



THE RISE OF CARGO-FOCUSED HUB AIRPORTS

PANDEMIC YEAR 2020

Chaddick Policy Brief | March 25, 2021
By Joseph P. Schwieterman and Euan Hague

Our analysis of newly released air cargo traffic data for 2020 shows that:

- ➔ Tonnage at cargo-focused hub airports, i.e., airports with extensive cargo traffic but little or no passenger traffic, grew 31.4% from 2019 to 2020
- ➔ Chicago Rockford, Wilmington Air Park, Ft. Worth Alliance, and Boeing Field/King Co. airports were among the leaders of the 14 cargo-focused hubs identified
- ➔ A surge in online buying for at-home delivery is fueling much of the growth
- ➔ Airports that are focal points for air freight integrators DHL, FedEx, and UPS and have more passenger traffic than cargo-focused hubs grew more slowly, yet at a still substantial 9.0% rate
- ➔ The rapid growth raises important social, economic, and environmental questions

The emergence, evolution, and performance of specialized cargo airports have long been of interest to investors and policymakers in the United States.¹ This Chaddick Policy Brief reviews the recent growth of **cargo-focused hub airports**, i.e., airports that have significant roles in cargo movement while handling a low volume of passenger traffic. Examples of such airports are California's Sacramento Mather and Ft. Worth Alliance airports.

This Brief reviews findings from our analysis of newly released 2020 data and offers brief case studies of six prominent cargo-focused hub airports.



CHADDICK INSTITUTE FOR METROPOLITAN DEVELOPMENT AT DEPAUL UNIVERSITY CONTACT:
JOSEPH SCHWIETERMAN, PH.D. | PHONE: 312.362.5732 | EMAIL: chaddick@depaul.edu

PHOTO CREDIT (ABOVE): A UPS MD 11 AT SAN BERNARDINO INT'L, JAN. 22, 2021, BY PIEWEN CHEN

IDENTIFYING AND MEASURING CARGO-FOCUSED HUB AIRPORTS

Cargo-focused hub airports are defined for the purpose of this Brief as airports that handle:

- 1) at least 20 million pounds (9,072 metric tons) of domestic air cargo annually; and
- 2) fewer than 310,000 passengers annually based on 2019 traffic levels, the last full year prior to the pandemic. Airports below this threshold do not rank in the top 200 in the United States with respect to domestic passenger volume. This threshold is also derived from our earlier analysis showing that airports handling fewer than this number of passengers have limited passenger service and are only lightly used by major network airlines.²

Our analysis uses Bureau of Transportation Statistics (BTS) data (T-100), is limited to airports on the U.S. Mainland, and excludes international cargo traffic. Cargo-focused hub airports can be divided into two subcategories, **cargo-only** and **cargo-dominant**. **Cargo-only airports** meet the cargo criteria but have no or very low passenger use (i.e. under 10,000 passengers annually) while **cargo-dominant airports** have 10,000 – 299,999 passengers.³ **Mixed purpose airports** meet the cargo criteria and have handled 310,000 or more passengers for two consecutive years before the pandemic.

Figure 1: Location and Relative Size of Cargo-Focused Hub Airports

Size of Circles Proportional to 2020 Domestic Tonnage.



This map shows the relative size of cargo-focused hub airports, which, by definition handle more than 20 million pounds of cargo and fewer than 310,000 passengers. Cargo-only airports are underlined. Airports for which 2020 data is not yet available are in brown. Note: Former hubs are depicted as a hollow circles.

The data we use should not be confused with *landing weight* data often publicized by airport authorities. Landing weight is the summation of gross weight of arriving and departing planes. Those statistics, while more rapidly available, are less useful measures of an airport’s cargo role.⁴ One limitation of the newly released BTS data is that cargo traffic is rounded to the nearest million pounds and passenger traffic is rounded to the nearest thousand passengers.⁵

NOTABLE FINDINGS

Finding 1: Fourteen airports met the definition of being cargo-focused hubs in 2020. The largest of these are Illinois’ Chicago Rockford International (841 million domestic tons), Texas’ Ft. Worth Alliance (532 million), Ohio’s Wilmington Air Park (439 million) and Washington’s Boeing Field/King Co. International (226 million). Chicago Rockford now handles more domestic cargo than prominent commercial airports such as Seattle-Tacoma International.

Each of the 14 cargo-focused hubs identified regularly handles larger freight aircraft, and none are served by mainline jets of large network passenger airlines.⁶ Among the five largest cargo-focused hubs with respect to cargo tonnage, all but Wilmington Air Park are focal points (hubs) for air freight integrators. Chicago Rockford, Boeing Field, and Sacramento Mather are focal points for UPS, while Ft. Worth Alliance has a major FedEx operation. Eight of the largest ten, including Mather and New York’s Stewart International, are also served by Amazon Air, which expanded rapidly in 2020 (Please refer to the endnotes for a discussion of the special circumstances surrounding the inclusion Stewart as a cargo-focused hub).⁷

Table 1: Largest Cargo-Focused Hub Airports

Ranked by 2020 Domestic Air Cargo, in Millions of Pounds Handled

Rank	Airport	2018	2019	2020	2019 - 20 Growth	Integrator Hubs & Amazon Air
1	Chicago/Rockford Int'l, IL	638	710	841	18.5%	UPS, Amazon
2	Fort Worth Alliance, TX*	331	363	534	47.1%	FedEx, Amazon
3	Wilmington Air Park, OH*	<1	113	439	288.5%	Amazon
4	Boeing Field/King County Int'l, WA*	242	228	226	-0.9%	UPS, Amazon
5	Sacramento Mather, CA*	150	169	189	11.8%	UPS, Amazon
6	Rickenbacker Int'l, Columbus OH	174	153	165	7.8%	
7	March ARB, Riverside, CA*	< 1	108	140	29.6%	Amazon
8	Stockton Metropolitan, CA	85	125	116	-7.2%	Amazon
9	Stewart Int'l, Newburgh, NY (note)	43	80	115	43.8%	
10	San Bernardino Int'l, CA*	23	81	109	34.6%	UPS, Amazon
11	Mobile Downtown, AL	54	53	58	9.4%	
12	Southwest Georgia Reg, Albany, GA	43	55	53	-3.6%	
13	Laredo Int'l, TX	75	49	39	-20.4%	
14	Casper/Natrona County Int'l, WY	24	34	25	-26.5%	
	Total	1,882	2,321	3,049	31.4%	

Source: Bureau of Transportation Statistics, [T-100 Domestic Data](#). Note: See Endnote 7 for detail on Stewart Int'l.

* Cargo only airport (< 10,000 annual passengers)

Columbus, OH's Rickenbacker International is ranked seventh and is the busiest cargo-focused hub airport that is neither a focal point for an air freight integrator (although FedEx and UPS planes both use the facility) nor regularly used by Amazon Air. Nevertheless, Rickenbacker is a major transshipment point for international shipments, particularly retail products. This airport's ranking among cargo-focused hubs would likely be higher if international traffic were included in our analysis.

Finding 2: Cargo-focused hub airports saw substantial growth between 2019 and 2020, with an increase in tonnage of more than 31%. Seven of the largest 10 of these hubs recorded traffic growth of 18% or more. Wilmington Air Park grew spectacularly, at 289%.

The rapid growth of cargo-focused hubs stems from a variety of factors, including the growing ease and decreased cost of at-home package delivery, a dramatic shift in consumer behavior as a result of the pandemic, and a shift to airborne commerce due to the relatively low price of jet fuel in recent years.

The data show that:

- **Half of the largest ten cargo-focused hubs airports grew by 25% or more** between 2019 and 2020. Chicago Rockford, which handled the greatest tonnage, grew 18.5%.
- **Wilmington Air Park had the greatest growth (289%) in percentage terms.** As noted in our [previous publication](#), Amazon Air has invested heavily in Wilmington, establishing it as its fifth largest hub. Amazon operates roughly 15 flights from the airport daily, despite having a heavier concentration of flights at Cincinnati/Northern Kentucky International (CVG), which is less than 60 miles away.
- **Four the five fastest growing cargo-focused hub airports when measured in percentage terms, are cargo-only airports.** These airports handle fewer than 10,000 annual passengers (< 28 per day), with some handling none at all. These are Ft. Worth Alliance, March ARB-Riverside, San Bernardino International, and Wilmington Air Park.
- **The two fastest growing cargo-focused hub airports in terms of absolute traffic growth, are cargo-only facilities:** Wilmington and Ft. Worth Alliance.
- **Among the 10 cargo-focused hubs with the most traffic, only two,** Boeing Field/King Co. and Stockton Metropolitan, saw cargo traffic *drop* in 2020. Stockton's cargo traffic, while marginally down, remains more than 25% higher than 2018, the last full year prior to the arrival of Amazon Air. Boeing Field's traffic has been stable, having recovered from a slump during 2012-13. Amazon Air has recently expanded existing operations at nearby Seattle-Tacoma International Airport.
- **Other airports with expanding cargo operations** that warrant attention include San Antonio, Texas's Kelly Field, Florida's Lakeland Linder, and Ohio's Toledo Express modest passenger activity. All three are served by Amazon Air, with Toledo being one of that airline's newest additions. We expect data on these airports to be available soon. Only Toledo has scheduled passenger flights, and its passenger activity is modest.

Finding 3: Growth at cargo-focused hub airports has far outpaced growth at mixed purpose airports, which have more balanced passenger/cargo air traffic. Nevertheless, mixed purpose airports that are operational focal points for DHL, FedEx, and UPS grew at an impressive 9.0% rate.

Most airports that are operational focal points (hubs) for air freight integrators are *mixed purpose airports*. These airports handle more than 310,000 passengers, and thus do not meet the definition of a cargo-focused hub. In descending order, the largest cargo handlers in this category are Memphis International (FedEx), Louisville International (UPS), and Cincinnati/Northern Kentucky International (DHL). Each handled more than 2.5 billion tons of domestic cargo in 2020 (Table 2).

Table 2: Mixed Purpose Commercial Airports that are DHL, FedEx, and UPS Hubs
Ranked by 2020 Domestic Air Cargo, Millions of Pounds Handled

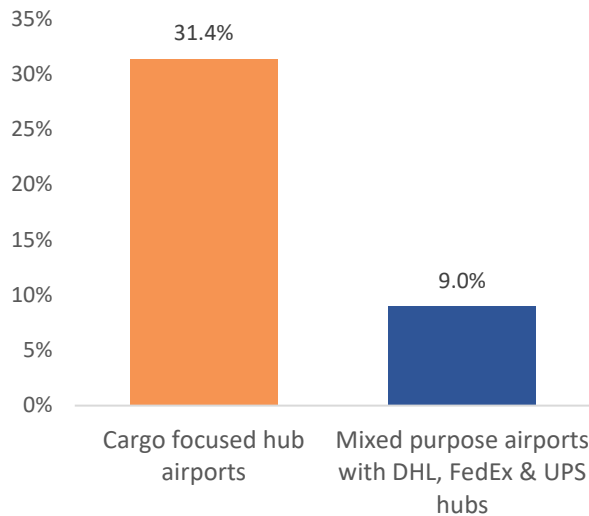
Rank	Airport	2018	2019	2020	2019 - 20 Growth	Integrator Hubs & Amazon Air
1	Chicago/Rockford Int'l, IL	638	710	841	18.5%	UPS, Amazon
2	Fort Worth Alliance, TX*	331	363	534	47.1%	FedEx, Amazon
3	Wilmington Air Park, OH*	<1	113	439	288.5%	Amazon
4	Boeing Field/King County Int'l, WA*	242	228	226	-0.9%	UPS, Amazon
5	Sacramento Mather, CA*	150	169	189	11.8%	UPS, Amazon
6	Rickenbacker Int'l, Columbus OH	174	153	165	7.8%	
7	March ARB, Riverside, CA*	< 1	108	140	29.6%	Amazon
8	Stockton Metropolitan, CA	85	125	116	-7.2%	Amazon
9	Stewart Int'l, Newburgh, NY (note)	43	80	115	43.8%	
10	San Bernardino Int'l, CA*	23	81	109	34.6%	UPS, Amazon
11	Mobile Downtown, AL	54	53	58	9.4%	
12	Southwest Georgia Reg, Albany, GA	43	55	53	-3.6%	
13	Laredo Int'l, TX	75	49	39	-20.4%	
14	Casper/Natrona County Int'l, WY	24	34	25	-26.5%	
	Total	1,882	2,321	3,049	31.4%	

Source: Bureau of Transportation Statistics, [T-100 Domestic Data](#). Note: See Endnote 7 for details on Stewart Int'l.

The newly released data show that:

- **Domestic cargo shipments at mixed purpose airports that are focal points for air freight integrators grew by 9.0%** in 2020, compared to the 31.4% rate for cargo-focused hubs. California's Ontario International grew the fastest, seeing 20.8% growth, in part due to simultaneous Amazon Air and UPS expansion.
- **Globally, air cargo grew a much slower rate in 2020**, according to International Air Traffic Association estimates.⁸ This is partially due to weakness on many international routes. Traffic diminished in many parts of the world.
- **Despite the substantial growth at cargo-focused hubs through 2020**, these facilities do not yet handle nearly as much cargo as air freight integrator "megahubs" such as CVG, Louisville, and Memphis. Chicago Rockford is about one tenth as large as Memphis and about a third as large as CVG. In 2020, Rockford ranked 16th in domestic cargo volume, while Ft. Worth Alliance ranked 24th.

Figure 2: Growth at Cargo-Focused Hub vs. Other Types of Airports
Change in Tonnage Handled 2019-20



Finding 4: The economic, social, and environmental ramifications of the surge in traffic at airports oriented toward cargo is being felt by surrounding communities and has profound implications for safety, job access, and the environment.

The surge in online buying, the growing prevalence of next-day delivery, and the corresponding drop in buying at brick-and-mortar stores carry profound social, economic, and environmental effects. These include:

- **Increases in greenhouse gases.** Research is emerging that online shopping leaves a higher environmental footprint than purchases at traditional stores.⁹ The greenhouse gases from additional flight and truck activity supporting the delivery of packages to homes and businesses, together with the packaging materials used, has been shown to offset the gains resulting from less personal-vehicle use. Virtually none of the online platforms using business-to-consumer shipping moves cargo by rail. The noise impact of rising freight activity also warrants attention.¹⁰ More research on this topic, however, is needed.
- **Safety issues.** The risks posed by rising truck and delivery van traffic on vehicular and pedestrian safety are another area of concern. The risks to pedestrians on city streets near warehouses with heavy truck traffic are becoming a particularly acute problem.
- **Job access barriers.** The shift in retail from brick-and-mortar locations to warehouses in outlying areas often makes job access more difficult for those without ready access to private vehicles. There is also concern about the tendency for these locations to offer primarily low-paying jobs.

The growing use of electric delivery vans and the use of more sustainable jet fuels can reduce the package delivery sector's environmental footprint. However, the far reaching effects of an accelerated shift to increased online buying is a topic that warrants the attention of policymakers. We anticipate that

problems mentioned above will spur new public policies dealing with some of the negative effects of the surge in package delivery.



A FEDEX BOEING 757-222(SF) AT CALIFORNIA'S ONTARIO INTERNATIONAL AIRPORT ON DECEMBER 22, 2020. BY PEIWEN CHEN

SUMMARY

The year 2020 was a time of substantial growth at airports that are hubs for companies specializing in air cargo. Surging volumes of traffic from the fulfillment centers of online retailers to homes and businesses have greatly altered the way our country uses its highways, streets, and airports. In the process, cargo-focused hub airports have shouldered a much heavier burden than in the past, with tonnage growing much faster than at mixed purpose airports. More growth is expected throughout 2021. Along with the rapid transformation of retail activity – and the associated growth in truck, delivery van, and freight aircraft traffic to support this sector – comes a variety of difficult economic, environmental, and social questions.

CASE STUDIES OF CARGO-FOCUSED HUB AIRPORTS

We present these case studies to illustrate development patterns of cargo-focused hub airports. Daily flight estimates are based on Chaddick Institute flight-tracker monitoring.

1. Chicago Rockford International Airport: This two-runway airport, formerly Rockford Municipal Airport, has been the largest cargo-focused hub on the U.S. mainland for much of the post-2003 period.¹¹ Expanded cargo traffic has helped offset diminished passenger traffic in recent decades. In the 1960s, passenger activity declined at Rockford airport due to improved access to O'Hare International Airport. This left the airport without any scheduled passenger flights for brief periods after 1981. UPS made it an operational focal point in 1993, which gradually grew in size and, by 2019, consisted of 50 - 60 weekday freight departures. Cargo traffic grew from 402.4 million pounds in 2003 to 841 million in 2020, perpetuating its status as the largest of the country's cargo-focused hub airports. Rockford is also now one of Amazon Air's three largest hubs. Two scheduled passenger carriers, Allegiant Airlines and Apple Vacations, operate from the airport.

2. Fort Worth Alliance: This two-runway cargo-only airport, opened in 1989 and owned by the City of Fort Worth, is located 14 miles northwest of downtown Fort Worth. At 1,198 acres, its footprint is mid-sized for a cargo-focused hub airport. Its close proximity to BNSF railway yards and the Dallas-Fort Worth metropolitan region's large population have allowed for rapid growth. Cargo traffic grew from 285 million pounds in 2003 to 295 million in 2010, and 534 million in 2020, in part due to its role as a hub for FedEx. Passenger traffic has been handled entirely on charter and non-scheduled specialty operators, although American Airlines maintained a maintenance facility here through 2012. Runway improvements in 2018 allowed for all-weather flight operations to Europe. Amazon Air began operations at the airport in late 2019 and presently operates around 16 daily flights.

3. Sacramento Mather Airport: This two-runway cargo-only airport, owned by Sacramento County (which also operates Sacramento International Airport), is 11 miles east of the state capital. After a U.S. Air Force base on the site was decommissioned, Mather reopened in 1995 for civilian use. It had no scheduled passenger service in recent years, and cargo traffic has fluctuated dramatically, falling from 142.5 million pounds in 2003 to 99.5 million in 2010 before rebounding to 189 million in 2020. Much of the recent growth is attributable the expanded presence of UPS, which had 15 – 16 arrivals or departures daily in 2019, making it the largest cargo-focused hub west of Texas.

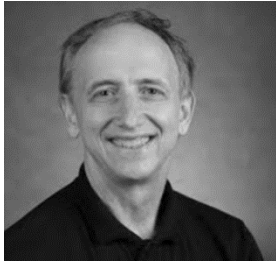
4. Rickenbacker International – Columbus OH: This former U.S. Air Force base, located 10 miles south of downtown Columbus, encompasses 4,342 acres, giving it one of the largest footprints of the six case study airports. The air cargo hub is operated by the Columbus Regional Airport Authority, which also manages John Glenn International Airport, the city's principal passenger airfield. The airport's cargo business was cultivated in the 1960s and 1970s by Flying Tigers Airlines, an all-cargo carrier acquired by FedEx in 1988. Much subsequent growth was attributable to activity by Forward Air, a trucking line with extensive operations at the airport. Domestic cargo traffic grew from 137.5 million pounds in 2003 to 165 million in 2020. (These estimates exclude this airport's sizeable international traffic). Our analysis suggests that Rickenbacker is today the only cargo-focused hub airport with more than three daily departures by both FedEx and UPS. Norfolk Southern operates a large intermodal rail facility nearby. Passenger traffic was only 239 in 2000 but reached 301,000 in 2019 due to expansion by Allegiant

Airlines. This increase in passenger traffic suggests this airport may be making the transition to a *mixed-purpose* hub.

5. Boeing Field Airport – Seattle, WA: This airport, formally King County International, has the smallest footprint (634 acres) of the six case study airports highlighted in this section. It served as Seattle’s principal passenger airport until 1928 and continues to be used heavily by The Boeing Company, which has test facilities on the airport grounds. Cargo traffic grew from 142.5 million pounds in 2003 to 201.2 million in 2010. Cargo traffic increased further to 226 million pounds in 2020. Boeing Field has the second-highest number of daily UPS flights (19) among cargo-focused hub airports in 2019, behind only Chicago Rockford. Passenger traffic remained modest, falling from 63,917 in 2010 to just 17,030 in 2019. Recently added service by JSX (formerly JetSuiteX), a regional airline, could stimulate its passenger numbers.

6. Stockton Metropolitan Airport: Formerly Stockton Army Base, Stockton Metropolitan has been served by several passenger airlines for many years. However, annual passenger traffic has generally remained in the 75,000 – 150,000 range. Cargo traffic, by contrast, is growing rapidly due to the growth of Atlas Air, an all-cargo airline used by Amazon Air. Amazon operates a major warehouse less than 20 miles away in Tracy, CA. Cargo traffic grew from less than 0.1 million pounds in 2000 to 74.6 million in 2010, and 116 million pounds in 2020, in part due to expansion by Atlas in 2016 to support rising Amazon traffic. By early 2020, Amazon Air was operating [six flights daily](#), up from four in April 2020. Stockton is the only one of the six case study airports that lacked regular FedEx and UPS flights in 2019, when we evaluated its flight activity.

AUTHORS & STUDY TEAM



AUTHOR: JOSEPH P. SCHWIETERMAN, PH.D., a professor of Public Service Management and director of the Chaddick Institute for Metropolitan Development at DePaul University, is a nationally known authority on transportation and urban economics. He is author of the book *Air Cargo and the Opening of China* and editor-in-chief of *Issues in Aviation Law and Policy*, a DePaul journal.



CO-AUTHOR: EUAN HAGUE, PH.D., is professor and director of the School of Public Service at DePaul University. A cultural and urban geographer, Dr. Hague is the co-author of *Regional and Local Economic Development* (Palgrave, 2011) and co-editor of *Neoliberal Chicago* (University of Illinois, 2017). He received the Barbara A. Holland Scholar-Administrator Award from the Coalition of Urban and Metropolitan Universities in 2019.



EDITORIAL TEAM: STEVE RUDOLPH, M.ED., J.D., is manager of Chaddick's Air Transport Policy Initiative and managing editor of DePaul's *Issues in Aviation Law and Policy* journal. He was formerly executive director of the International Aviation Law Institute at DePaul's College of Law.



CRYSTAL BELL is the program manager for the Chaddick Institute for Metropolitan Development and a graduate student studying public policy at DePaul University. She has assisted in the development of Chaddick's policy briefs on Amazon Air. Crystal also provided technical assistance for Chaddick's intercity bus publications.

DESIGN TEAM: JESSICA KUPETS and ALL TOGETHER

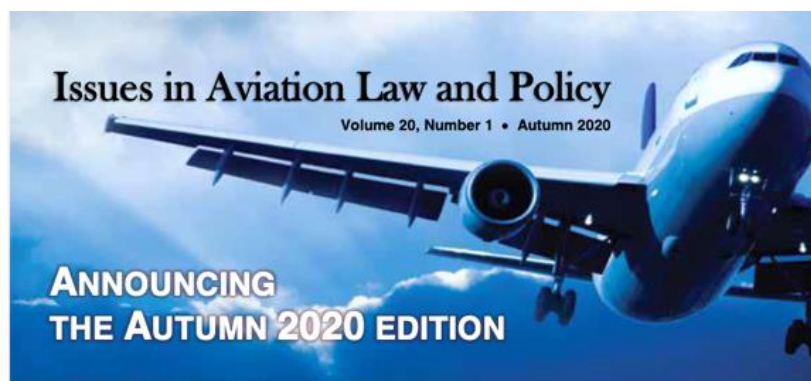
THE CHADDICK INSTITUTE, WHICH PROMOTES EFFECTIVE PLANNING AND TRANSPORTATION, DOES NOT RECEIVE FINANCIAL SUPPORT FROM AIRLINES, RETAILERS, OR AFFILIATED INDUSTRIES.

AMAZON AIR BRIEFS

The Chaddick Institute released three widely circulated policy briefs between June 2020 and February 2021 on the expansion of Amazon Air, a unit of Amazon. Each brief explores the airline's domestic and international initiatives. To access the briefs, click [here](#).

ISSUES IN AVIATION LAW AND POLICY

The Chaddick Institute is home to the widely circulated peer-reviewed journal *Issues in Aviation Law and Policy*, featuring timely works from authors around the world. IALP covers both legal and policy issues affecting civil aviation, as well as matters related to commercial airports and other aspects of aviation. Please email chaddick@depaul.edu for subscription information or a complimentary copy.



Articles

Decision of the International Court of Justice on the Qatar Issue and the ICAO Council
Ruwantissa Abeyratne

An Obligation to Provide Air Travel in the Covid-19 Era (A European Perspective)
Sarah Jane Fox

The Montreal Convention in an Age of Automation
Benjamyn I. Scott and Andrea Trimarchi

Here We Go Again: The Perpetual Question of the Recoverability for Psychological Harms under the Montreal Convention
Delphine Defosse

Adapting to the Times: The Questionable Applicability of Article 3bis to Cyberweapons Demands New Approach to Safeguarding International Commercial Drone Operations
Ethan M. McInteer

Legislative Turbulence: 14 C.F.R. Part 117 and the "Cargo Carveout"
James G. Baas



DEPAUL UNIVERSITY

CHADDICK INSTITUTE FOR
METROPOLITAN DEVELOPMENT

14 E. Jackson Boulevard, Suite 1600 • Chicago, IL 60604 USA
Telephone +1 (312) 362-5769 • IALP@depaul.edu

¹ For a discussion of cargo airports, we recommend: i) J.D. Kasarda & G. Lindsay (2011). *Aerotropolis: The Way We'll Live Next*. New York, NY: Farrar, Straus and Giroux, and ii) P.S. Morell & T. Klein, (2018). *Moving Boxes by Air: The Economics of International Air Cargo*. London, U.K.: Routledge.

² Information about this topic can be found in our working paper, “The Evolving Role and Scale of Cargo-Focused Hub Airports in the United States, 2003 – 2020,” by Joe Schwieterman and Euan Hague. Please consult the authors for information about this paper. The top 200 threshold is based on travel volumes in 2018, the last full year available when the working paper was prepared.

³ Cargo-only airports average fewer than 28 passengers daily (e.g., about 14 enplanements and 14 deplanements). No airports in this category have regularly scheduled passenger service. If passenger service is available at all, it is usually limited primarily to sporadic charter flights.

⁴ A notable problem with data on the landing weight of airplanes, which is used to assess landing fees at airports, is that does not differentiate between the weight of planes and the amount of cargo that is onboard. These estimate vary widely based on the types of planes used and the degree to which planes are filled to capacity.

⁵ Data provided on the BTS data dashboard rounds cargo traffic to the nearest million pounds and passenger traffic to the nearest thousand.

⁶ The country’s four largest network airlines are American Airlines, Delta Air Lines, Southwest Airlines, and United Airlines.

⁷ Stewart International saw a surge in international passenger traffic in 2018 and 2019 due to expansion by Norwegian Airlines, which was grounded in April 2020. Stewart continues to be served by several domestic airlines. Its passenger traffic surpassed 350,000 in both 2018 and 2019, a level which exceeds the 310,000 threshold for inclusion as a cargo-focused airport. However, much of this traffic was dependent on Norwegian, and domestic traffic fell to just 101,000 in 2020, a far greater drop (in percentage terms) than at most other airports. Without Norwegian’s service, we do not expect its passenger traffic to surpass the 310,000 threshold in the next few years. As a result, Stewart is included as a cargo-focused hub for purposes of this study.

⁸ Please refer to this International Air Transport Association study from December 2020: <https://www.iata.org/en/iata-repository/publications/economic-reports/air-freight-monthly-analysis---december-2020> .

⁹ For a comparative assessment of greenhouse gas emissions, please refer to this 2020 article by Shahmohammadi, et. al, in *Environmental & Science Technology*, available at <https://pubs.acs.org/doi/10.1021/acs.est.9b06252>.

¹⁰ For a discussion of noise impacts, refer to this New York Times article from April 4, 2020: <https://www.nytimes.com/2020/04/15/business/cargo-planes-deliveries-noise.html>

¹¹ Please refer to endnote 2.

v3