets. Aircraft size is typically dictated by peak one-way demand. These details help determine aircraft capacity/size and resultant operational frequency.

Even if outbound utilization drops to zero percent, a carrier would still "up-gauge" aircraft size if inbound air cargo demand growth is significant enough to warrant the change. When air cargo tonnage in a specific market is growing, the carrier has the choice of increasing operations or using larger aircraft to provide more capacity. Often, they choose to use larger aircraft with greater hauling capacity. Therefore, while air cargo tonnage may increase, it is often the case that the number of operations supporting that growth does not necessarily need to increase, as larger aircraft are introduced to meet growing demand.

Burrell Aviation anticipates the split between inbound and outbound air cargo to slightly favor inbound freight. This is consistent with what is observed at ELP. From 2013 to 2022, ELP averaged 52 percent inbound and 48 percent outbound air cargo tonnage. The inbound/outbound split often varied by year, with the widest split being 57 percent inbound and 43 percent outbound in 2021. From 2013 to 2015, enplaned freight comprised 51 percent of the total. Since Burrell Aviation's cargo facility won't be operational until at least 2025, the inbound/outbound split is an estimate and actual aircraft utilization rates (percent of cargo carrier capacity utilized) by direction (arriving or departing) will vary.

The ultimate inbound/outbound split of cargo tonnage for DNA is anticipated to be within a few percentage points of being an even 50/50 split. Therefore, unbalanced, or uneven directional flow of air cargo is not anticipated to be a driver of aircraft size. Instead, the baseline tonnage for Burrell Aviation of 8,000-10,000 annual tons will be compared against the effective payload of several relatively common narrow-body cargo aircraft. The number of annual operations for each aircraft type to meet 100% of demand will be estimated regardless of direction or number of weekly operations.

As shown in **Figure 4-40**, Burrell Aviation's baseline demand estimate of 8,000-10,000 annual tons by 2025 would require as many as 529-661 annual operations using a Boeing 737-700 or as few as 296-370 annual operations using a Boeing 757-200. As shown in **Figure 5-9**, DNA's air cargo tonnage is projected to increase at an AAGR of 2.5 percent to between 12,130-15,160 annual tons by 2042. These ranges of annual tonnage demand reflect high and low growth scenarios. This level of annual cargo tonnage would require as many as 802-1,103 annual operations using a Boeing 737-700, or as few as 448-560 annual operations using a Boeing 757-200.

Figure 5-9: Annual Operations to Meet 100 Percent of Preferred Forecast of DNA Air Cargo Tonnage

Forecast Year →	2025*		2027		2032		2042	
Aircraft Make and Model	Annual Ops to Meet 8,000 Tons of Demand	Annual Ops to Meet 10,000 Tons of Demand	Annual Ops to Meet 8,400 Tons of Demand	Annual Ops to Meet 10,500 Tons of Demand	Annual Ops to Meet 9,500 Tons of Demand	Annual Ops to Meet 11,870 Tons of Demand	Annual Ops to Meet 12,130 Tons of Demand	Annual Ops to Meet 15,160 Tons of Demand
Boeing 757-200F	296	370	310	388	351	439	448	560
Boeing 737-800F	400	500	420	525	475	593	606	758
Boeing 737-400F	494	617	519	648	586	733	749	936
Boeing 737-300F	501	627	526	658	595	744	760	950
Boeing 737-700F	529	661	556	694	628	785	802	1,003

*Note: Lagged start of service; 2025 is anticipated first fully operational year
**Note: Red text denotes greater than or equal to 500 annual operations
Source: Jviation

The number of annual operations to fully meet projected demand, as shown in **Figure 5-9**, does not consider the number of actual operational days per week. The air cargo industry primarily operates on weekdays (Monday through Friday), but this operational schedule is dependent on the actual needs of the market and the business model of each individual air cargo carrier. If deemed appropriate and necessary, operations could occur seven days per week. For perspective, 1,003 operations would result in an average of 3.8 operations per day, when only considering weekday operations (Monday through Friday). If operating seven days per week, 1,003 operations would result in an average of 2.7 operations per day. These calculations of average daily operations by aircraft help in identifying the critical/design air cargo aircraft for DNA. A comparison of average aircraft operations needed per day to meet 100 percent of projected air cargo tonnage demand by 2042 is presented in **Figure 5-10**.

Figure 5-10: Comparison of Average Operations per Day to Meet 100 Percent of Demand by 2042

Forecast Year →	2025		2025		2042		2042	
Aircraft Make and Model	Ops per Day to Meet 8,000 Tons of Demand (Operating 5 Days Per Week)	Ops per Day to Meet 10,000 Tons of Demand (Operating 5 Days Per Week)	Ops per Day to Meet 8,000 Tons of Demand (Operating 7 Days Per Week)	Ops per Day to Meet 10,000 Tons of Demand (Operating 7 Days Per Week)	Ops per Day to Meet 12,130 Tons of Demand (Operating 5 Days Per Week)	Ops per Day to Meet 15,160 Tons of Demand (Operating 5 Days Per Week)	Ops per Day to Meet 12,130 Tons of Demand (Operating 7 Days Per Week)	Ops per Day to Meet 15,160 Tons of Demand (Operating 7 Days Per Week)
Boeing 757-200F	1.1	1.4	0.8	1.0	1.7	2.2	1.2	1.5
Boeing 737-800F	1.5	1.9	1.1	1.4	2.3	2.9	1.7	2.1
Boeing 737-400F	1.9	2.4	1.4	1.7	2.9	3.6	2.1	2.6
Boeing 737-300F	1.9	2.4	1.4	1.7	2.9	3.7	2.1	2.6
Boeing 737-700F	2.0	2.5	1.4	1.8	3.1	3.9	2.2	2.7

Source: Jviation

Critical Design Aircraft Considerations

To estimate aircraft operations, the air cargo tonnage must be reconciled against the capacity of a specific aircraft to determine the number of daily operations required to meet the demand. Due to physical limitations in the environs of DNA, for all practical purposes Runway 10-28 is limited to its existing length of 9,550 feet. Since a runway extension is not practical, the maximum ARC the existing runway could be upgraded to is either category D-III or C-IV. An upgraded ARC for Runway 10-28 would need to be accomplished through runway widening and strengthening.

Burrell Aviation's baseline estimated demand of 8,000-10,000 annual tons by 2025 considers the cargo carrying capacity of a Boeing 737-300 Freighter (B733). This aircraft has an effective payload of 34,000 pounds with a maximum takeoff weight (MTOW) of 138,500-pounds. The B733 has 8.5 upper deck pallet positions. Considering the baseline demand in 2025, the first full year Burrell's facilities will open, the B733 would need to fly 501-627 annual operations to meet 100 percent of air cargo tonnage demand.

As tonnage demand increases at the preferred forecast rate of 2.5 percent annually, the B733 would require upwards of 760-950 annual operations by 2042 to fully meet projected demand. This translates to an average of 2.9-3.7 operations per day when operating five days per week or 2.1-2.6 operations per day if operating seven days per week. It may be more cost-effective to use a larger aircraft with greater payloads to carry projected levels of air cargo tonnage.

There are several larger variants of the Boeing 737, including the Boeing 737-800 Boeing Converted Freighter (B738). The B738 has a MTOW of 174,200-pounds, an effective payload of 42,000-pounds, and 11.5 upper deck pallet positions. Boeing 737 freighters in all variants are not yet present in large numbers across U.S. cargo fleets. This is due to their more limited performance in terms of payload, range, and takeoff field length requirements due to the aircraft's lower thrust-to-weight ratio. In the future, B738 freighters are expected to become a more prevalent as passenger airlines continue to retire older B738 aircraft and cargo airlines acquire and/or convert them. A B738 would need to conduct 400-500 annual operations to meet baseline demand in 2025 and 605-758 annual operations to meet projected demand in 2042.

Given the projected air cargo demand at DNA by 2042, a larger narrow-body freighter such as the Boeing 757-200F (B752) may be warranted to accommodate annual tonnage demand with fewer flights. The B752 has an effective payload of 56,000 pounds and can accommodate 15 upper deck pallets. The B752 has a MTOW of 240,000 to 255,000-pounds. This aircraft is much more common across U.S. cargo fleets and is expected to remain operational in large numbers for the foreseeable future. There are no other comparable air cargo replacement aircraft in terms of their payload, range, or hot/high in terms of takeoff performance characteristics.

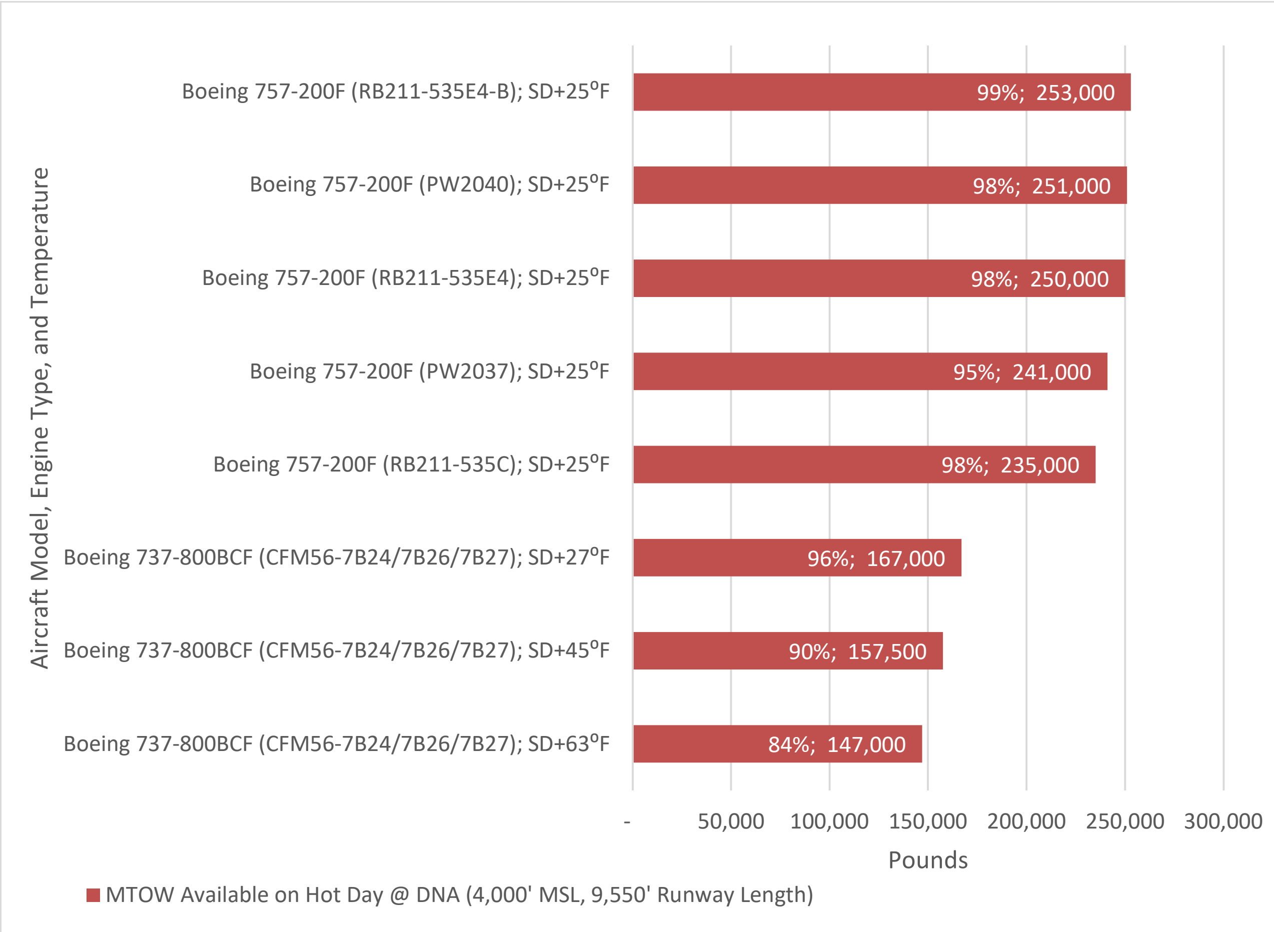
Using Boeing's Airplane Characteristics for Airport Planning manuals for both the B752 and B738 aircraft, comparisons of MTOW available at DNA on a hot day by variant are presented in **Figure 5-11**. This evaluation considers elevation and runway length, approximately 4,000-feet MSL and 9,500-feet of runway length at DNA. A hot day is defined as Standard Day[59] + 25^{o} Fahrenheit for the B752, whereas the B738 is evaluated against three different hot day temperatures. These are Standard Day + 27^{o}, + 45^{o}, and + 63^{o} Fahrenheit. As shown, a B752 can operate at 95-99 percent of its MTOW, depending on engine configuration, on a hot day at DNA. By contrast, a B738 can operate at 84-96 percent of its MTOW.

Figure 5-12 uses the same Boeing manuals to conduct a payload/range comparison between the B738 and B752 aircraft using a range of 2,500 nautical miles. This distance is the approximate longest ferry range identified by Burrell Aviation for anticipated operations between DNA and Anchorage (ANC). As shown, on a Standard Day with zero wind, the Operating Empty Weight + Payload at 2,500 nautical miles range is approximately 128,000 pounds for a B738 versus 190,000 pounds for a B752.

Analysis of takeoff performance means that on hot day at DNA, a B752 can takeoff at a higher percent of total MTOW than a B738. This means there is more usable payload available for cargo. When considering payload/range on a standard day at DNA, the B752 can also carry its larger payload over a longer distance than a B738. For a 2,500 nautical-mile flight, as is expected to be the longest ferry range for Burrell's operator, the B752 is a much more capable cargo aircraft. On a hot day, the delta between a B752 and B738 payload taking off from DNA and flying 2,500 nautical miles is even more pronounced.

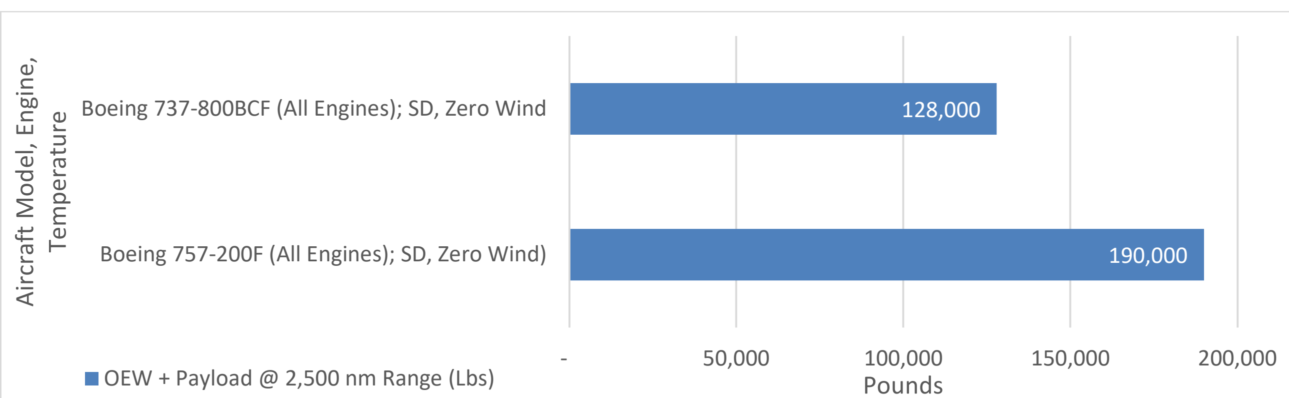
[59] Standard Day temperature is 15^{o} Celsius or 59^{o} Fahrenheit

Figure 5-11: Comparison of Percent of MTOW Available on Hot Day at DNA (4,000' MSL; 9,550' Runway Length) – Boeing 737-800BCF vs Boeing 757-200F



Source: Boeing Aircraft Performance Characteristics for Airport Planning, Jviation

Figure 5-12: Comparison of Payload/Range Operating Empty Weight + Payload (Pounds) at 2,500 Nautical Miles on Standard Day with Zero Wind – Boeing 737-800BCF vs Boeing 757-200F



Source: Boeing Aircraft Performance Characteristics for Airport Planning, Jviation

Preferred Air Cargo Operations Forecast

As shown, the performance characteristics of the B752 are clearly superior to the B738, particularly at a "hot and high" airport such as DNA. DNA has an elevation of over 4,000-feet and averages over 100 days per year with daily temperatures of 90^{o} Fahrenheit or greater.

In the near term, a B733 will likely be the variant used by Burrell's partners to commence initial cargo operations. However, once air cargo operations are successfully established at DNA, it is likely that the projected demand will quickly outgrow the smaller B733 platform. Based on projected demand by 2027, a B738 would be better suited to serve the "high" range of forecasted air cargo demand. By 2042, based on the preferred forecast, a B752 would likely be the best-suited and most useful aircraft size. A preferred forecast of annual aircraft operations by aircraft type is presented in **Figure 5-13** and **Figure 5-14** that shows high, low, and average demand scenarios.

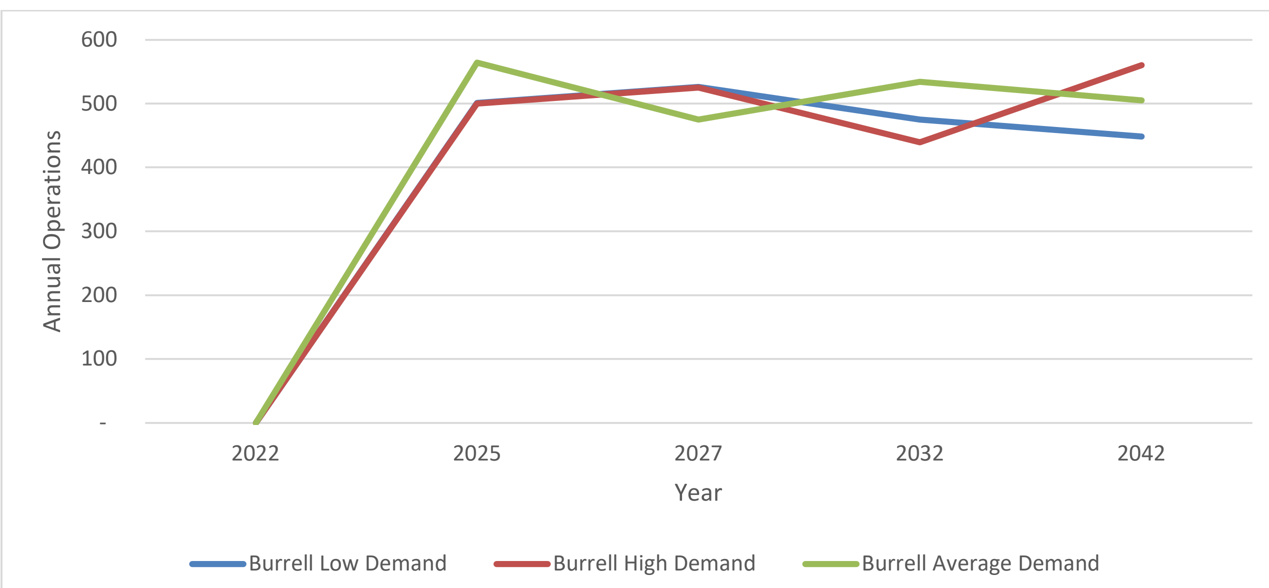
Figure 5-13: Preferred Forecast of Air Cargo Operations by Aircraft Type (Low, High, Average)

Forecast Year →	2025*			2027			2032			2042		
	Annual Tonnage Demand											
	Low: 8,000	High: 10,000	Avg: 9,000	Low: 8,400	High: 10,500	Avg: 9,450	Low: 9,500	High: 11,870	Avg: 10,680	Low: 12,130	High: 15,160	Avg: 13,650
Aircraft Make and Model	Annual Cargo Aircraft Operations											
Boeing 757-200F								439		448	560	505
Boeing 737-800F		500			525		475		534			
Boeing 737-300F	501		564	526		592						

*Note: Lagged start of service; 2025 is anticipated first fully operational year

Source: Jviation

Figure 5-14: Preferred Forecast of Air Cargo Operations for DNA



Source: Jviation

Since precise tonnages figures are not known for a service that does not yet exist, using estimates provided by Burrell, low, high, and average projections of demand were established. In the low demand scenario, the preferred forecast projects:

- 501 B733 operations in 2025
- 526 B733 operations in 2027
- 475 B738 operations in 2032
- 448 B752 operations in 2042

The high demand scenario projects:

- 500 B738 operations in 2025
- 525 B738 operations in 2027
- 439 B752 operations in 2032
- 560 B7752 operations by 2042

A scenario of average demand projects:

- 564 B733 operations in 2025
- 592 B733 operations in 2027
- 534 B738 operations in 2032
- 505 B752 operations by 2042

Across the three scenarios that represent the anticipated range of baseline and forecast demand, annual aircraft operations may decrease as tonnage increases due to up-gauging from a smaller to a larger aircraft with more air cargo carrying capacity. A larger aircraft with greater payload capacity that can carry the same annual tonnage in fewer annual operations is generally more cost effective for the carrier. The actual number of air cargo aircraft operations will also be dependent on the number of markets the tonnage demand is spread across, peak one-way demand, and the ferry range from origin to destination markets. If any of these factors vary from the assumptions used in this section, tonnage and operations may differ from the preferred forecast. It is also important to note that this is a forecasting exercise for long-range planning purposes, and it is reasonable to assume that actual tonnage and operations may be above or below these forecasted levels.

5.4 Summary of Preferred Forecast Scenarios

Projections of air cargo tonnage and operations in this section help set the stage for facility requirements at DNA. There are many types of activities that support future air cargo growth in the Borderplex market area. These include automotive, electronics, aerospace, textiles, and pharmaceutical products that are prevalent and growing sectors of the maquiladora industry in the Mexican state of Chihuahua. E-commerce is also rapidly growing and accounts for an increasing portion of the total air cargo market.

Despite some uncertainty as the global economy rebounds from the COVID-19 pandemic, both industry and government projections for air cargo remain strong. The preferred forecast incorporates a moderate rate of growth for future scheduled air cargo tonnage and annual operations at DNA. The preferred projection is based on both FAA projections and recent historic tonnage data for nearby ELP. **Figure 5-15** summarizes the preferred forecasts for high, low, average demand. As shown, the preferred forecasts project tonnage to grow at an average annual rate of 2.5 percent, while dedicated cargo aircraft operations are projected to grow at an average annual rate of 0.7 percent in association with the high demand scenario. The low and average demand scenarios for cargo aircraft operations exhibit flat or negative growth rates due to up-gauging of aircraft size to accommodate growth in air cargo tonnage. **Figure 5-16** and **Figure 5-17** present only the average tonnage demand scenario and corresponding cargo aircraft operations required to meet that demand.

Figure 5-15: Preferred Tonnage and Operations Forecast for DNA (High, Low, Average)

Year	Low	High	Average
Annual Tonnage Demand			
2022	-	-	-
2025*	8,000	10,000	9,000
2027	8,400	10,500	9,450
2032	9,500	11,870	10,690
2042	12,130	15,160	13,650
AAGR	**2.5%**		
Annual Cargo Aircraft Operations			
2022	-	-	-
2025*	501	500	564
2027	526	525	592
2032	475	439	534
2042	448	560	505
AAGR	**-0.7%**	**0.7%**	**-0.6%**

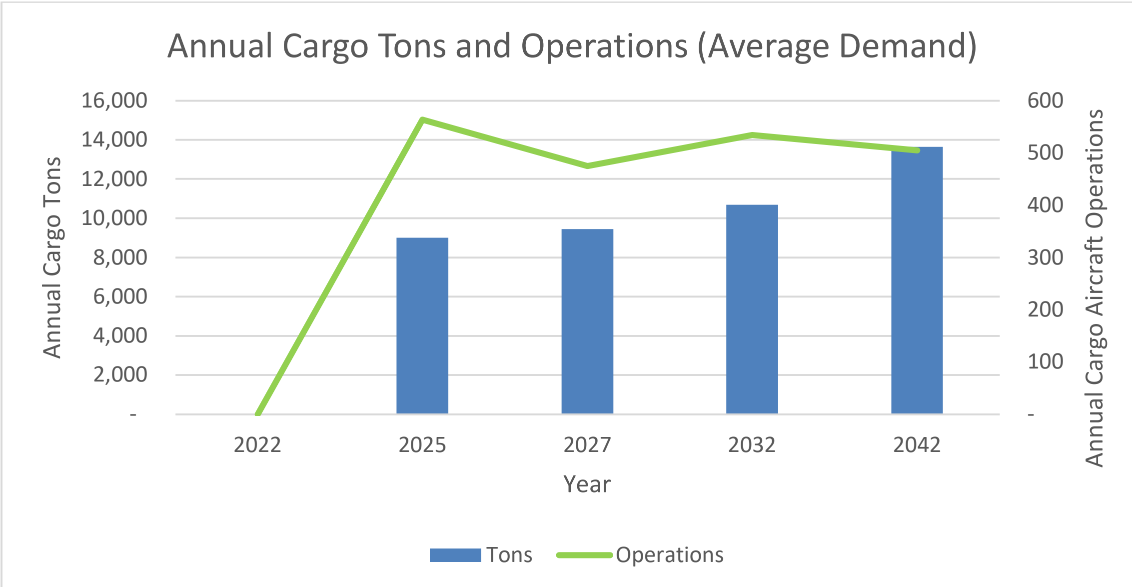
*Note: Lagged start of service; 2025 is anticipated first fully operational year
Source: Burrell Aviation, FAA, Jviation

Figure 5-16: Preferred Forecast of Air Cargo Operations by Aircraft Type (Average Only)

Forecast Year →	2025*	2027	2032	2042
	Annual Tonnage Demand			
	Avg: 9,000	**Avg: 9,450**	**Avg: 10,680**	**Avg: 13,650**
Aircraft Make and Model	**Annual Cargo Aircraft Operations**			
Boeing 757-200F				505
Boeing 737-800F			534	
Boeing 737-300F	564	592		
Summary (AAGR -0.6%)	**564**	**592**	**534**	**505**

*Note: Lagged start of service; 2025 is anticipated first fully operational year
Source: Jviation

Figure 5-17: Preferred Forecast of Air Cargo Tonnage and Cargo Aircraft Operations



Source: Jviation

For the preferred air cargo tonnage forecast, the FAA Aerospace Forecast (U.S. Domestic All Cargo Carrier Total RTMs) was selected for the preferred rate of growth. The growth rate in this forecast is specific to the air cargo industry and matches actual historic tonnage growth at ELP from 2017 to 2022. The selected rate of growth for the tonnage forecast (2.5% average annual rate of growth) also considers predictions made by Burrell Aviation during this study's outreach/interview process. For dedicated cargo operations, projections are based on the preferred forecast of tonnage. Operations are derived considering the tonnage forecast and appropriate effective payload capacities for various air cargo aircraft. The implied growth rate for operations is a byproduct of selecting the appropriate aircraft type based on the demand forecast. The forecast of operations by scheduled air cargo aircraft supports the study's forecast as it is tied to the preferred tonnage growth rate, albeit at a reduced rate to account for the likelihood of carriers increasing the size of aircraft before increasing frequency of operation.

The preferred forecast scenario is based on Burrell Aviation's anticipated total annual tonnage for DNA starting at 8,000-10,000 tons in 2025 and increases by an average annual rate of 2.5 percent to between 12,130 and 15,160 tons by the end of the planning period (2042). This annual tonnage translates to approximately 500 annual aircraft operations in 2025, changing to between 448 and 560 annual aircraft operations by 2042. This assumes the air cargo operator(s) serving DNA up-gauge aircraft size as appropriate to accomplish their mission with as few operations as necessary. Since the anticipated baseline and forecast air cargo demand is assumed to require greater than 500 annual operations by a Boeing 757-200 Freighter (C-IV ARC) by the end of the planning period (2042), the Boeing 757-200 is designated as the critical or the design aircraft for DNA. The critical/design aircraft is an important input for planning for future facility needs.

6 Air Cargo Facility Needs and Summary of Findings

6.1 Introduction

Once potential air cargo demand is identified and a forecast that identifies a critical aircraft is completed, the study focus shifts to identifying facilities to accommodate future demand and to determining other actions that could be considered to foster air cargo activity at DNA. Although the potential for longer-term demand remains strong, insufficient evidence currently exists to justify immediate actions related to the development of proposed Runway 3-21. Consequently, this section focuses on determining near-term facility developments and enhancements to consider in order to serve projected air cargo demand. This section includes analysis of the following as they relate to developing cargo facilities at DNA:

- Airport Reference Code (ARC)/Runway Design Code (RDC)
- Runway
- Taxiways
- Air Cargo Facilities
    - Cargo Warehouse/Building
    - Aircraft Parking Apron
    - Truck/Automobile Parking
    - Ground Service Equipment (GSE) Storage
- Other Supporting Cargo Facilities and Services
- Tail Height Analysis
- UAS, AAM, Electric Aircraft Considerations
- Noise Contours

This section considers facility requirements for the two air cargo aircraft identified as the most likely candidates to operate at DNA. As discussed in the forecast section of this report, these two aircraft are the Boeing 737-800BCF (B738) and the Boeing 757-200F (B752). This study ultimately identified the B752 as DNA's critical cargo aircraft for planning purposes, and this section focuses primarily on facilities to accommodate this aircraft. For comparative purposes, facility requirements related to the B738 are also considered. The Jetport's current Airport Layout Plan (ALP) is based on the Boeing 737 the critical aircraft.

6.2 Airport Reference Code (ARC)/Runway Design Code (RDC)

An airport's critical aircraft is determined by the largest aircraft to have at least a total of 500 takeoffs and landings annually. The critical aircraft establishes each airport's ARC. Determining an airport's critical aircraft and establishing an appropriate ARC are part of the planning process for each airport. The ARC has two components that relate to the critical aircraft. The first component is the aircraft approach category (AAC) for approach speed, identified with letters A, B, C, or D. The second component relates to the aircraft wingspan and/or tail height and is known as the airplane design group (ADG), identified with Roman Numerals I, II, III, IV, V, or VI. Information pertaining to the two ARC components, AAC and ADG, is shown in **Figure 6-1**.

Per the Jetport's most recent ALP, the Runway 10-28 is currently built to C-II design standards, and the critical aircraft is a Gulfstream 280. According to the Jetport's most recent ALP, the ultimate ARC for Runway 10-28 is C-III. An ARC of C-III includes most older variants of the Boeing 737 aircraft. This includes the Boeing 737-300, 737-400, and 737-700 variants which are each used, to some extent, as cargo aircraft by U.S. carriers. As shown in **Figure 6-1**, the B738 has an ARC of D-III, while the B752 has an ARC of C-IV. At the conclusion of this Air Cargo Study Update, DNA sponsors will have to decide whether to modify DNA's ARC and to what design standard. As this study concludes, a change to the Jetport's ARC could be considered to address the operating requirements of larger air cargo aircraft.

The Runway Design Code (RDC) is the designation of the critical aircraft used by each runway like the ARC. The RDC also includes a visibility component based on the type of instrument flight procedure for the runway. Runway 10-28 at DNA has an RDC of C-II-5000 reflecting the 1-mile Runway 10 approach procedure.

Figure 6-1: Airport Reference Codes and Example Aircraft Types

Source: Jviation

In the simplest of terms, the B752 has a wider wingspan and taller tail height but a slower approach speed when compared to a B738. However, each aircraft's respective ARC dictates many other runway and taxiway design standards. **Figure 6-2** identifies which design components are related to the ARC. Comprehensive airport design standards are identified in the FAA's Airport Design Tools for Advisory Circular 150/5300-13. **Figure 6-3** summarizes several key aircraft specifications and airport design differences between the B738 and the B752 aircraft.

Figure 6-2: Relationship of Aircraft Characteristics to Design Components

Aircraft Characteristics	Design Components
Approach Speed	RSA, ROFA, RPZ, runway width, runway to taxiway separation, runway to fixed object.
Landing and Takeoff Distance	Runway length
CMG Distance	Fillet design, apron area, parking layout
MGW	Taxiway width, fillet design
Wingspan / Tail Height	Taxiway and apron OFA, parking configuration, hangar locations, taxiway to taxiway separation, runway to taxiway separation

Source: FAA Advisory Circular 150-5300-13B

Figure 6-3: Comparison of Boeing 737-800BCF vs. Boeing 757-200F Details/Performance Characteristics

Facility / Service Component	Boeing 737-800BCF	Boeing 757-200F
Approximate Number in Active U.S. Cargo Fleets	50 and counting (Passenger to Freighter Conversions)	>200 (Out of Production)
Aircraft Approach Category (AAC) Airplane Design Group	Category D Group III	Category C Group IV
Wingspan Height Length	117-Feet-5-Inches 41-Feet-2-Inches 129-Feet-6-Inches	124-Feet-10-Inches 44-Feet-6-Inches 155-Feet-3-Inches
Approach Speed (MLW)	142 Knots	137 Knots
Runway Width (Design)	150 Feet	150 Feet
Maximum Taxi Weight	174,700 Pounds	256,000 Pounds
Maximum Takeoff Weight (MTOW)	174,200 Pounds	255,000 Pounds
Maximum Landing Weight (MLW)	146,300 Pounds	210,000 Pounds
Effective Payload (80% Bulk Out)	42,240 Pounds	56,000 Pounds
Max Cargo Volume	5,000 Cubic Feet	8,400 Cubic Feet
Design Range (MTOW, Volume-Limit Payload)	2,025 Nautical Miles	2,700-3,150 Nautical Miles*
Operational Empty Weight + Payload to Fly 2,500 Nautical-Mile Range (DNA to ANC)	128,000 Pounds	190,000 Pounds
Percent of MTOW Available on a Hot Day at DNA (86ºF, 4,000-Feet Mean Sea Level, 9,500-Foot Runway)	84-95%*	95-99%*
Main Deck Pallet Positions	11.5	15

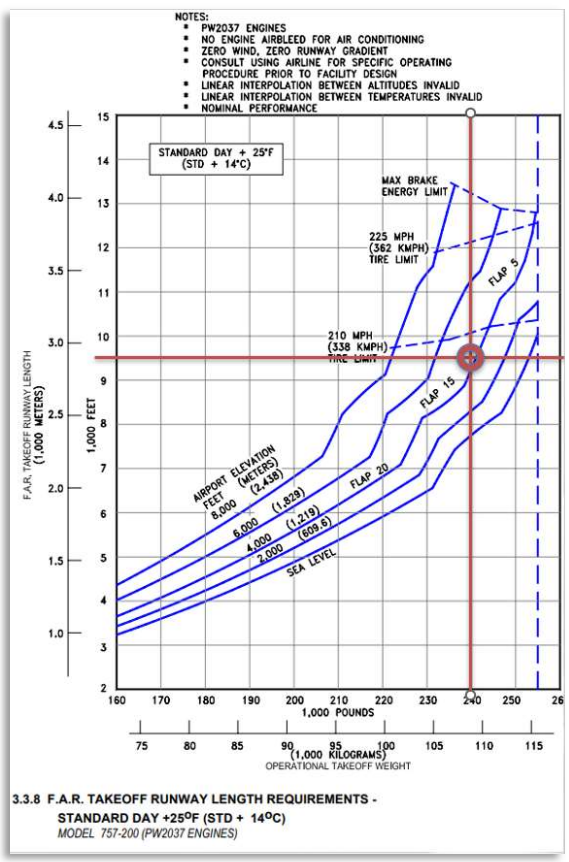
Facility / Service Component	Boeing 737-800BCF	Boeing 757-200F
Lower Hold Bulk Cargo Capacity	1,553 Cubic Feet	1,830 Cubic Feet
Aircraft Parking/Apron Area Need	36,100 Square Feet	51,700 Square Feet
Taxiway Design Group (TDG) / Nominal Width	TDG-3 / 50 Feet	TDG-4 / 50 Feet
Main Landing Gear Configuration	Dual-Wheel (Two Wheels on Each Main Gear Leg)	Dual Tandem-Wheel (Four Wheels on Each Main Gear Leg)
Percent of Weight on One Main Gear Leg Weight on Each One Main Gear Leg (Maximum Taxi Weight) Weight on Each Main Gear Wheel (Maximum Taxi Weight)	46.79% 81,508 Pounds 40,754 Pounds	45% 115,200 Pounds 28,800 Pounds

*Note: Depending on engine configuration
Source: Boeing Airplane Characteristics for Airport Planning, FAA Advisory Circular 150/5300-13B, Airport Design, ACRP Report 143: Guidelines for Air Cargo Facility Planning and Development, Jviation

6.3 Runway

Runway 10-28, DNA's sole runway, is currently 9,550-feet long by 100-feet wide with a weight bearing capacity of up to 90,000 pounds for a dual-wheel main landing gear configuration. The ARCs of the both the B738 (D-III) and B752 (C-IV) have runway design standard widths of 150-feet. DNA's current runway width of 100-feet should be widened by 50-feet to accommodate either or both of the air cargo aircraft.

Due to physical limitations off each runway end, including a rail line and an escarpment, Runway 10-28 is currently at its maximum length (9,550 feet). As discussed in the forecast section of this report, this length is sufficient to accommodate takeoffs and landings of B738 and B752 aircraft at relatively high percentages of their maximum takeoff weight (MTOW) and maximum landing weight (MLW). With hot day conditions at DNA (86°F and an elevation of 4,000-Feet Above Mean Sea Level), the 9,550-foot length is sufficient to accommodate a B738 taking off at up to 96 percent of its 174,200-pound MTOW and a B752 taking off at up to 95-99 percent of its 255,000-pound MTOW, depending on engine configuration. On extremely hot days (104° F and 122°F), takeoff performance for the B738 degrades significantly, whereas the performance of the B752 is impacted but not as much.



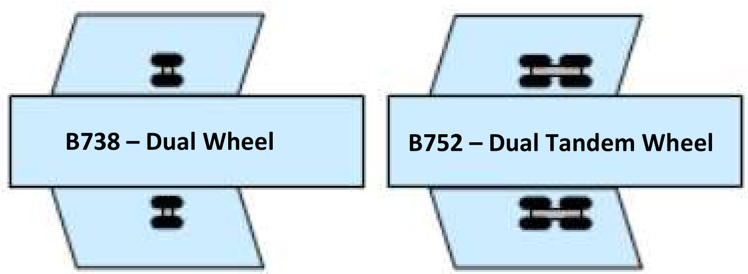
At top-right is a runway length table for airport design issued by Boeing for the 757-200 aircraft. This type of table is used by airport planners to design runways. For example, this table indicates that on a hot day (84 degrees Fahrenheit) at an airport with an elevation similar to DNA at approximately 4,000-feet above sea level and a runway length of approximately 9,500-feet, a B757-200 could takeoff at approximately 95 percent of its

MTOW.[60] Takeoff performance improves at cooler temperatures. In reality, many factors other than runway length, elevation, and ambient temperature must be considered when determining an airport's optimal runway length. Actual runway length requirements depend on many factors such as aircraft weight, load factor, stage length, ambient temperature, airport elevation, wind conditions, runway surface moisture, runway gradient, carrier operating procedures, engine configuration, and flap settings.

Maximum takeoff weight (MTOW) of an aircraft is the maximum weight at which the pilot is allowed to attempt takeoff, due to structural or other limitations. Currently, Runway 10-28 is capable of accommodating aircraft weighting up to 90,000-pounds with a dual-wheel main landing gear configuration. The MTOW for a B738 is 174,200 pounds, whereas a B752 has a MTOW of 240,000-255,000 pounds, depending on engine configuration. The B738 has a dual wheel main landing gear, while the B752 has a dual-tandem main landing gear, as shown in **Figure 6-4**. Since the B752 has eight main landing gear wheels to distribute its weight, compared to four main landing gear wheels for a B738, the pavement strength requirements are similar for both aircraft. As shown in **Figure 6-3**, at maximum taxi weight, the B738 puts 81,508 pounds on each main gear leg versus 115,200 pounds for the each B752 main gear leg. However, on a per wheel basis, each main gear wheel for a B738 supports 40,754 pounds, whereas each main gear wheel for a B752 supports 28,800 pounds.

To increase the weight bearing capacity of Runway 10-28, its existing pavement requires a 2-inch Hot Mix Asphalt (HMA) FAA P-401 overlay, and the existing runway pavement requires a 9-inch HMA with a 6-inch Crushed Aggregate Base Course (CABC) FAA P-209 on a prepared subgrade FAA P-152. This strengthening will meet the needs of larger air cargo aircraft operating at DNA.

Figure 6-4: Main Landing Gear Configurations – B738 vs. B752



Source: Wikipedia – Aircraft Undercarriage Arrangements

In addition to the width of the runway (increased from 100 to 150 feet), paved runway shoulders are often needed to provide resistance to jet blast erosion. For both the B738 and B752, paved runway shoulders are required to be 25 feet wide on both sides of the runway. Runway 10-28 currently has 20-foot paved shoulders on both sides of the runway. These existing 20-foot shoulders should be replaced with 25-feet of new runway surface pavement on each side of the runway once its width is increased to 150 feet. New 25-foot paved shoulders are required for both B738 and B752 aircraft.

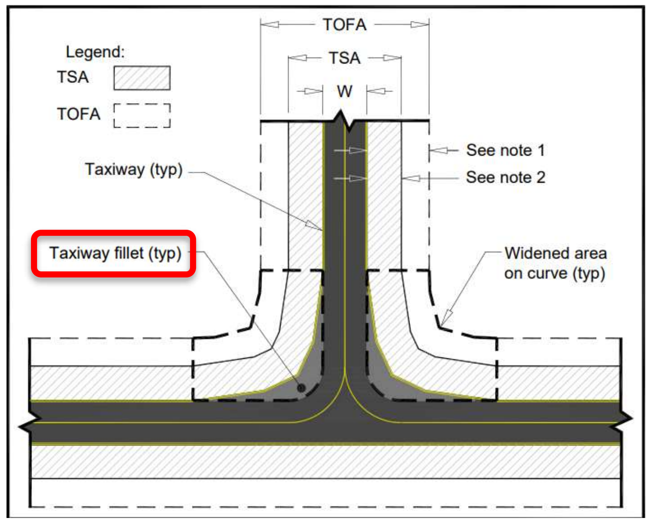
6.4 Taxiways

In the FAA's former airport design guidance, taxiway design was driven by the Airplane Design Group (ADG). In the updated AC 150/5300-13B, a new component drives taxiway design. This new component is the Taxiway Design Group (TDG). The TDG includes seven classifications, and it is based on the design aircraft's overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) dimension. For DNA, the TDG will vary depending on the area of the Jetport that is being accessed. For example, T-hangar areas may be served by TDG 1A/1B while other areas may require TDG 2, 3 or greater based on the aircraft type served. With respect to air cargo aircraft

[60] Standard Day temperature is 59 degrees Fahrenheit (F).

that could operate at DNA, the B738 is a TDG-3, while the B752 is TDG-4; both aircraft dictate a 50-foot-wide taxiway. DNA's parallel Taxiway A is currently 75-feet wide with 25-foot shoulders. Based on these dimensions no change to the width of parallel Taxiway A is needed.

Runway to taxiway separation standards are based on ADG and visibility minimums. These standards are derived from landing and takeoff flight path profiles and the physical characteristics of the design aircraft. Both the B738 and B752 require Runway Centerline to Parallel Taxiway Centerline separation distances of 400 feet at sea level. For airports at higher elevations, such as DNA, an increase in separation distances may be required to keep taxiing and holding aircraft clear of the inner-transitional Object Free Zone (OFZ). If the runway is greater than or equal to 100 feet (30.5 m) above sea level, with approaches that have visibility of less than 3/4 statute mile (1.2 km), the separation distance increases by an elevation adjustment. This runway to taxiway separation distance is increased by 1 foot for each 100 feet above sea level. DNA's elevation is 4,112.8 feet above sea level. DNA's current Runway Centerline to Parallel Taxiway Centerline separation distance of 445 feet is sufficient to for both B738 and B752 design standards. No change is needed.

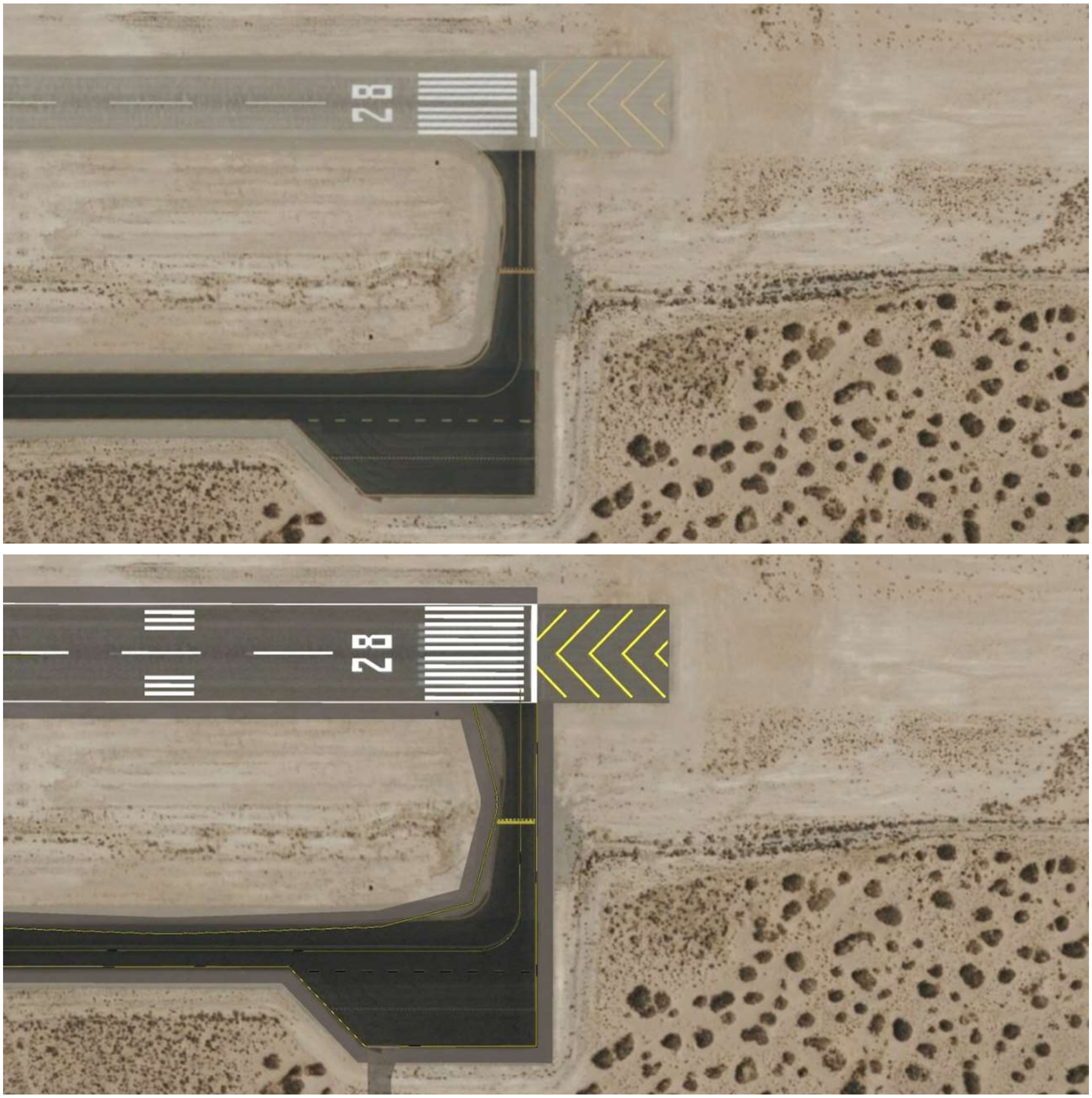


Taxiway centerlines are designed so that a pilot can taxi with the "cockpit over the centerline". Meaning that the pilot simply follows a line. Due to different aircraft characteristics, larger aircraft with longer and/or wider landing gear configurations may not be able to taxi using "cockpit over the centerline" without inadvertently exiting the taxiway pavement during a turn. Instead, pilots use judgmental oversteer which requires pilots to make judgement calls at each turn, increasing pilot workload and potential risk.[61] The TDG classifications also have design criteria for taxiway/taxilane width and fillet geometry that are defined by the critical TDG aircraft. The TDG aircraft may differ from the critical ADG for the airport. Taxiway fillets, which are the radii of the taxiway centerlines and additional pavement, are also defined by TDG.

As previously discussed, a B738 falls under TDG-3 and a B752 falls under TDG-4 design criteria. DNA taxiway fillets are currently constructed to various design standards. Taxiways A1, A3, A3, and A5 are constructed pre-TDG standards, Taxiway A4 is constructed to TDG-2 standards. Future taxiway fillets should be reconstructed to accommodate B738 or B752 aircraft. **Figure 6-5** and **Figure 6-6** present DNA's existing pre-TDG taxiway fillets, compared to TDG-4 taxiway fillets at each runway end. These are approximate, planning-level examples.

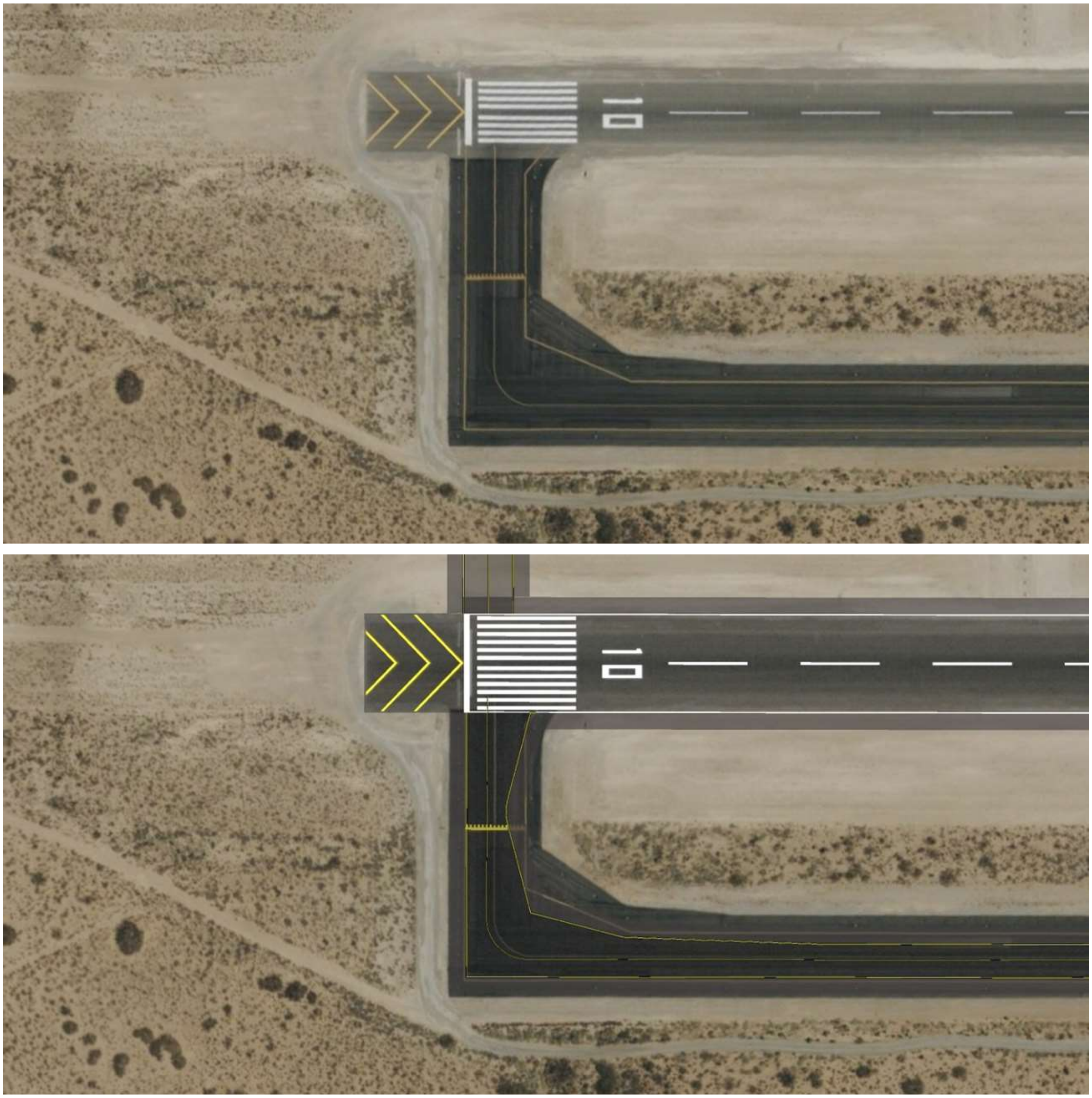
[61] Airfield Geometry Safety, runways, taxiways, and pilots. – Jean-Christophe Dick (airport.consulting)

Figure 6-5: Runway 28 End Taxiway Fillets – Existing (Top) vs. TDG-4 (Bottom)



Source: Google Earth, Jviation

Figure 6-6: Runway 10 End Taxiway Fillets – Existing (Top) vs. TDG-4 (Bottom)



Source: Google Earth, Jviation

Taxiway A is currently 75 feet wide with 25-foot shoulders. With these characteristic, Taxiway A can serve as an interim runway during major runway improvement projects. This need could be imminent with propose widening and strengthening of Runway 10-28. Connecting taxiways at DNA range from 35 to 75 feet in width. With growth in air cargo activity, new taxilanes will be needed to connect the planned air cargo apron area to existing Taxiway A. These taxilanes should be constructed to TDG-4 (or TDG-3) design standards.

As for taxiway pavement strength, the strength of existing pavement sections vary across DNA taxiways. Taxiway A, Taxiway A1, A2, A4, and A5 are built accommodate a 90,000-pound aircraft with dual wheel main landing gear configuration. The eastern 1,050 feet of Taxiway A and Taxiway A1 pavement will each need a 2-inch Hot Mix Asphalt (HMA) FAA P-401 overlay to increase their strength to serve air cargo aircraft. New pavement for taxiway fillet geometry is 9-inch HMA, 6-inch Crushed Aggregate Base Course (CABC) FAA P-209, on a prepared subgrade FAA P-152. Existing shoulders on Taxiway A, Taxiways A2, and A5 will need reconstruction to meet TDG-3 or TDG-4 design standards.

6.5 Air Cargo Facility Analysis

The planned air cargo facilities, as originally proposed by Burrell Aviation, feature a 120,000-square-foot cargo warehouse building (part of a larger distribution and cold storage building), a 120,000-square-foot cargo apron (part of a larger apron connected to maintenance facilities), and four 30,000-square-foot maintenance hangars. The main cargo warehouse building will also include space dedicated to cold chain storage and distribution facilities. This section compares the air cargo development plan for DNA proposed by Burrell to typical air cargo building space requirements. This comparison is accomplished using industry throughput ratios.

6.5.1 ACRP Modeling for Air Cargo Facility Needs

To determine what facilities are needed to accommodate forecast air cargo tonnage, space requirements are developed based on industry throughput ratios collected by the consultant. The ratios are based on a calculation of average tons per square feet and consider data from surveys of numerous existing air cargo facilities at airports across the U.S. Specific building, apron, equipment storage, truck parking, and truck dock/door ratios have been identified for each type of cargo "carrier"; facility needs are an output of a cargo facilities model. The model is based on facility needs of air cargo carriers in the following categories:

- Integrated express: air cargo carriers that provide door-to-door package deliveries
- Passenger airline belly cargo
- All-cargo carrier: air cargo carriers that ship only cargo
- Combi-carriers: cargo carriers that use aircraft configured to carry both passengers and cargo on the main deck

By applying ratios to anticipated cargo demand, facility requirements are determined for DNA. For this analysis, the facility needs of all-cargo carriers were considered. The facility needs for this classification of carriers is like that of the integrated express carriers. The specific type of carrier that will operate at DNA has not yet been identified. The approach to this analysis provides flexibility for accommodating the needs of different types of air cargo carriers.

The model used in this analysis is designed to estimate space utilization for air cargo facilities at airports. The model is flexible in that it can estimate spatial utilization for aggregated cargo areas on an airport as well as specific buildings and aprons at an airport. It is designed with two types of airports in mind: airports serving primarily domestic air cargo demand and airports serving international air cargo demand. Since the tonnage throughput associated with potential air cargo demand at DNA is expected to be carried by contract all-cargo carriers, DNA is modeled as an all-cargo carrier facility handling primarily domestic air cargo. The throughput ratios used in the model are based on industry averages from airports across the country collected as part of *ACRP Report 143: Guidelines for Air Cargo Facility Planning and Development*.

When applying these carrier ratios, forecasts of cargo tonnage throughput, and aircraft types, air cargo facility needs can be estimated. A detailed analysis of projected space requirements to meet the projected air cargo throughput at DNA – as established by the ACRP model for apron areas, cargo buildings, truck/auto parking areas, and truck docs/doors – reveals that the planned improvements will be more than ample to accommodate projected demand while providing the airport with the opportunity to expand its air cargo service.

DNA's planned facilities includes a single building with 503,000 square feet of combined space for air cargo, cold storage, and distribution purposes. The air cargo warehouse component comprises about one-quarter of the total building, or approximately 143,000 square feet. Based on tonnage throughput ratios, this air cargo building is adequate for the tonnage forecasted through end of the planning period (2042). Through discussions with Burrell Aviation, it is likely that once successful cargo operations are established at DNA, additional cargo activity could be attracted. This additional demand could quickly outpace the preferred tonnage forecast, which is based on initial and more conservative baseline cargo demand. Assuming the planned cargo facilities have security fencing and airside access control, any air cargo warehouse should have truck docks/doors to allow for the movement of freight between airside and landside.

When planning for cargo apron space, there are two primary methods for determining space requirements: a throughput metric based on annual tonnage handled or a need for peak-period aircraft parking. Based on the anticipated aircraft ADG and throughput ratios, it is estimated that the planned cargo apron will be more than sufficient to accommodate demand throughout the planning period, both for aircraft apron parking and paved ground service equipment (GSE) storage. The planned cargo apron of over 405,000 square feet will be sufficient to accommodate forecasted air cargo volumes and aircraft types by a wide margin. Should carriers operate more than one of each aircraft type, the apron should still be sufficient.

When planning an actual cargo apron, there is a wide range of specific considerations, including:

- Aircraft parking distance from building
- Aircraft parking angle relative to building
- Aircraft fleet mix to be used (i.e., aircraft sizes, nose-loading aircraft, nose gear position relative to aircraft nose, wingtip separation, blended wing/winglets)
- Number of aircraft parked simultaneously
- Power or tug aircraft movement
- Presence of service roads
- Number and types/sizes of GSE

When considering only aircraft parking space needs, the total space required takes into consideration aircraft wingspan and overall length for the largest aircraft type expected to operate at an airport. Buffer space is also included in the total square footage requirement to separate aircraft as well as to provide sufficient spacing from and between buildings and service lanes. While the FAA does not have specific cargo apron design standards, Airports Council International – North America (ACI-NA) and Airlines for America (A4A) does provide cargo apron facility guidelines.

Figure 6-7 identifies aircraft parking space requirements by Airplane Design Group (ADG) for several common air cargo aircraft. As previously described, ADG is an FAA-defined grouping of aircraft types based on wingspan and tail height with six groupings represented by Roman numerals I through VI. ADG pairs with Aircraft Approach Category (AAC), which is aircraft approach speed-based, to determine an airport's Airport Reference Code (ARC). These space requirements are designed to ensure aircraft components (wings, tail, fuselage) do not conflict with object free areas (OFAs) for adjacent runways or taxiways. The total apron area (in square feet) for each aircraft is calculated by multiplying aircraft wingspan (plus 25 feet) by aircraft length (plus nose tail buffers). The cargo apron parking space requirements shown in **Figure 6-7** are averages for multiple aircraft types in each ADG.

Figure 6-7: Aircraft Parking Apron Need by Aircraft ADG

Example Cargo Aircraft	FAA ADG	Parking Space Requirements by Aircraft ADG (square feet)
Boeing 737-700	C-III	36,100
Airbus A300, Boeing 757-200	C-IV	51,700
Airbus A330-200, Boeing 777-200	C-V	72,000
Boeing 767-300, McDonnell-Douglas MD-11	D-IV	58,700
Boeing 747-400, Boeing 777-300	D-V	76,200
Boeing 747-8F	D-VI	100,000

Source: FAA Advisory Circular 150/5300-13B, Airport Design, *ACRP Report 143: Guidelines for Air Cargo Facility Planning and Development*

As part of the lease agreement with Burrell Aviation, no aprons will be upgraded by Doña Ana County. The lessee (Burrell Aviation) is responsible for investing to build the planned air cargo development, which is estimated at over $70 million. It is also worth noting that the existing west heavy apron of approximately 240,000 square feet (300' X 800') is sufficient to accommodate forecasted air cargo volumes and aircraft types.

6.5.2 Other Cargo Airport Infrastructure Attributes

Air cargo carriers often have preferred airside facilities and supporting services when operating at an airport. These facilities and services were identified in past research conducted by the Transportation Research Board (TRB) in *ACRP Report 143: Guidebook for Air Cargo Facility Planning and Development*. While facilities that support air cargo operators vary based on the type of aircraft used by the provider and the volume of activity accommodated (both number of operations and tonnage processed), the following are examples of common supporting facilities and airport attributes sought by air cargo operators:

- Approach with Vertical Guidance
- Weather Reporting
- Fixed Base Operator (FBO)
- Jet Fuel Available
- Full Parallel Taxiway
- Aircraft Rescue and Fire Fighting (ARFF) Facility
- Proximity to High Concentration of Nearby Air Cargo Demand Generators
- Proximity to Interstate Highway
- Last-Mile Road Quality (Good Access Roads; Proximity to Limited Access Highway; Limited or No Residential Roads)
- Compatible Land Uses Surrounding Airport
- Limited Residential Areas in Vicinity of Airport

It is worth noting that having all the above facilities/services is not a prerequisite for an airport to support an air cargo operator; rather, these facilities/services are a composite of those identified in *ACRP Report 143*. Air cargo operators can and do operate at airports lacking one or more of these facilities/services. When evaluating and comparing DNA to the attributes listed above, DNA already has most of the identified attributes. A GPS approach with vertical guidance exists on Runway 10, and a precision instrument approach to Runway 28 has been designed and will be implemented with planned improvements to Runway 10-28. Another item that may be important to consider in the future as operations grow is the establishment of air traffic control tower to enhance the safety and the efficiency of operations of the airspace around the Jetport. Formal guidance on the establishment criteria for air traffic control services and navigational facilities is provided in FAR Part 170[62]

It is worth noting that an ARFF facility, while desirable, is not a requirement for an air cargo operator. This is a facility/service most often found at airports that also accommodate scheduled commercial airline operations. There are, in fact, many airports that serve air cargo carriers that do not have ARFF facilities. Firefighting services at DNA are provided by a nearby, off-airport station; however, as air cargo operations grow, examining the need for an on-airport ARFF facility may be warranted.

Navigational aids are a critical component in airport infrastructure and are frequently used by air cargo carriers. Without adequate navigational aids, many air cargo carriers would experience less dependable operations during periods of inclement weather or reduced visibility. As a result, customers would experience delays in critical shipments. For this discussion, navigational aids are divided into two categories:

- **Visual aids** - These include runway lighting, airport beacons, obstruction lighting, wind indicator, segmented circle, and visual glideslope indicators.
- **Instrument navigational aids** - These include Non-Directional Beacons, Very High Frequency Omnirange (VOR), or Instrument Landing System (ILS) and Global Positioning Systems (GPS) instrument approaches.

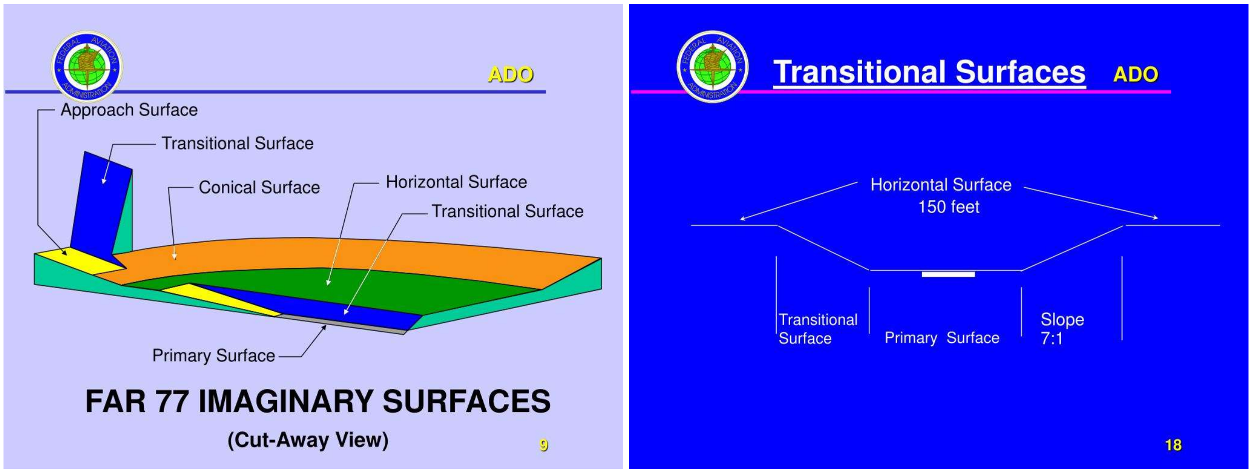
DNA has many of the above visual and instrument navigational aids. Visual aids include medium intensity runway lighting (MIRL), rotating beacon, precision approach path indicators (PAPIs) on both runway ends, lighted wind indicator, segmented circle, and runway end identifier lights (REILs). Navigational aids include a vertical guidance approach to Runway 10 (RNAV GPS). A precision instrument approach is planned for Runway 28.

6.5.3 Tail Height Analysis

Since the planned cargo apron is anticipated to accommodate large narrow-body air cargo aircraft, the Jetport has a need to understand limitations on aircraft parking positions, as they relate to aircraft tail heights and applicable imaginary airspace surfaces. Federal Aviation Regulation Part 77 (FAR Part 77) establishes standards and notification requirements for objects affecting navigable airspace. FAR Part 77 allows the FAA to identify potential aeronautical hazards in advance during airport planning efforts, thus preventing, or minimizing adverse impacts to the safe and efficient use of navigable airspace. **Figure 6-8** presents graphical depictions of FAR Part 77 imaginary surfaces, including the transitional surface, which is most relevant for evaluating vertical infrastructure or tail heights of aircraft parking on an apron.

[62] eCFR :: 14 CFR Part 170 -- Establishment and Discontinuance Criteria for Air Traffic Control Services and Navigational Facilities (FAR Part 170)

Figure 6-8: FAR Part 77 Imaginary Surfaces



Source: FAA

The transitional surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces, for portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.[63]

A new precision instrument approach is in design for Runway 28; this approach will have ¾-mile visibility minimums. This future approach changes the width of the Jetport's primary surface from 500-feet wide (250-feet in each direction from runway centerline) to 1,000-feet wide (500-feet in each direction from runway centerline). Applicable Part 77 dimensional standards are presented in **Figure 6-9**.

Figure 6-9: Obstruction Identification Surfaces – FAR Part 77 Dimensional Standards

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON - PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON - PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
				A	B		
		A	B		C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

- A - UTILITY RUNWAYS
- B - RUNWAYS LARGER THAN UTILITY
- C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
- D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
- * - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

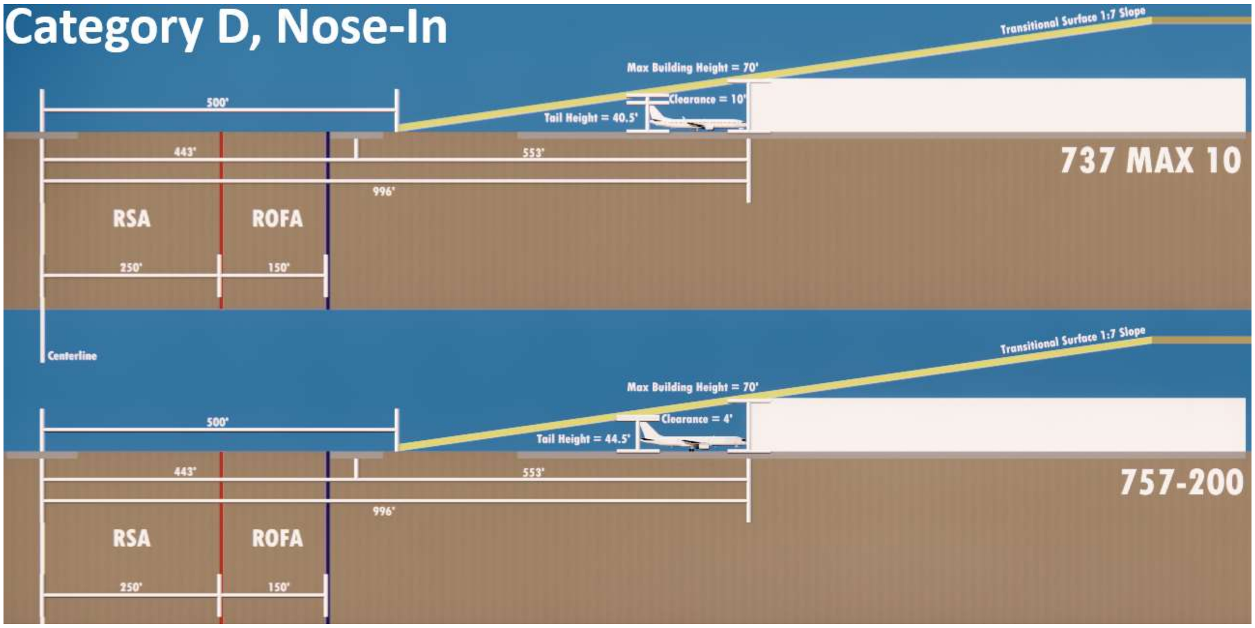
Source: FAA

For the purposes of this analysis, the two aircraft selected to evaluate tail heights relative to the transitional surface are a Boeing 737-Max 10 (B7XM) and a Boeing 757-200 (B752). These are the largest variants of the respective aircraft families currently under consideration for use by cargo operators that could operate at

[63] FAR Part 77.25(e)

DNA's planned air cargo facilities. As shown in **Figure 6-10**, when these two aircraft are parked nose-in to the planned cargo facility, the B7XM tail clears the transitional surface by 10 feet, while the B752 clears by 4 feet.

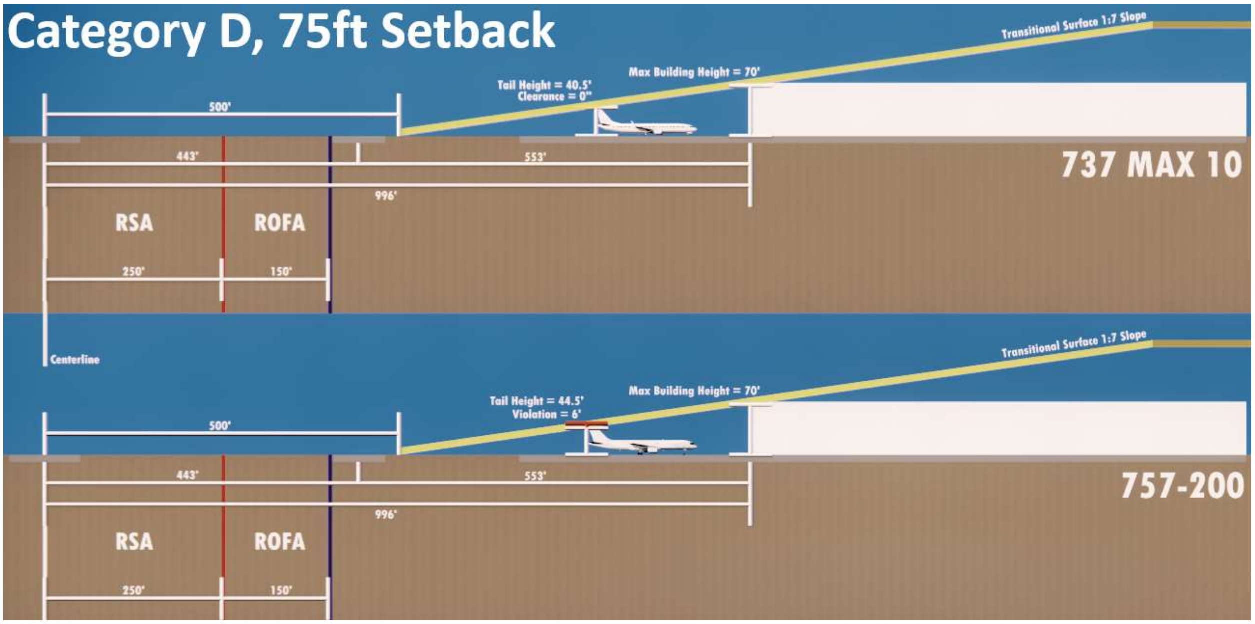
Figure 6-10: Category D Instrument Approach; Nose-In Configuration



Source: Jviation

From a functional perspective, cargo aircraft would not park fully nose-in to the cargo building. There would need to be space for ground support equipment (GSE), particularly tugs for pushback. While there are no set standards for the parking distance between a cargo aircraft and a cargo building, cursory observations of a wide range of U.S. cargo facilities indicates that a 75-foot separation is a useful parameter to consider. By adjusting aircraft parking positions to incorporate a 75-foot separation between the building aircraft nose, clearances between aircraft tail heights and the transitional surface are significantly reduced, as shown in **Figure 6-11**.

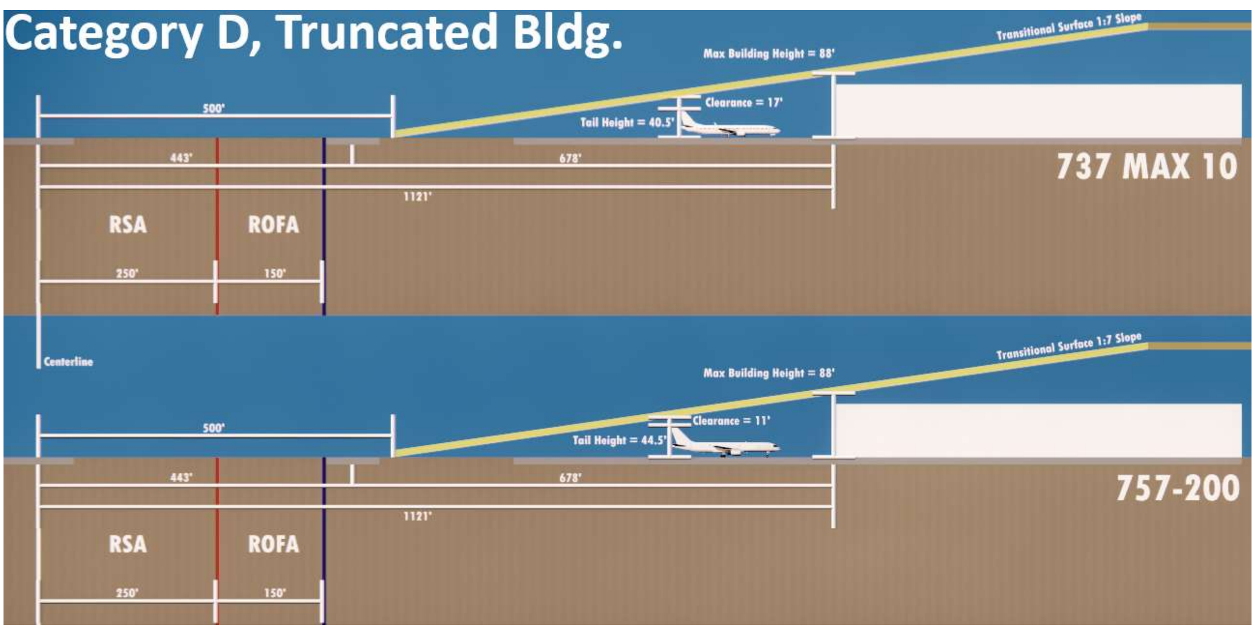
Figure 6-11: Category D Instrument Approach, 75-Foot Aircraft Parking Position Setback



Source: Jviation

As shown in **Figure 6-11**, the B7XM tail now touches the transitional surface (clearance of 0-feet), while the B752 tail penetrates the transitional surface by 6 feet. One possible solution to this potential penetration would be to reduce the size of planned air cargo building. For example, if the building were reduced by 125-feet, as shown in **Figure 6-12**, tail heights would be well clear of the transitional surface. As shown, the B7XM would have a clearance of 17 feet and the B752 would have an 11-foot clearance.

Figure 6-12: Category D Instrument Approach, Truncated Building with Aircraft Parking Position Setback



Source: Jviation

Although this aircraft is not anticipated to operate at DNA in the near term, this 125-foot setback would also allow for tail clearance by a Boeing 767-300 (B763). A B763 is a common wide-body cargo aircraft with approximately 64 percent more payload compared to a B752. In the event that the planned crosswind runway is built in the future, this size of aircraft could be accommodated at the planned cargo building without a tail penetration to the Transitional Surface. However, in discussions with Burrell Aviation, the developer for the planned cargo facilities, the preference is to only reduce the building size by around 42 feet. This would maximize total building square footage and accommodate aircraft similar to B752 or smaller without a Transitional Surface penetration.

It is important to note that this is a desktop analysis that uses ground elevations available from Google Earth. The graphics and measurements presented are for illustrative purposes and should not be considered official guidance. An actual Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) should be conducted to determine specific conditions at DNA with regard to Part 77 airspace surfaces and potential obstructions or penetrations.

6.6 Considerations for UAS, AAM, and Electric Aircraft

As discussed in **Section 2.2**, the aviation industry is experiencing growth in new and innovative aviation technology. Uncrewed Aircraft Systems (UAS) and Advanced Air Mobility (AAM) have the potential to augment or supplement more traditional air cargo transport. It is possible that these technologies will also enable timely delivery of small air cargo parcels to areas that are remote and not easily accessible. The logistics industry is investing in this technology to accommodate parcel delivery on the first or last mile of delivery, intralogistics and automation within factories/warehouses, medical deliveries, and transportation of smaller air freight parcels in urban and rural areas. Companies such as Beta Technologies, as one example, are developing small electric piloted aircraft (AAM) which may be used to carry air cargo on short routes.

FAA Advisory Circular 107-2A provides guidance for small UAS (less than 55 pounds) operations in the National Airspace System (NAS). Small UAS typically do not operate from airports. As large UAS (greater than 55 pounds) continue to develop and AAM aircraft come online, it is likely that airports will play a greater role in accommodating their operations. Some UAS and AAM aircraft are expected to operate in a manner similar to piloted aircraft and, therefore, will need airfield facilities for their safe and efficient operation. Airfield facility planning guidance, specifically tailored to address the unique needs of large UAS and AAM, is limited. As technologies advance, UAS and AAM operators and civilian airports will find airfield design guidelines useful to their business and operational decisions.

ACRP Research Report 212: UAS and Airports, Volume 2, Incorporating UAS into Airport Infrastructure Planning provides guidance on whether and how airports should update master plans/airport layout plans (ALPs) for UAS operations. Research related to airport considerations for large UAS, Vertical Take-Off and Landing (VTOL) and electric aircraft is ongoing as part of ACRP Project 03-50, "An Airport-Centric Study of the Urban Air Mobility Market"; and ACRP Project 03-51, "Electric Aircraft on the Horizon." *ACRP Report 238, Airfield Design for Large Unmanned Aircraft Systems* was recently published.

Per an FAA memorandum, over the next five years, the agency expects to see more aircraft transitioning to electric, hydrogen, and hybrid propulsion. The first type of certified AAM aircraft will operate under the eVTOL and Short Take-Off and Landing (STOL) models. To support these aircraft, airports and heliports will likely begin planning to incorporate electric charging stations, hydrogen refilling stations, and other support facilities into their existing infrastructure. Airports may also choose to identify or construct designated vertiports to support the landing and takeoff needs of AAM aircraft. The FAA is already seeing an increase in the number of airspace evaluations for electric charging stations at airports and received its first airspace case for a stand-alone vertiport in Florida.

FAA is the clearinghouse for reviewing and approving new vertiports FAA Regional Offices and Airport District Offices (ADOs) are the point of contact for airports and heliports/ vertiports to submit the necessary documentation for securing approval of construction plans and operating procedures.[64]

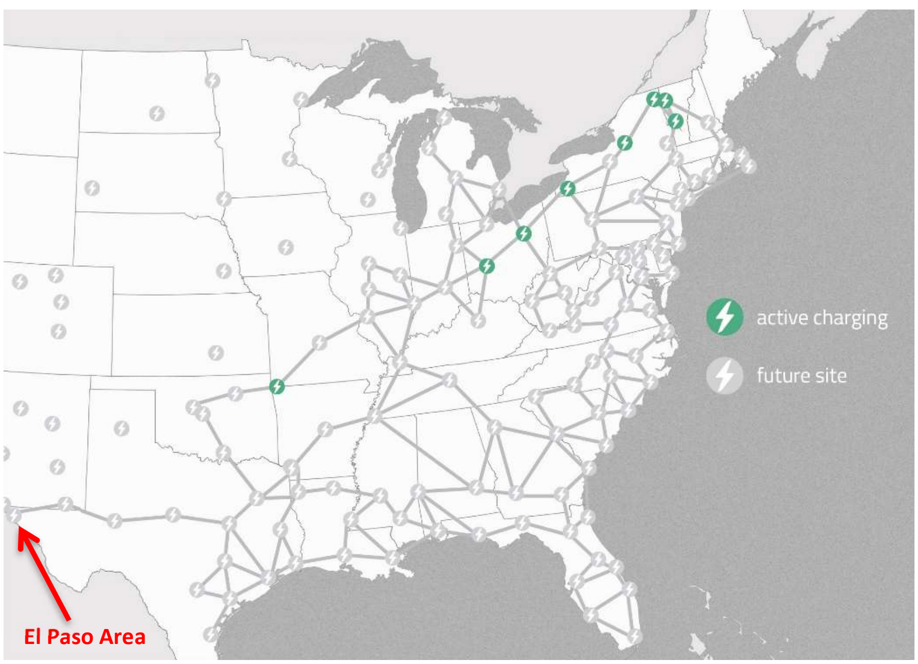
Given evolving technology, it is prudent for airports to start planning for future UAS/AAM activity. Core questions to consider when planning for UAS/AAM follow:

- How does the airport set up infrastructure/facilities for AAM?
- What will AAM aircraft require for their operations?
- What does the airport need to do to prepare for AAM?

Beta Technologies, a Vermont-based eVTOL manufacturer, has secured orders from UPS's Flight Forward program for up to 150 of the Alia eVTOL aircraft. This aircraft is expected to have a range of 250 miles (considering current battery technology) and to be able to carry a cargo payload of 1,000 to 7,500 pounds. This aircraft may operate as a crewed or uncrewed small feeder aircraft (SFAC) supporting regional point-to-point air cargo delivery. UPS is expected to take delivery of its first 10 of these electric aircraft in 2024. UPS will also use Beta's proprietary modular electric charging stations. These stations can rapidly recharge aircraft in less than an hour. UPS also expects to use the charging stations for its growing fleet of electric ground vehicles.[65]

As shown in **Figure 6-13**, Beta is planning for an extensive number of charging stations across its network, including around DNA in New Mexico and El Paso. The development of these charging stations is not tied exclusively to air cargo aircraft. Introduction of electric aircraft is still at three years in the offing; specific implications of the introduction of this technology will need to be monitored in the interim for their impact on air cargo.

Figure 6-13: Beta Charging Network (Planned)



Source: Beta Technologies

[64] FAA memo on "Process for Submitting and Reviewing Proposed Landing Pads and Supporting Equipment for Advanced Air Mobility and Electric Aircraft," June 2021
[65] https://evtol.com/news/beta-technologies-ups-deal-150-evtol-aircraft/

Numerous states and sponsors of large airports have undertaken AAM studies to help airports and communities stay current on changing aircraft and aircraft related technologies. These include Departments of Transportation for California, Florida, Georgia, Illinois, North Carolina, and Ohio. These studies, or "roadmaps," are intended to produce toolkits for airports and communities along with a statewide strategic plan to help states keep pace with new aviation technology. It may be worth advocating for a similar planning study for New Mexico.

6.7 Noise Analysis

6.7.1 Background and Purpose

An aircraft noise analysis was completed as part of the DNA air cargo study update. To assess the potential for noise impacts due to the increasing and changing aircraft activity, the FAA's Aviation Environmental Design Tool (AEDT) was used to evaluate the future noise contours. Results of this analysis were three distinct sets of noise contours, each corresponding to a future scenario of potential aviation activity levels. This analysis did not include any field measurements.

6.7.2 Federal Regulations

FAA Order 1050.1F Environmental Impacts: Policies and Procedures Desk Reference notes that sound is a physical phenomenon consisting of pressure fluctuations that travel through air and are sensed by the human ear. Noise is considered unwanted sound that can cause annoyance and disturb routine activities (e.g., talking on the telephone, sleep, conversation). Standard operation of fixed and rotary-wing aircraft, such as take-off and landing, can cause aviation noise. Noise is often the predominant aviation environmental concern of the public. Significant levels of aircraft noise in communities around airports tend to generate the most issues.

The FAA evaluates noise impact through the Day Night Average Noise Level (DNL), to estimate a person's average exposure to sound over a 24-hour period. This is expressed as the noise level for the average day of the year on the basis of annual aircraft operations. DNL calculations utilize a number of variables, including aircraft models and engine types, approach and departure tracks, number of operations, and time of day. DNL uses the A-Weighted decibel (dBA) for aircraft sound estimates. A-Weighted measures account for how the human ear hears noise. A 10 dBA penalty (double the noise level) is added to noise occurring during the nighttime (between 10 p.m. to 7 a.m.) to account for peoples' higher sensitivity to noise and expectation for quieter noise levels during these hours.

The purpose of DNL noise contours generated by AEDT is to depict the generally expected average, annualized noise exposure at a relative location, not noise levels occurring in a specific location or for a single aircraft event. The FAA and Environmental Protection Agency (EPA) have set a guideline of 65 DNL to determine compatible land use around airports. Noise metrics, such as the DNL, estimate noise exposure and help predict community response to various noise levels. Noise complaints can and will occur in areas impacted by lesser noise levels because individual human perception of noise is subjective.

6.7.3 Computer Modeling

Future aircraft noise contours for DNA were modeled using the FAA's AEDT. "AEDT is a software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences. AEDT is a comprehensive tool that provides information to FAA stakeholders on each of these specific environmental impacts. AEDT facilitates environmental review activities required under NEPA by consolidating the modeling of these environmental impacts in a single tool.[66]

The first public release was AEDT 2a in 2012. The latest version, AEDT 3e, was released for use on May 2022, which was the version used for noise modeling at DNA. AEDT creates maps of an airport's noise environment expressed in DNL to assist in potential impact assessment. Accurate noise contours are dependent on the use of reliable and accurate aircraft operational data.

6.7.4 Data Input

Input data falls into six general categories: aircraft operations, aircraft fleet mix, runway utilization, approach and departure profiles, and time. The cargo study forecast, based on data from on-site ADS-B collection and FAA's Traffic Flow Management System Counts (TFMSC), was used to identify aircraft types and operational patterns at DNA.

6.7.5 Forecast Scenarios

Three different forecast scenarios were modeled. The only difference between the first two scenarios is the aircraft used for cargo operations: Boeing 737-8 in Scenario 1 and Boeing 757-2 in Scenario 2. This was done to measure the difference, if any, the model of aircraft flown by a potential cargo operator would have on the overall 65 DNL size. Scenario 3 models aircraft noise based on the long-term (20 year) forecast to estimate potential noise increases as the operations for general aviation and cargo grow. **Figure 6-14** presents the three forecast scenarios and the variables included in the noise analysis.

Figure 6-14: Forecast Operations

Scenario	Year	General Aviation Operations	Cargo	Total Operations
Scenario 1	2027	27,913 (Mixed Fleet)	525 (Boeing 737-8)	28,438
Scenario 2	2027	27,913 (Mixed Fleet)	525 (Boeing 757-2)	28,438
Scenario 3	2042	37,957 (Mixed Fleet)	560 (Boeing 757-2)	38,517

Source: Jviation

To perform the noise analyses for DNA, a representative fleet mix comprised of 23 aircraft was selected based on the forecast data and discussion. Across the three scenarios, more than 350 unique operations with distinct variables were entered into the model for analysis. Operations are calculated for a daily average and then annualized for DNL metric calculations. These aircraft are listed in **Figure 6-15**. Arrivals and departures were assumed to be split evenly (50% and 50%) for each aircraft. Some aircraft are repeated due to being representative aircraft for multiple forecast categories (such as appearing in military and general aviation).

Straight-in arrival tracks and straight-out departure tracks were utilized for operations on both runway ends. Different aircraft were assigned different runway end usage percentages and day/night splits. For example, the cargo aircraft operations were split evenly between Runway 10 and Runway 28 for both arrivals and departures, to reflect wind conditions in conjunction with future planned approach procedures. For all modeling scenarios, existing Runway 10/28 was utilized. No runway extensions or additional runways were considered.

[66] Federal Aviation Administration (FAA). Aviation Environmental Design Tool (AEDT). https://aedt.faa.gov/

Figure 6-15: Representative Aircraft

Aircraft Types							
Cessna 172	Baron 58	King Air 200	PC12	Gulfstream G500	Phenom 300	Eurocopter AS350	Boeing 737-8
Cirrus SR22	Cessna 340	King Air 350	PC24	Citation 560	Learjet 60	Bell 407	Boeing 757-2
Piper PA28	King Air 90	Cessna 425	Citation CJ4	Citation CJ3	Cirrus VisionJet	Robinson 44	

Source: Jviation

6.7.6 Output

The calculated 60, 65, and 70 DNL noise contours, relative to the airport runways and airport property line, are shown in **Figure 6-16**, **Figure 6-17**, and **Figure 6-18.**

Figure 6-16: 2027 Boeing 737 Operations

Source: Google Earth, Aviation Environmental Design Tool, Jviation

Figure 6-17: 2027 Boeing 757 Operations

Source: Google Earth, Aviation Environmental Design Tool, Jviation

Figure 6-18: 2042 Boeing 757 Operations

Source: Google Earth, Aviation Environmental Design Tool, Jviation

Figure 6-19 lists the area of these contours in square miles. For all three scenarios the 65 DNL is contained on airport property. In Scenario 3 the 60 DNL slightly extends beyond the airport property on the northside of the runway, on to land owned by the Bureau of Land Management. The 65 DNL in Scenario 2 (Boeing 757) is about 12% smaller than the 65 DNL in Scenario 1 (Boeing 737), indicating the Boeing 757 is slightly less noisy in the model. Although in both scenarios the 65 DNL is easily contained within the airport property and there is no environmental impact concerns. If there is substantial change in the future fleet and operational mix, DNA should evaluate if a new noise analysis is warranted.

Figure 6-19: Noise Analysis Results Summary

Year	Contour	Metric	On- or Off- Airport	Area (square miles)
Scenario 1 2027	60	DNL	On-Airport	0.24578
	65	DNL	On-Airport	0.09960
	70	DNL	On-Airport	0.03395
Scenario 2 2027	60	DNL	On-Airport	0.23052
	65	DNL	On-Airport	0.08717
	70	DNL	On-Airport	0.02833
Scenario 3 2042	60	DNL	On- and Off-Airport	0.31868
	65	DNL	On-Airport	0.13983
	70	DNL	On-Airport	0.04695

Source: Aviation Environmental Design Tool, Jviation

6.8 Summary of Findings from Facility Analysis

One of the primary goals of this study is to identify improvements or actions needed to support existing and future air cargo demand at DNA. Any existing deficiencies were identified by comparing existing DNA facilities and services to typical facilities required by both B738 and B752 cargo aircraft. The facility needs for cargo aircraft at the activity levels projected in the preferred forecast are summarized in **Figure 6-20**.

Figure 6-20: Summary of Air Cargo Facility Needs / Action Items

Facility Attribute	Existing	Need / Action Item
Runway Length	9,550 Feet	No Action
Runway Width	100 Feet	150 Feet
Airport Reference Code (ARC)	C-II	C-IV
Runway Pavement Strength	90,000 Pounds (Dual Wheel)	255,000 Pounds (Dual Tandem Wheel)
Runway Shoulders	20 Feet	25 Feet (Reconstruct with Runway Widening)
Taxiway Configuration	Full Parallel	No Action
Taxiway Design Group (Fillets)	TDG-1B	TDG-4
Taxiway and Taxilane Shoulders	Partial	Reconstruct
Runway Centerline to Taxiway Centerline Separation	445 Feet	No Action
Aircraft Parking Positions	Potential Penetration of Transitional Surface (Planned Air Cargo Apron Aircraft Parking Positions)	Truncate Planned Building by 42 Feet; Conduct Formal Obstruction Evaluation / Airport Airspace Analysis (OE/AAA)
Approach with Vertical Guidance	One Runway End (Runway 10)	Both Runway Ends
Weather Reporting	Yes	No Action
Jet Fuel	Yes	No Action
Fixed Base Operator (FBO)	Yes	No Action
Cargo Building/Warehouse	None (143,000 Planned)	No Action (Developer to Build)
Cargo Apron	240,000 Square Feet (West Heavy Apron) 405,000 Square Feet (Planned)	No Action (Developer to Build)
Aircraft Rescue and Firefighting (ARFF) Facility	Off-Site	Monitor Need for On-Site
Air Traffic Control Tower (ATCT)	None	Monitor Need
Proximity to Nearby Demand Generators	Yes	No Action
Proximity to Interstate Highway	8 Miles	No Action

Facility Attribute	Existing	Need / Action Item
Last-Mile Road Quality	Good	No Action
Compatible Land Use Surrounding Airport	Good	No Action
Limited Residential in Vicinity of Airport (Noise Exposure)	Good (65 DNL Fully Within Airport Property)	No Action (Re-Evaluate if Substantial Change to Future Fleet and Operational Mix)

Source: Jviation

6.9 Summary of Other Actions to Support Air Cargo at DNA

Air cargo connects businesses and residents to domestic and international markets. While air cargo operations represent a smaller percentage of overall aircraft activity at U.S. airports, when compared to commercial airline or general aviation aircraft flights, air cargo operations are nonetheless a vital component to commerce and transportation infrastructure that supports the economy. In general, air cargo is a conduit for the economy because of the wide variety of industries that rely on air cargo and the many high value commodities that are carried by air.

As this study has demonstrated, the Jetport and the market area it serves have the characteristics needed to generate air cargo demand and to support associated air cargo facilities and services to support that demand. The previous section of this report identified various near-term enhancements and improvements to DNA that are considered desirable to support air cargo carriers using larger jet aircraft. Improvements identified in this report are those that are considered important to meeting the most immediate air cargo demand identified for DNA. As air cargo activity at the Jetport gains traction, other facility related needs should be monitored and revisited as demand warrants.

In the near term, existing Runway 10-28 should be enhanced to accommodate the operational needs of the critical or design aircraft identified in this analysis. As the Borderplex continues to grow economically and air cargo service is established at DNA, subsequent planning efforts should revisit the need and justification for a crosswind runway. The Jetport's current planning documents show Runway 3-21 being developed at an ultimate length of 12,000 feet. Should future demand warrant, this runway length would be capable of supporting non-stop flights from DNA to various international destinations, particularly those in Asia. Other dimensions and specifications for a future runway at the Jetport, plus a supporting taxiway system, would be identified once a future or critical design aircraft is established. Future planning at the Jetport should also consider the need and justification for an Air Traffic Control Tower and/or an ARFF facility.

Experience at other airports, which have attracted air cargo activity, shows that these airports have been most successful when a collaborative approach has been employed. Successful results are more likely when the local airport, the airport sponsor, state/regional/local economic development groups, and business and industry work together to attract air cargo service. A working group could help steer a regional strategic plan to better align interests and plan for infrastructure assets needed to support the area's logistical needs. The working group could serve as a conduit to synthesize a variety of local, area, and regional planning studies into one document. The working group would unite many different entities working across purposes. Through monthly or bimonthly coordination meetings, collaboration to achieve development objectives identified in this plan could be facilitated.

A working group, representing the entities identified here along with others, should be established to promote and to help attract air cargo operators to the Jetport. Some of the potential activities for this working group could include:

- **Document Commitment**: Secure letters of support and interest from area and regional businesses as they relate to use of the near-term facility improvements and the longer-range improvements discussed in this plan. Any prospective Jetport user should sign a letter of intent that their commitment on how they plan use of the Jetport in terms of aircraft type, stage length, operating weight, and operational frequency.
- **Coordinate with the FAA**: Coordinate with the FAA to review and approve the air cargo forecast when air cargo operator commitments or schedules are in-hand.
- **Expand Communication**: Engage companies (existing and future) operating in the maquilas to monitor their air cargo needs that can be met by DNA.
- **Monitor Changes**: Monitor the air cargo industry and changes in aircraft technology or other transportation modes that may likely impact air cargo carriers.
- **Education and Networking**: Attend cargo conferences and other similar events to stay abreast of changes in the air cargo industry and to market DNA facilities and assets.
- **Marketing**: Promote and advertise the facilities and the advantages offered by the Jetport's location and facilities, including the development of promotional/information-oriented videos, infographics, a website, and printed documents.
- **Identify Fiscal Benefits**: Conduct an economic impact study to estimate the potential economic returns (including tax revenues) that would be supported by air cargo operations at DNA and the capital projects to support them.
- **Seek Funding**: Advocate for local, state, and federal funding to support facility improvements to accommodate air cargo activity.

As this study documented, the ingredients are in place to support successful air cargo service, but more work will still be needed to make that service a reality.