Takeoff in Northern Kentucky

BIG MOVES AT "CVG" LIFT AMAZON AIR'S DELIVERY CAPABILITIES

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Our analysis of Amazon Air's evolution since March 2022 shows that the carrier:

- Grew markedly–by 71%–at Cincinnati-N. Kentucky (CVG), expanding from 26 to 44 flights daily;
- Greatly reduced overall expansion, growing by just 3.8%, far slower than previously;
- Added El Paso and Las Vegas flights, putting 73% of the U.S. mainland's population within 100 miles of one of its airports; and
- Is channeling growth to support Buy with Prime, a new program offering fast and free delivery for Amazon Prime members on independent websites.

Amazon Air is heavily investing in the expansion of Cincinnati-Northern Kentucky International (CVG) as well as expanding in Europe, the Mountain States, and Florida, while slowing growth within the rest of its system. The expansion in the Ohio Valley supports next-day fulfillment of products that can't be easily stocked at all regional warehouses and paves the way for expanded third-party delivery, a sector dominated by FedEx and UPS.[1] This independently produced brief reviews Amazon Air's initiatives between March and September 2022 and builds upon our previous bi-annual Amazon Air Brief, released in March.[2] For a primer on Amazon Air, see the sidebar on page 5.

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PHOTO (ABOVE): BOEING AIRPLANES AT CVG, AUGUST 2022

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MAJOR FINDINGS FROM OUR ANALYSIS

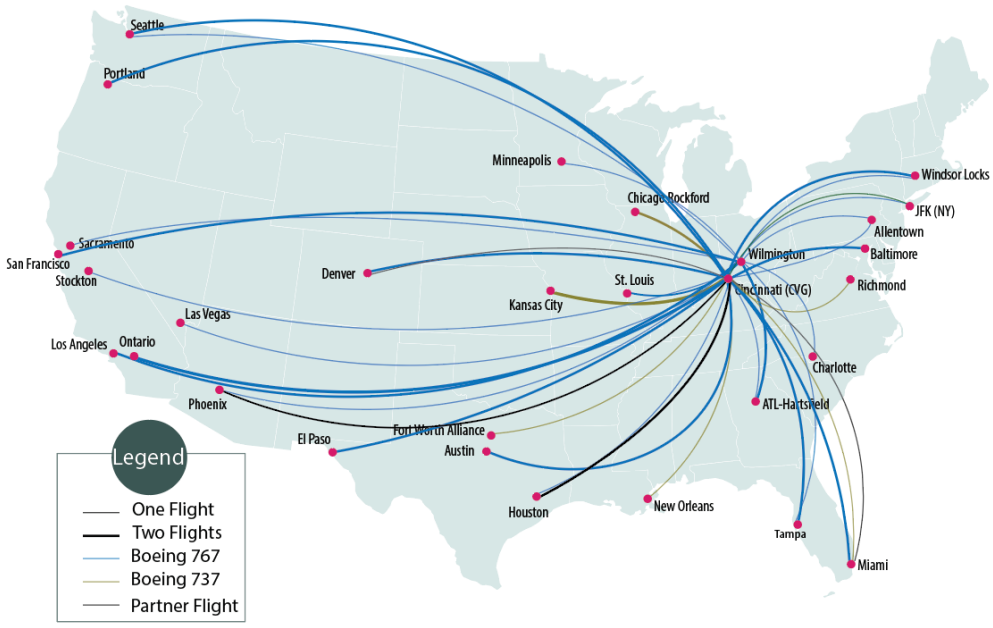
The analysis draws on publicly available sources of information, including:

- Flight data on 5,300 Amazon Air takeoffs and landings from flightaware.com and flightradar24.com since 2020, including analysis of activity from September 2 – 8, 2022. We define the term "flights" as the sum of takeoffs and landings at an airport;
- Geographic analysis of Amazon flights using ArcGIS Pro software and U.S. Census data; and
- Information on fleet registration from the FAA and other sources, including planespotters.net.

FINDING 1. Intensive expansion at Cincinnati-Northern Kentucky International Airport (CVG) has boosted average Amazon Air activity there from 25.6 to 43.9 flights daily, a 71% increase. When partner flights—takeoffs and landings on planes not branded as Amazon Air despite apparently being on Amazon-related missions—are included, CVG now regularly sees around 60 daily flights. A new set of evening arrivals and after-midnight departures, together with Wilmington (ILN)'s continuing hub role, greatly facilitates airplane-to-airplane transfers.

Amazon Air's moves during spring and summer 2022 bring clarity to whether Amazon envisions CVG becoming overwhelmingly important to its domestic network or merely a focal point. Between late August 2021, immediately after the ground facilities at CVG opened, and last March, flight activity inched only slightly upward, growing from 21.5 to 25.6 daily. Almost all departures in March occurred during mid-day hours, making the schedule awkwardly configured for next-day delivery.

FIGURE 1: Amazon Air Flights at Cincinnati (CVG) & Wilmington (ILN)
September 2, 2022, with partner flights shown



Note: not all routes served in both directions on sample day

Since March, the hub's size and orientation have undergone a metamorphosis. Activity has grown to almost 44 daily flights, a 71% increase from March, despite a downturn in its systemwide growth (see Finding

2). In addition, Amazon remains committed to Wilmington Air Park (ILN), which is just 60 miles by highway from CVG. Flight activity there has held steady over the past year, although it has fallen modestly from 24.2 to 20.4 daily since March. This airport pair–and CVG in particular–are increasingly the nerve center of Amazon Air's domestic operation. The percentage of its flights serving points on United States accounted for by CVG and ILN grew from approximately 14% to 21% in the six months leading up to September 2022.

Clear scheduling patterns have been put into place at CVG, with flights firmly organized into tight arrival and departure "banks" (or time intervals).

- Inbound flights (arrivals) are concentrated between 3:45 am and 8:50 am and between 4:30 pm and 8:30 pm, with a paucity of flights outside of these windows (Table 1).
- Outbound flights (departures) are concentrated between 11:30 and 1:45 am, 5:15-7:45 am, and noon-4:15 pm. Few departures usually occur between 5 and 10 pm.

TABLE 1: Amazon Air's CVG Arrival & Departures

September 2, 2022 | Not including partner flights

Arrival time	Origin
1:31 AM	El Paso (ELP)
12:52 AM	Baltimore (BWI)
3:54 AM	Denver (DEN)
4:14 AM	Seattle (SEA)
4:39 AM	Denver (DEN)
5:06 AM	Houston (IAH)
5:47 AM	Atlanta (ATL)
7:00 AM	Tampa (TPA)
7:14 PM	New Orleans (MSY)
7:15 AM	Allentown (ABE)
8:28 AM	Windsor Locks (BDL)
8:48 AM	Portland (PDX)
9:13 AM	Ontario (ONT)
4:35 PM	Fort Worth (AFW)
5:10 PM	Portland (PDX)
5:53 PM	Chicago (ORD)
5:56 PM	Austin (AUS)
6:08 PM	Ontario (ONT)
6:11 PM	Tampa (TPA)
6:32 PM	Baltimore (BWI)
6:33 PM	Miami (MIA)
8:06 PM	Kansas City (MCI)
8:17 PM	Las Vegas (LAS)

Departure time	Destination
12:21 AM	Windsor Locks (BDL)
12:33 AM	Ontario (ONT)
12:55 AM	Tampa (TPA)
12:59 AM	Richmond (RIC)
1:01 AM	Austin (AUS)
1:04 AM	Kansas City (MCI)
1:11 AM	Portland (PDX)
1:17 AM	Stockton (SCK)
1:36 AM	Miami (MIA)
1:42 AM	Chicago (ORD)
5:19 AM	Baltimore (BWI)
5:23 AM	Seattle (SEA)
6:14 AM	Denver (DEN)
7:39 AM	El Paso (ELP)
12:03 PM	Stockton (SCK)
2:42 PM	Austin (AUS)
3:00 PM	Portland (PDX)
3:06 PM	Miami (MIA)
3:20 PM	New York (JFK)
3:42 PM	Ontario (ONT)
10:11 PM	Miami (MIA)
10:44 PM	Houston (IAH)

Amazon's CVG now more closely resembles FedEx and UPS hubs in Memphis and Louisville than it did in March, with a new cluster of "overnight flights" departing between midnight and 6 am. This scheduling, not evident in our previous review, positions Amazon for more next-day fulfillment from its vast warehouse network in Kentucky, Indiana, and Ohio. The timing of flights also facilitates plane-to-plane transfer. Many planes arrive in the late afternoon or early evening and depart after midnight.

Such growth has occurred without a discernable reduction in partner flights ("shadow flights"), i.e., flights operated by contractors on planes that have not been reported as being branded as Amazon Air. Partner activity at CVG, in fact, appears to have risen. ABX Airlines and Air Transportation International (ATI) together operate around 10 daily flights at CVG that appear to be on Amazon missions, based on our schedules and itinerary analysis. These airlines are subsidiaries of Air Transport Services Group, in which Amazon owns an equity stake. When Amazon Air and partner flights are combined, CVG flight activity averages around 55 daily flights (27+ takeoff and landing combinations). On most days, the total is closer to 60.

Wilmington (ILN) departures are more tightly concentrated in the early morning hours than CVG, with most occurring between midnight and 1:45 a.m. Wilmington sees around three partner flights daily. In

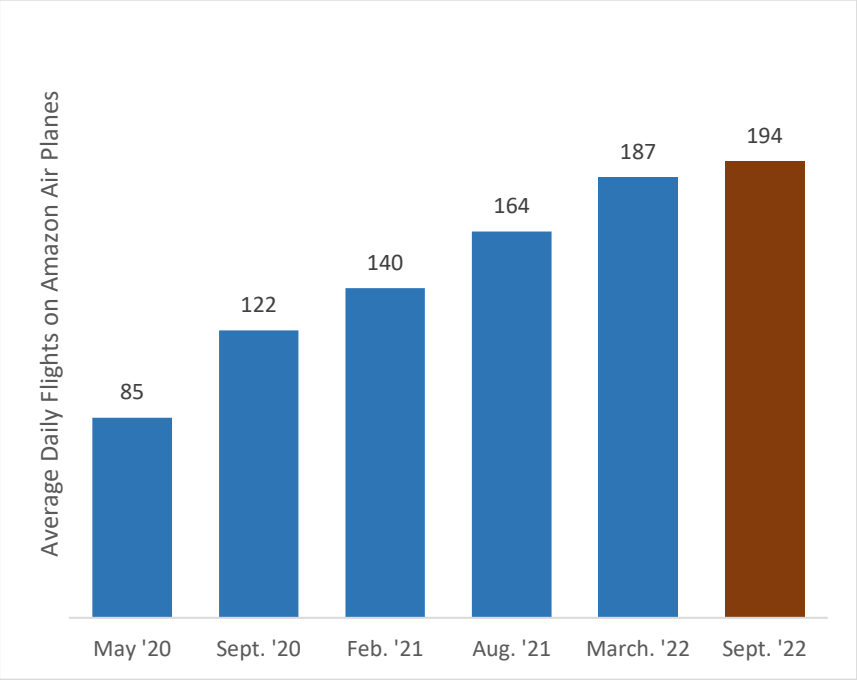
total, when partner flights are included, CVG and ILN appear to have an average of around 84 takeoffs and landings daily, and upwards of and close to 100 on the busiest days.

FINDING 2. Total flight activity on Amazon Air grew by just 3.8% between March 2022 and August 2022, far less than the 14.3% during the previous six months. The slowdown reflects Amazon's move to slow the rate of facility expansion, the flattening trajectory of online sales, and softer demand for air-cargo services in general. The reported size of Amazon Air's fleet remained at 87 to 88 planes for most of the period from March to September, although several planes appear to be imminent.

Amazon Air grew from 187.0 flights per day in March 2022 to 194.1 flights this month, a less than 4% increase based on our review of seven representative days of operations (Figure 2).[3] Its growth over the past year has been around 18.4%. Partner flights across the system appear to have stayed about the same.

These trends indicate that Amazon has adjusted to a "new normal" and taken decisive steps to adjust from overly optimistic estimates about the need for facilities and warehousing. According to MWPVL International, it has dropped dozens of existing and planned facilities around the United States. Concerns about a sluggish Christmas season may have spurred some of the reductions. Yet, Amazon continues to add warehouses where necessitated by customer demand.[4]

FIGURE 2: Growth in Daily Amazon Air Flight Activity
September 2022



Amazon Air activity *outside* of the Ohio Valley continues to fluctuate in ways that are difficult to predict. Such ebbs and flows, as noted in previous briefs, testify to the dynamic nature of Amazon's logistics network. Our analysis shows that Amazon Air adjusts schedules far more frequently than air cargo integrators, although the degree of fluctuations appears to be falling as CVG grows in importance. Even so, Amazon Air remains something of a unicorn in the air-cargo world.

Among the other recent changes since March are:

How does Amazon Air differ from FedEx and UPS?

Amazon Air relies on contractors to do all its **freighter flying**, an approach different from FedEx and UPS. Although 88+ planes are registered to Amazon Air and bear the retailer's familiar "smile" logo, Amazon Air does not have an airline operating certificate. Its contractors, in turn, provide flight crews and maintenance, as well as most of the loading and unloading of planes. Our analysis indicates that Amazon Air is **primarily designed to support inventory movement** between its warehouses and fulfillment centers. This analysis suggests that the airline's role in handling packages on their way to customers' doorsteps (which is mostly handled by trucks and vans) and "third party" shipping (i.e., shipping for customers outside of the Amazon supply chain) has been limited. Even so, this appears to be changing as **Amazon more aggressively enters the third-party shipping business** in direct competition to FedEx and UPS (see discussion on page 8). Amazon's contractors include Air Transport Services Group (ATSG), a holding company for a variety of cargo airlines; Atlas Air; ASL Airlines Ireland; and Silver Airlines. Amazon has bought a minority equity stake in ATGS and Atlas Air, deepening its air-cargo roots.

- Significant growth at Florida's Lakeland Linder Airport (LAL), near Tampa, which grew from around 16 to 18 daily flights. At Chicago Rockford (RFD), activity rebounded to 12 flights daily (See Table 2). Conversely, activity fell at Fort Worth Alliance (AFW), Portland (PDX), Seattle-Tacoma (SEA), and several other hubs.

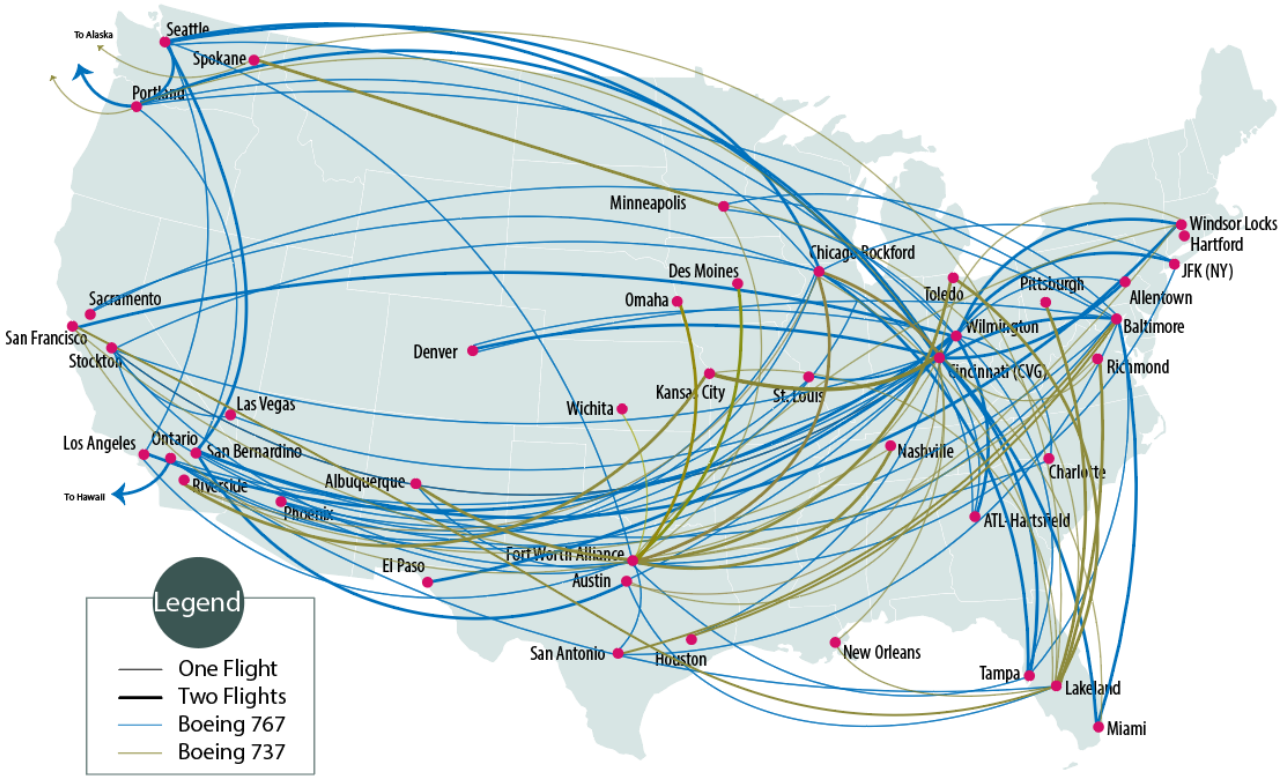
- In Southern California, the division of flight activity between Ontario International (ONT), Riverside (RIV), and San Bernardino (SNB) leaves Amazon's long-term strategy for this region a matter of speculation. Both Riverside and San Bernardino, separated by only 21 miles, have seen a reduction in flight activity since March, and now have just 10 and 5 flights daily, respectively. Activity at Ontario has remained largely the same (see Table 2, page 7). SXB appears to be important to Amazon's expansion plans, but its expansion has likely been affected by a walkout in August by workers demanding higher pay and improved working conditions.[5] We expect Amazon to proceed with more investment in California's coastal regions, much as UPS and FedEx have done in Ontario and Oakland, respectively. Whether SBN ultimately becomes its dominant hub in the region remains to be seen.

- Amazon Air is prioritizing growth in Europe, particularly in Leipzig and Milan, and partner-flight activity in Europe remains extensive. Intra-European Amazon Air flights grew from 36.4 to 44.3 daily between March and this month, not including partner flights (see Appendix, page 11). Leipzig, long reported as being a priority, saw flight activity grow from 3.2 to 8 daily. This rise was accommodated by a drop at Cologne from 5.8 daily flights to just one. Milan grew by an even greater amount, to nine daily (see Appendix).

- Extensive partner-flight activity that is not encompassed by these estimates, including the emergence of overnight flights possibly being used for Amazon-related missions, suggests that Amazon's European operation may be larger than the above estimates suggest (See Table 2 and discussion in Endnote 6[6]). Activity in Europe continues to be primarily ASL Ireland Airlines' Boeing

737s, mostly operated on daytime schedules consistent from day to day.

FIGURE 4: Amazon Air's Domestic U.S Flight Network, September 2, 2022



- The Northeast and New England expansion remains riddled with complexity. Flights are becoming more concentrated at Windsor Locks–Bradley International (BDL) near Hartford, CT and Thurgood Marshall Baltimore–Washington International (BWI). BDL grew to 10 daily flights, the highest number since the inception of Amazon Air flights, and BWI now averages 18. Even so, these regions pose difficult logistical challenges for the retailer. Opposition to Amazon's planned expansion at Newark Liberty International (EWR) does not appear to be abating, and congestion at New York's JFK International Airport is worsening as passenger airlines bounce back. Plus, Amazon Air now has only a skeletal operation in Allentown-Bethlehem, PA, a metropolitan region now primarily served by partner flights. As a result, BDL and BWI, supported by Amazon's vast ground operation system, appear poised to shoulder most of the growth—unless Amazon Air has a public-policy breakthrough at Newark, which we identified as presently having no regular flights.

FINDING 3. Since March, Amazon Air has added three U.S. airports: El Paso, TX; Las Vegas, NV; and Lihue, HI—putting 73.4% of the U.S. mainland's population within 100 miles from one of its airports, up from about 60% eighteen months ago. All airports on the U.S. mainland added over the past six months with regular service are more than 125 miles from existing

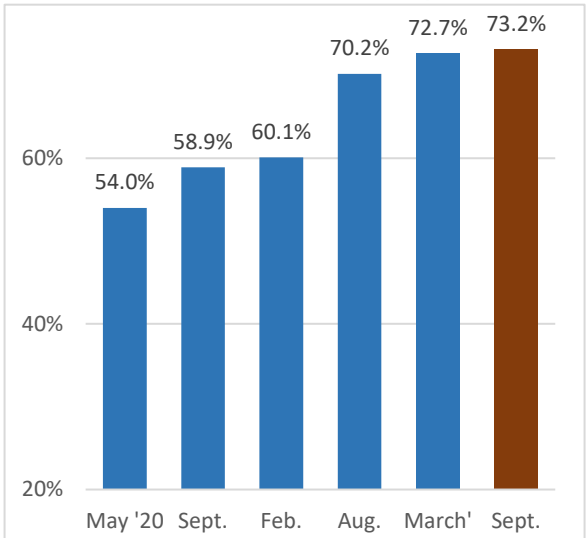
TABLE 2: Trends in Daily Takeoffs & Landings at Airports Served by Amazon Air

Airport	Status	Earlier Time Periods- Amazon Air daily flights					:2 Amazon Air + Partner Flights		
		April 2020	August 2020	February 2021	August 2021	March 2022	Amazon Air September 2022	Approx. Partner flts, typical day+	Total Daily Flights incl. Partner Flights
Albuquerque Int'l Sunport (ABQ)						4.8	1.9		1.9
Allentown Lehigh Valley Int'l (ABE)		6	5.0	4.3	0.0	1.4	2.3	2	4.3
Anchorage Ted Stevens Int'l (ANC)		4	2.0	2.0	1.8	2	2		2.0
Atlanta Hartsfield-Jackson Int'l (ATL)		0	2.0	2.5	2.3	3.2	4		4.0
Austin-Bergstrom International (AUS)		0	4.0	4.2	3.7	5.8	6.1		6.1
Baltimore-Washington Marshall Int'l (BWI)	*Hub*	6	9.0	10.5	19.5	19.2	18		18.0
Charlotte Douglas Int'l (CLT)					1.7	5	3.7		3.7
Chicago O'Hare International (ORD)		0	2.7	3.5	7.5	7.2	6		6.0
Chicago Rockford International (RFD)	*Hub*	15	16.5	15.8	10.2	9.2	11.7		11.7
Cincinnati/Northern Kentucky Int'l (CVG)	*Superhub*	24	25.7	27.8	21.5	25.6	43.9	10	53.9
Denver International (DEN)		4	3.7	4.2	1.0	2.2	3.9	4	7.9
Des Moines International (DSM)						1.6	2		2.0
El Paso Int'l (ELP)	*New*						1.7		1.7
Fairbanks Int'l (FAI)					2.0	1.8	1.7		1.7
Fort Worth Alliance (AFW)	*Hub*	8	16.7	17.2	26.3	36.6	29.9		29.9
Honolulu Daniel K. Inouye Int'l (HNL)		4	4.3	3.8	5.2	5.6	3.1		3.1
Houston G. Bush Intercontinental (IAH)	*Hub*	9	10.2	10.0	7.3	7.2	3.6	10	13.6
Kahului (OGG)		2	2.2	1.8	2.2	2	1.7		1.7
Kailua-Kona/Kona International (KOA)		0	1.7	2.0	2.5	2	1.7		1.7
Kansas City International (MCI)					3.7	2.2	6.1		6.1
Lakeland Linder International (LAL)	*Hub*	0	11.5	11.5	21.2	16.2	17.9	7	24.9
Las Vegas McCarron(LAS)	*New*						2.6		2.6
Lihue (LIH)	*New*						2		2.0
Los Angeles International (LAX)		0	0.0	2.0	3.8	6	3.7	2	5.7
Miami International (MIA)	*Hub*	6	7.3	6.7	5.7	6.8	8.1	2	10.1
Minneapolis-Saint Paul International (MSP)		2	3.7	2.0	6.3	6	4.4		4.4
Nashville International (BNA)						3.8	4		4.0
New Orleans, L. Armstrong Int'l (MSY)		0	0.0	2.0	2.0	2	2		2.0
New York John F. Kennedy Int'l (JFK)	*Hub*	0	8.0	8.8	10.0	8.2	4	2	6.0
Omaha Ebbly (OMA)						2.4	2		2.0
Ontario International (ONT)	*Hub*	13	21.5	20.5	12.8	12	12.4		12.4
Phoenix Sky Harbor International (PHX)		4	6.5	9.5	9.5	6.2	4	6.0	10.0
Pittsburgh International (PIT)					3.8	6.2	2		2.0
Portland International (PDX)	*Hub*	6	8.2	10.5	15.3	13.8	12.4		12.4
Richmond International (RIC)		0	5.0	4.0	3.7	2	3.7		3.7
Riverside March Air Reserve Base (RIV)		4	5.7	6.5	9.3	9.2	5.4	2	7.4
Sacramento International (SMF)		4	6.2	4.5	6.0	2	2	2	4.0
San Antonio/Kelly Field (SKF)		2	3.2	2.0	2.0	2	4.1		4.1
San Bernardino International (SBD)	*Hub*				8.0	14	10.3	4	14.3
San Francisco International (SFO)		2	2.8	7.0	4.0	3.8	5.7		5.7
San Juan Luis Muñoz Marin Int'l (SJU)		0	2.7	2.0	2.0	1.8	1.7		1.7
Seattle-Tacoma International (SEA)	*Hub*	9	9.3	11.2	11.7	14	10.3		10.3
Spokane International (GEG)						1.8	2		2.0
St. Louis Lambert International (STL)					3.6	1.8	4.4		4.4
Stockton Metropolitan (SCK)		4	4.0	6.2	5.3	4	5.9		5.9
Tampa International (TPA)		16	11.3	13.2	7.7	8.8	8		8.0
Toledo Express (TOL)					3.7	4	4		4.0
Wichita Dwight D. Eisenhower National (ICT)						1.2	1.4		1.4
Wilmington Air Park (ILN)	*Hub*	13	13.7	14.8	20.5	24.2	20.4	3	23.4
Windsor Locks Bradley Int'l (Hartford) (BDL)		2	6.8	8.0	4.2	5.6	10		10.0
Outside United States									0.0
Canadian Airports					10.2	10.2	10.0	Note a	10.0
Western Europe Airports		0	0.7	16.8	16.3	36.4	44.3	Note a	44.3
Total takeoffs & landings		170.0	243.5	279.3	326.9	374.0	388.2	56.0	444.2
Total flights		85.0	121.8	139.7	163.5	187.0	194.1	28.0	222.1

For a discussion of sampling process, see Endote 3. *Note a*: See discussion in appendix Not shown on table: Dallas-Fort Worth Int'l., .2 flights in 2/21

airports and more than a 10-hour truck trip from Cincinnati. The retailer is focused on filling gaps in areas that can't be easily served by ground transport routes from the Ohio Valley.

FIGURE 5: Share of Population of U.S. Mainland within 100 miles of an Amazon Airport



The share of the U.S. mainland's population within 100 miles of an Amazon Air airport inched up from 72.7% to 73.4% between March and September. As recently as September 2020, its coverage was 58.9%. These percentages are conservative, considering that the retailer can ship parcels or inventory much longer distances than 100 miles from its airports while still providing next-day delivery. See our airport map on page 11.

ATR-42 turboprops remain workhorses on short-hop missions from Fort Worth Alliance. Four took to the skies between late 2021 and early 2022, mostly running shuttles to and from Albuquerque, NM; Des Moines, IA; Omaha, NE; and Wichita, KS. Since then, a fifth turboprop has been added.

Amazon Air continues to refrain from transoceanic missions, although we still anticipate the eventual resumption of transoceanic flying (which is mentioned in our briefs from 2020), particularly once more Boeing 767s, and possibly larger planes, such as Boeing 777s, are added. How soon this will happen is difficult to predict due to Amazon's more cautious approach to expansion.

Amazon's ability to ship inventory and packages over relatively long distances by truck from its Ohio Valley hubs likely explains the dearth of airports added in the Midwest, Mid-Atlantic, and Northeast over the past year. Amazon Air's continuing absence from the vicinity of metropolitan Buffalo and Rochester, NY, Memphis, TN, and Raleigh, NC is likely due to this reason. For example, Cincinnati to Raleigh, is around nine hours by truck, which is well within federal hours of service rules governing drivers.

Amazon Air at Cincinnati-Northern Kentucky Int'l in August 2022.

FINDING 4. Amazon Air's expanding capabilities at CVG augment "Buy with Prime," a program announced in April, allows merchants to offer fast and free delivery to Amazon Prime members, even for purchases made on the independent websites of these merchants. Amazon's expanding capabilities at its CVG hub allows the company to promote this program more broadly than would have been possible at the start of this year.

The rollout of Buy with Amazon in late April provides a clear indication of Amazon's intentions in the third-party shipping sector. The program allows consumers to use their Prime membership when selecting shipping options, even if their purchase is on a platform other than Amazon.com. Buy with Amazon differs from the more established Fulfillment by Amazon program in two notable ways. First, customers receive clear indications that Amazon will provide the delivery when they place orders. Second, Buy creates a new incentive for Amazon Prime membership, thereby providing benefits beyond the revenues reaped from shipping the items being ordered. Whether Amazon expects most merchants in the Buy program to have packaging done within Amazon warehouses is unclear. One of the possible downsides is a potential reluctance among merchants to give Amazon information about the products they are selling.

This rollout of Buy reinforces our belief that Amazon's core strength lies in business-to-consumer delivery rather than next-day "anywhere to anywhere" delivery akin to that provided by FedEx and UPS. This segment is also a better fit for Amazon than business-to-business delivery, such as delivering components and parts to manufacturers. One reason is that CVG is still small compared to major FedEx and UPS hubs. Moreover, Amazon remains significantly far from being able to universally offer *early morning delivery* on next-day shipments throughout the entire U.S. mainland. Even so, with CVG's development, the company is gradually closing the gap. Reports have emerged that Walmart is expanding Amazon fulfillment, with some delivery trucks even being co-branded as Amazon and Walmart vehicles.

Our analysis indicates that a merchant who ships via Amazon Air from metropolitan Cincinnati and has packages ready for shipment by early afternoon (local time) could have those packages delivered by the next afternoon (or early evening) to points in all of the 25 largest U.S. metropolitan regions. They could have packages delivered by sometime the next day to perhaps 95% of the U.S. mainland's population. Amazon also appears to be close to having the capacity to offer second-day delivery between any two points on the U.S. mainland using only its own network.

SHORT-TERM OUTLOOK AND PREDICTIONS

Amazon's CVG hub has moved notably in the direction of becoming a large-scale and nighttime operation akin to that of FedEx's and UPS's largest hubs. At the same time, its operations remain much more decentralized than its competitors.

Through the rest of this year and early 2023, we expect:

- A resumption in the growth of Amazon Air's fleet, with the possible addition of 7–9 planes by March. Among the likely new planes are a pair of former Delta 767s slated to enter service. We no longer expect its fleet to surpass 100 by the end of this year, as predicted in March. Nor do we expect the extraordinary growth rates of 2020-2021 to return anytime soon. Nonetheless, we believe that large and sustained growth lies ahead, with many international markets ripe for the picking.

- Further development of nighttime operations at CVG and at other hubs. We expect at least a dozen more daily flights (six takeoffs and six landings) to be added at CVG in the next six months, with most departures being after midnight. This will boost CVG to 55+ daily flights, not including partner flights, making the hub nearly twice as large as any other hub. Investing more in Northern Kentucky will simplify the company's supply chain and help improve the utilization of its payload capacity.

An ABX Air Boeing 767 at Ontario International Airport (ONT) on August 25, 2022 (Peiwen Chen)

- Development of an expansive network over of "overnight" flights in Europe, mirroring the overnight network taking shape in the United States. Amazon Air may already be making such a move, considering that an increasing number of partner flights in Western Europe were identified through our analysis that depart between midnight and 6 pm and have the same itineraries as daytime Amazon Air flights. All involve Boeing 737s belonging to ASL Airlines Ireland, not reported as being part of Amazon Air. ASL in adding up to 20 freighters to support of Amazon, FedEx, and UPS. Although there is much uncertainty about Amazon's plans in Europe, we believe an expansive overnight network is in the offing, with flights centering on Leipzig and Milan. Schedules will likely be akin to those at CVG, Fort Worth Alliance, and other hubs in the United States.

- We expect Amazon to garner a larger piece of the delivery business being handled by FedEx, UPS, and the U.S. Postal Service that does not involve purchases on its online platform, in part due to rollout of Buy with Prime and Fulfillment by Amazon. We do *not* expect, however, that the company will announce any plans to broadly enter the consumer-to-consumer segment anytime soon. This would require both large-scale investments in facilities to collect parcels and a change in the orientation of Amazon Air. Instead, it will focus on providing business-to-consumer delivery for companies that can stock inventory at several locations or need only next-day or second-day delivery, while prioritizing enhancing overnight and same-day delivery options for Amazon Prime subscribers.

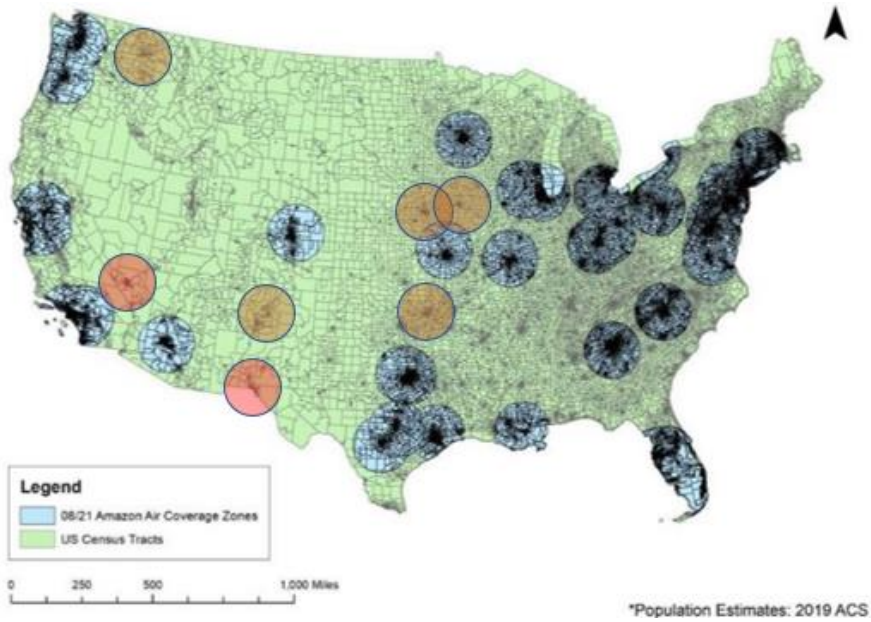
APPENDIX

A. DAILY FLIGHT ACTIVITY IN EUROPE AND CANADA

Airport	March 2022 Average	September 2022 Amazon Air
European Airports		
Barcelona (BCN)	3.8	2.0
Cologne (CGN)	5.8	0.9
East Midlands (EMA	3.2	2.0
Hannover (HAJ)	2.4	4.0
Katowice (KTW)	2.0	2.0
Leipzig (LEJ)	3.2	8.0
Liege (LGG)	0	1.7
Madrid (MAD)	5.0	6.0
Milan (MXP)	3.2	9.0
Paris (CDG)	5.8	6.0
Rome (FCO)	2.0	2.0
Shannon (SNN)	0	0.7
Southend (SEN)	0	0.0
	36.4	44.3
Canadian Airports		
Calgary (YYC)	2.2	2.0
Edmonton (YEA)	4.0	4.0
Hamilton (YHM)	4.0	4.0
Vancouver (YVR)	2.2	2.0
	12.4	12.0

These tallies exclude partner-flight activity. See discussion of partner flights in endnote 6 and our March 2022 brief.

B. AMAZON AIR AIRPORTS ON U.S. MAINLAND WITH 100 MILE BUFFER



Brown circles denote airports added Sept. '21 – February '22. Red circles are March – September '22 additions.

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TECHNICAL SUPPORT: ALLISON WOODWARD

For our five earlier Amazon Air Briefs and our March 2021 brief on expanding activity at cargo-only airports, please click here.

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[1] Amazon Air is not to be confused with the retailer's experimental drone unit, Amazon Prime Air.
[2] This brief is prepared as an extension of the Chaddick Institute's mission to promote public understanding of the evolution of transportation systems. The findings are based entirely on the Chaddick Institute's independent analysis of publicly available data. Any opinions expressed are those of the authors.
[3] The Chaddick Institute collected samples of 5–6 representative (non-holiday) days to evaluate Amazon Air and partner activity for brief issues through March 2022. We recorded all flights by airplanes listed on planespotters.com as being part of Amazon Air. In our most recent sample, we collected seven days from September 2–8, 2022. The new sample encompasses each day of the week. We determined that flight activity does not differ significantly by day of the week or on holidays.
[4] For a good discussion of this issue, see this *Seattle Times* article, available at https://www.seattletimes.com/business/amazon-sellers-see-scary-holiday-season-as-consumers-pull-back.
[5] *Ibid.*
[6] Please refer to our March 2022 brief for a discussion of partner flight activity in Europe. Our analysis for this study identified an increasing number of partner flights in Western Europe departing between midnight and 6 pm and involving the same airports as daytime Amazon Air flights. Whether all or some of these flights are on Amazon missions is a matter of speculation. All involve Boeing 737s belonging to ASL Airlines Ireland not reported as being part of Amazon Air. We plan to explore this in great depth in future briefs.

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