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STRATEGIC MOVES BY AMAZON AIR | WINTER 2021

Chaddick Policy Brief | February 16, 2021
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Our analysis of Amazon Air's recent activities indicates that the carrier has:

- Successfully launched an intra-Europe network using planes registered to Amazon
- Expanded flights by 15% since August and positioned itself for another growth spurt this spring
- Set into motion plans to fly numerous airplanes it owns rather than leases, primarily 767s
- Invested heavily in Cincinnati & Wilmington, OH, giving it new options to handle third-party shipping
- Boosted its presence at major passenger-oriented airports in the country's largest cities

Amazon Air has taken decisive steps to implement an international strategy

and is positioned for sustained growth in the next six months. Retail giant Amazon's fully owned Air subsidiary now has a significant presence on two continents.[1]

This independently produced brief offers an overview of Amazon Air's evolving orientation between September 2020 and February 2021.[2] The analysis draws upon publicly available data from a variety of informational sources including:

- Data from flightaware.com and flightradar24 on 1,700 Amazon Air plane takeoffs and landings in early 2021 and an equal number from 2020
- Information on fleet registration from various published sources, including planespotters.net
- Assessment of the company's strategic direction from investment analysts

The results of our latest analysis build upon our September 2020 Amazon Air Brief. That brief described Amazon's "summer surge" that occurred May - September 2020, including new hub development and the company's broadening geographic reach. Our May 2020 Brief explains why we expect its fleet to grow, possibly reaching 200 planes by 2028.

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PHOTO CREDIT (ABOVE): BOEING 737-800 AT MADRID, BY ADRIAN NOWAKOWSKI .

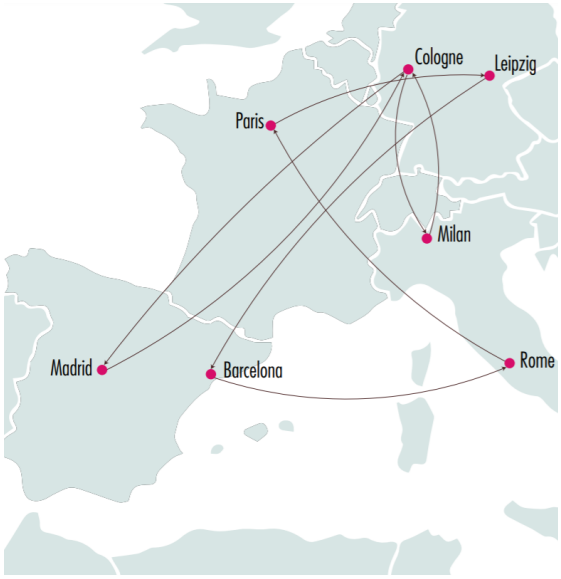
SEVEN FINDINGS FROM OUR ANALYSIS:

FINDING 1. Amazon Air's intra-Europe network, operated using planes registered to the company since late last year, is a conduit for growth throughout Europe. The network is served using a pair of Boeing 737s leased to ASL Ireland Airlines, and a third plane will likely enter service soon. The Irish carrier generally operates eight daily flights on medium-distance routes such as Leipzig – Barcelona and Cologne – Madrid.

Among Amazon Air's most significant developments of the past year is the emergence of intra-Europe operation serving four countries, using planes registered under the Amazon Air name. Almost immediately after leasing a pair of planes in October and November to ASL Ireland Airlines, the contractor deployed them on major routes within Western Europe. ASL is a familiar player in the cargo scene, providing services for both DHL and FedEx.

Previously, Amazon Air had been reportedly working with carriers using non-Amazon planes to meet its European needs. The Boeing 737-800s are intensively used, each generally completing four flight segments daily—a higher number than most of its U.S.-based airplanes. These planes fly from the wee hours to late evening between seven cities. One plane regularly makes a morning Cologne, DE – Milan, IT roundtrip followed by a Cologne – Madrid, ES roundtrip that same day. The other is often dispatched on Leipzig, DE – Barcelona, ES – Rome, IT – Paris, FR –Leipzig trips (Figure 1).

FIGURE 1: Amazon Air's Intra-Europe Network



Amazon Air's intra-Europe network, launched in November, primarily serves seven cities using Boeing 737 freighters.

Amazon Air's budding intra-Europe network, like its North American network, has a decentralized orientation and involves widely dispersed airports. No airport having regular flights is within 300 miles (483 kilometers) of another. Amazon Air has reportedly begun handling its own planes at Leipzig/Halle Airport and is reported to be planning to develop its own hub at that strategic spot.[3] However, Amazon generally has four daily flights serving Cologne, compared to just two daily at Leipzig and its five other European airports.

The new network is skeletal, confined entirely to Germany, Italy, France, and Spain. The network does not overlap with Amazon's semi-regular transatlantic service between the U.S. and Amsterdam and, significantly, does not yet encompass the Benelux countries, the United Kingdom, and the Republic of Ireland. Although the Leipzig flights give Amazon access to the Visegrad Group states, such as the Czech

Republic and Poland, Amazon will need to expand if the network is to come close to matching the broad geographic coverage of the U.S. network.

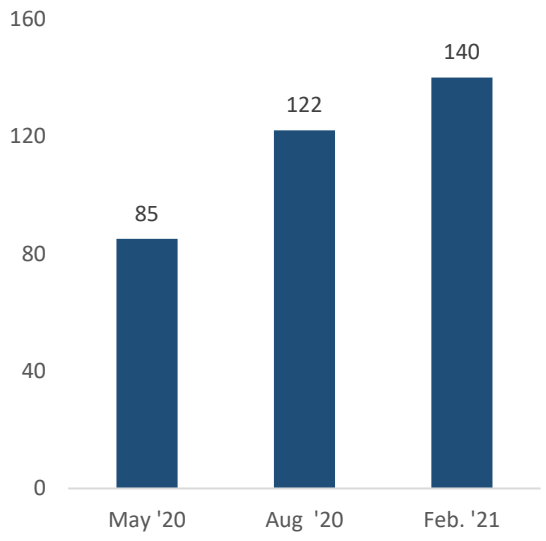
We expect that both Cologne, a hub for United Parcel Service (UPS) and Leipzig, a hub for DHL, will emerge as bona-fide hubs for Amazon Air, with the latter seeming poised for more rapid development, over the next year. A third plane leased to ASL will likely take to the skies soon, and we expect the network's growth to be an important development over the next year.

FINDING 2. Amazon Air's flight activity grew by 15% between August 2020 and February 2021, despite the slowdown in retail shipments that typically occurs after the start of the new year. The airline now regularly makes an average of 140 flights daily, and we expect that number to grow to more than 160 by June 2021.

Daily flight activity on planes registered to Amazon Air grew from an average of 122 to 140 between August 2020 and February 2021, which constitutes 15% growth over a roughly six-month period (Figure 2). These estimates are derived from comparisons of the average number of flights over six-day periods in August 2020 and our more recent sample taken in late January/early February 2021 (see Appendix for details on our sampling process).

The *North American* portion of Amazon Air grew 8% between August 2020 and February 2021. When Amazon's intra-Europe flights are excluded, the share of its flights touching down or taking off at one or more of its three largest hubs, Cincinnati-Northern Kentucky International (CVG), Ontario International (ONT), and Chicago Rockford International (RFD), inched upward from 19.3% to 19.4% (see Appendix).

FIGURE 2: Growth in Daily Flight Activity

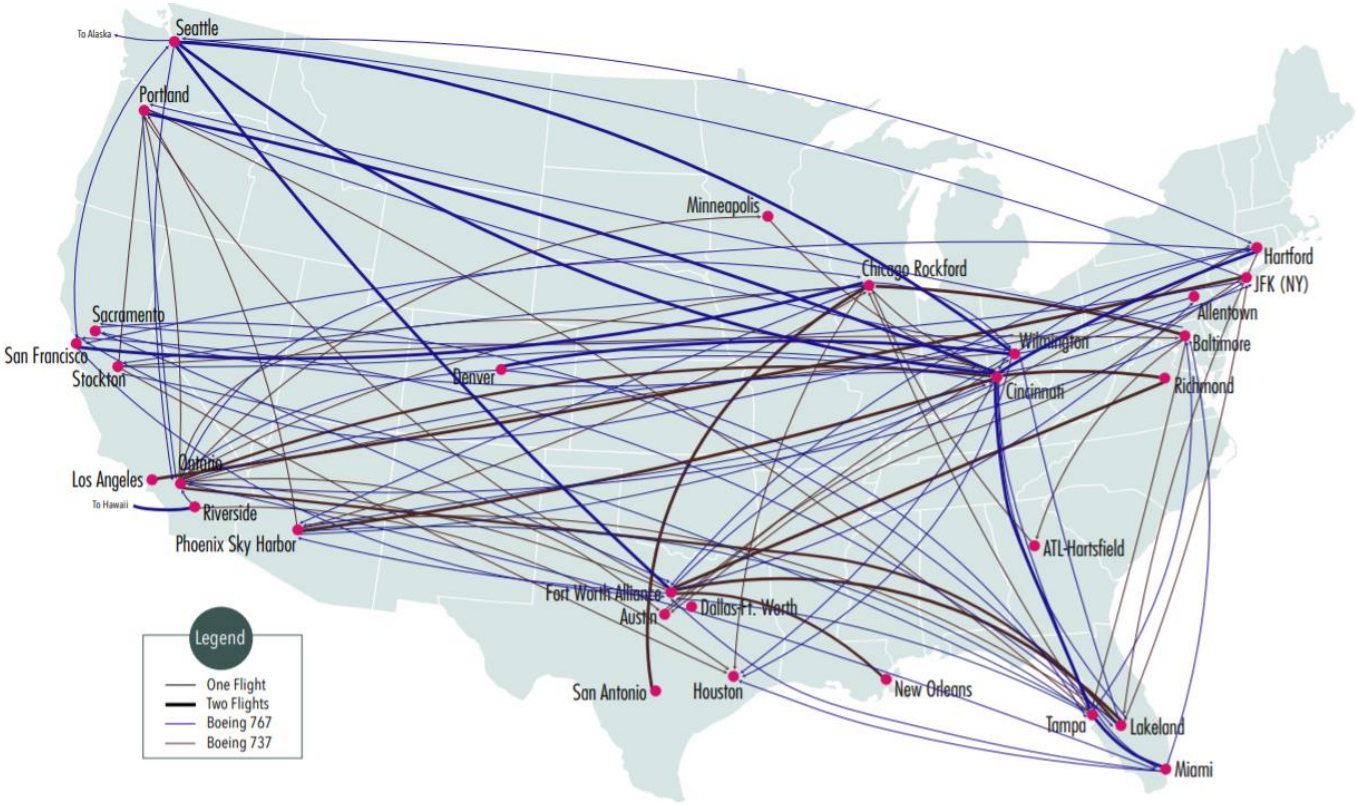


The number of flights on planes registered on Amazon grew from an average of 122 in late August 2020 to 140 in early February 2021, growth of 15%

Boeing 767s are the carrier's workhorses, accounting for about 80 daily flights, compared to about 60 flights using 737s. Almost three quarters (70%) of departures occur between 6 a.m. and 10 p.m., giving Amazon Air a less nocturnal orientation than FedEx Express or UPS. As new airplanes are added to the fleet (see discussion on next page), we anticipate the number of flights will grow to 160+ by June 2021. If it reaches this milestone, Amazon Air will have approximately doubled in size in the 13 months between May 2020 and June 2021.

Impressive as this is, Amazon Air's domestic operations will remain small compared to FedEx Express and UPS. Amazon's domestic network would still be only about 15% as large as UPS's. On international routes, the difference in size is much greater. Nevertheless, the airline's rapid growth rate sets it apart from nearly all other established cargo airlines.

FIGURE 3: Amazon Air North American Flight Network



Amazon Air's network, shown above on Thursday, January 21, 2021, remains highly decentralized, with point-to-point service between numerous non-hub cities. Kentucky's Cincinnati/Northern Kentucky International (CVG), California's Ontario International (ONT), and Illinois' Chicago Rockford International (RFD) remain its most heavily served points.

FINDING 3. Amazon Air is poised for another expansionary wave this spring. The airline has at least 10 planes registered to it that are not presently flying (some undergoing conversion to freighters) and another four slated to join its fleet soon. This growth will be undergirded by eleven Boeing 767 passenger models acquired from Delta Air Lines and WestJet.

Amazon has continuously expanded its fleet, registering planes every month since our September 2020 report. Among the highlights of its fleet development are the four WestJet and seven Delta Air Lines Boeing 767 passenger models Amazon recently announced it was in the process of acquiring. These planes, which will be owned outright by the carrier rather than leased, will reportedly be operated by its established contractors. Each requires modifications (or has already undergone modifications) for conversion to freighter service. Much of that work, a process typically taking about four months, is apparently being done in Mexico City, MX and Tel Aviv, IL (Israel). Some of these 11 planes, it has been reported, may not join its fleet until 2022.[4]

As we emphasized in past reports, a precise measure of the size of Amazon Air's fleet is hindered by the lack of publicly disclosed details about all its contractual arrangements. Investment analysts have noted that a significant amount of cargo may move on planes not registered to Amazon Air, particularly on

routes operating to points outside the U.S. According to a recent media report, Amazon Air reportedly described its fleet (presumably both planes registered to it and those registered to others) as being 81 planes in mid-January, whereas the public sources we evaluated showed the number of planes registered to it as somewhat less.[5]

These measurement issues aside, we feel strongly that monitoring *publicly available* data about planes registered by Amazon is an effective way to measure the carrier's changing scale and geographic orientation. **Based on public sources, between early September 2020 and February 2021, Amazon Air**:

- Expanded the **in-service** fleet of planes registered to it from **52 to 59**, a **13.5% increase**
- Expanded the **total fleet** of planes registered to it, including parked planes and those undergoing transformation to freighters, from **56 to 68**, for a **21.4% increase.** Nine off these planes are not presently in revenue service
- Has four planes that **are slated to be added to its fleet soon**. This does not include several of the Delta planes in the recently announced purchase

We anticipate that seven or eight planes registered to Amazon will likely begin service by June 2021, pushing the fleet of *active* planes under its registry to 66 or 67, which, together with more intensive utilization of existing planes, sets the stage for another growth spurt, like that occurring last summer.

FINDING 4. Expanding hubs at Cincinnati-Northern Kentucky International (CVG) and Ohio's Wilmington Air Park (ILN) position Amazon to move assertively into third-party delivery at the time of its choosing. The growing density of flight operations and warehouses around these airports, and the investments being made by other retailers and logistic providers in this area, give Amazon newfound capacity to provide expedited business-to-consumer deliveries for purchases not made on the Amazon platform. Flights from CVG and ILN already connect Amazon to most of the US population, and much more expansion appears imminent.

Between August 2020 and February 2021, activity at CVG has grown from 25.7 to 27.8 flights per day and Wilmington Air Park (just 69 miles northeast of CVG) grew from 13.7 to 14.8 daily flights (Figure 4). Cumulatively, these airports account for about 30% of the airline's flights. CVG and Wilmington are almost ideally situated for domestic package movements due to the centrality of their location, each within a 10-hour truck trip of much of the country's population. We expect both airports to remain focal points, as both have Amazon fulfillment centers near them and enjoy synergy with the DHL international hub at CVG, UPS Worldport in Louisville, KY, and Ohio's Columbus Rickenbacker International Airport (a major hub for international apparel shipments).

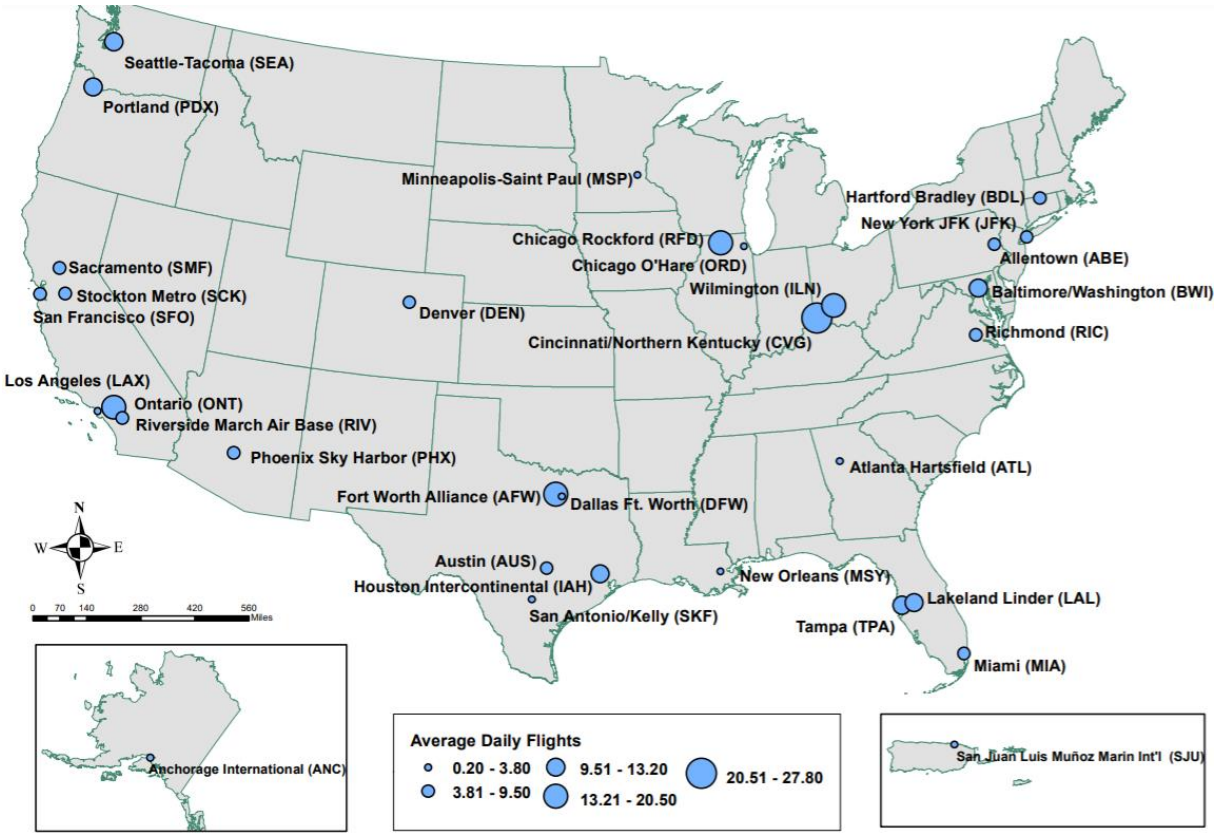
In November 2020, Morgan Stanley publicized its expectation that Amazon will launch a third-party delivery service in the United States, possibly as soon as this year.[6] **This service would include delivery of packages involving purchases not made on the Amazon platform, a move that could change the landscape of a sector long dominated by FedEx, UPS, and the U.S. Postal Service**. As the investment firm noted in May 2020, Amazon rolled out a "logistics as a service" offering in the United Kingdom, and a similar offering could be launched in the U.S. once the pandemic eases.[7] We concur, while acknowledging that Amazon has revealed little about its plans. In our view, however, Amazon's entry into this business will

Amazon's massive terminal facility at CVG, shown here on February 14, 2021, is designed to allow sorting on seven levels and projected to open this year.

likely occur in the next 18 months, and when it occurs, Amazon Air—and the CVG/Wilmington hubs in particular—will be critical (Figure 4).

Amazon would likely focus on retailer-to-consumer shipments (e.g., moving packages from retailer warehouses to consumers) without trying to replicate the comprehensive services offered by FedEx and UPS, which have vast

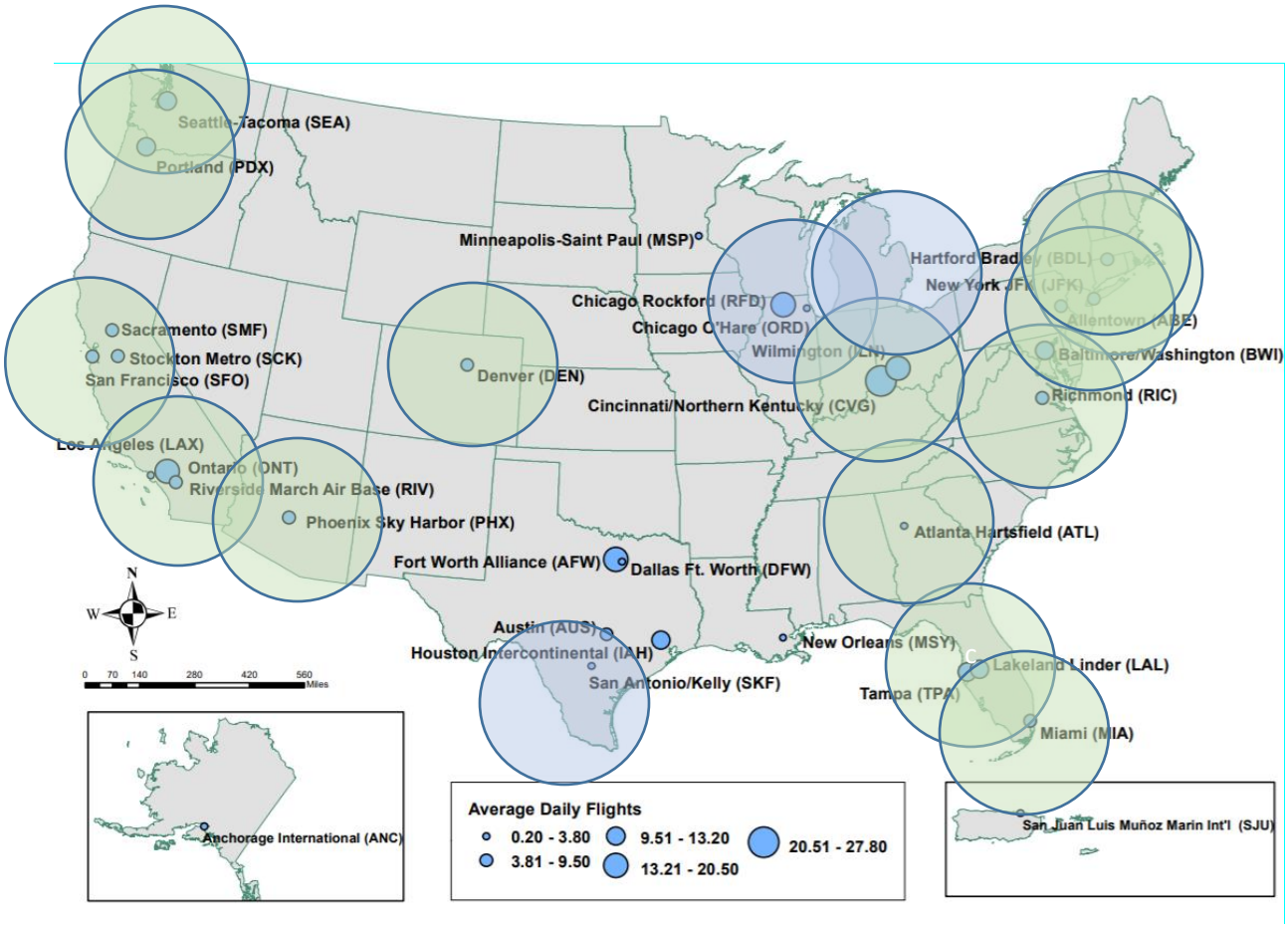
FIGURE 4: Distribution and Size of Amazon Air Airports in United States, excluding Hawaii



This map shows the average number of Amazon arrivals and departures at its North American airports, except Hawaii, in a six-day sample ending in early February 2021. The combined scale of its Ohio Valley hubs at CVG and Wilmington are evident, as is the airline's tendency to serve multiple airports in the same metropolitan region.

FIGURE 5: Points within 250 miles of an airport with nonstop Amazon Air service from CVG and Wilmington, OH

Amazon Air destinations in green; additional DHL destinations in blue



Area within 250 miles of an airport with nonstop Amazon Air flights from CVG

Area within 250 miles of an airport with nonstop DHL flights from CVG

Amazon Air's flight network at CVG and nearby Wilmington, Ohio already allows for the rapid shipment of inventory and packages to points within a four- or five-hour truck drive of the vast majority of the U.S. population, with additional routes operated by DHL. Some of the notable gaps will likely be filled during Amazon's anticipated CVG expansion later this year. UPS's Worldport in Louisville, KY is just 90 minutes away by truck.

door-to-door networks. CVG can be expected to dwarf Wilmington in size after the former's new ground facilities are fully operational, which is expected either in the summer or fall of 2021. CVG's facilities will reportedly have the capacity to support up to 200 flights per day (see our May 2020 Brief). A new interchange is being built on Interstate 275 west of CVG, and a pair of interchanges on Interstate 75 is being expanded.[8] We expect Amazon to gradually knit together its vast facilities throughout this part of the Ohio Valley while continuing to rely on both airports.

As shown on Figure 5, Amazon Air's flights from CVG or Wilmington already reach airports within 250 miles (about a five-hour truck drive) of the vast majority of the country's population. The network reaches virtually the entirety of the East and West Coasts and much of the Sunbelt, Colorado, and the Southwest, with some of the notable gaps filled by DHL's nonstop flights from CVG. This diverse array of flights makes next-day delivery of packages originating in the Ohio Valley a workable option, assuming appropriate ground-travel infrastructure is in place. With additional expansion at CVG, and possibly Wilmington as well, Amazon is in position to have a next-day shipping network centering on the Ohio Valley that reaches 95% of the population of the contiguous United States. Such a network would be valuable to both Amazon and third-party retailers selling on different platforms.

Dividing operations between two airports poses several disadvantages, including lessened plane-to-plane schedule connectivity and reduced package-sorting efficiency on airport grounds. However, trucks handle the preponderance of Amazon's package shipments and most sorting and dispatching will likely occur away from these airports. The two-airport system allows Amazon to avoid concentrating so much activity at higher-cost locations around CVG and leverages Wilmington's role as the home to Air Transport Services Group (ATSG), one of its major airline contractors. Amazon has a robust relationship with ATSG and has a five-year lease at Wilmington, which apparently extends through at least 2023. Moreover:

- Extensive development is underway around both CVG and Wilmington, initiated by both Amazon and other retailers' interest in being near its expanding Ohio Valley operations
- A staggering 18 million square feet of newly completed industrial development (heavily oriented toward warehouse space) has come online both north and south of the Cincinnati area since 2017, much of it due to Cincinnati's expanding role as a logistics hub[9]
- A 755,000-square-foot project for Bed Bath & Beyond in Monroe, OH, is proceeding roughly midway between the two airports.[10] Wayfair already has a major presence at CVG
- Amazon tends to use several airports in the same region, as is evident in the Chicago, Southern California, Northern California, and West-Central Florida regions

By this September, much more will be known about Amazon's trajectory at CVG and Wilmington–and how its Ohio Valley operations are positioned for third-party delivery. More of the 100,000 electric vans the company has ordered from Rivian, an electric-vehicle company located near Detroit, MI, will be on the road as well, providing clues about its interest in third-party delivery.[11]

FINDING 5. Amazon Air is putting more emphasis on major commercial airports having extensive passenger traffic than in the past. The airline has markedly expanded at Portland International, Phoenix Sky Harbor International, San Francisco International, Seattle-Tacoma International, and Tampa International airports in recent months.

The airline's recent expansion has put greater emphasis on major commercial airports within large metropolitan areas that have continuously been busy passenger hubs. In our May 2020 Amazon Brief we anticipated that growth would remain concentrated at cargo-focused airports with little passenger traffic.

TABLE 1: Busiest Amazon Air Airports in North America (except Hawaii)

RANK	AIRPORT	FLIGHTS April 24, 2020	6-DAY AVG August, 2020	6-DAY AVG February, 2021
1	Cincinnati-Northern Kentucky Int'l (CVG)	24	25.7	27.8
2	Ontario Int'l (ONT)	13	21.5	20.5
3	Fort Worth Alliance (AFW)	8	16.7	17.2
4	Chicago Rockford Int'l (RFD)	15	16.5	15.8
5	Wilmington Air Park (ILN)	13	13.7	14.8
6	Tampa Int'l (TPA)	16	11.3	13.2
7	Lakeland Linder Int'l (LAL)	0	11.5	11.5
8	Seattle-Tacoma Int'l (SEA)	9	9.3	11.2
9	Baltimore-Washington Int'l Thurgood Marshall (BWI)	6	9.0	10.5
10	Portland Int'l (PDX)	6	8.2	10.5
11	Houston Bush Int'l (IAH)	9	10.2	10.0
12	Phoenix Sky Harbor Int'l (PHX)	4	6.5	9.5
13	New York John F. Kennedy Int'l (JFK)	0	8.0	8.8
14	Windsor Locks (Hartford) Bradley Int'l (BDL)	2	6.8	8.0
15	San Francisco Int'l (SFO)	2	2.8	7.0
16	Miami Int'l (MIA)	6	7.3	6.7
17	Riverside March Air Reserve Base (RIV)	4	5.7	6.5
18	Stockton Metropolitan (SCK)	4	4.0	6.2
19	Sacramento Int'l (SMF)	4	6.2	4.5
20	Allentown Lehigh Valley Int'l (ABE)	6	5.0	4.3

To some extent, this has happened. In autumn of 2021, Amazon expanded at Florida's Lakeland Linder International, California's Riverside March Air Reserve Base, and Ohio's Wilmington, none of which have any significant passenger traffic, as well as California's Stockton Metropolitan Airport, which has little. We also expect operations to commence this year at San Bernardino International Airport, another cargo-oriented airport that we expect to become a focal point of Amazon's Southern California operations. Nearby Riverside March Air Base, another cargo airport, is a focal point for Hawaii traffic.

At the same time, Amazon's recent expansion in Portland, Phoenix, San Francisco, and Seattle, and its continuing presence at busy passenger-oriented airports in Atlanta, Dallas, Denver, New York, and Tampa, suggests that it is increasingly willing to deepen its services at airports with massive passenger traffic (Table 1). In turn, several cargo-oriented airports have seen modest *reductions* in flight activity since August 2020, including Allentown, Chicago Rockford, and San Antonio Kelly.

Our results also show that Amazon is now only judiciously adding cities to its U.S. networks. Our February 2021 sample showed new regular flights only to Louis Armstrong New Orleans International Airport (MSY), which had lacked such service in August 2020. Even so, we expect Amazon to use its new planes to fill gaps in its North American network, which could include airport additions in the Carolinas, Michigan, Utah, and Upstate New York, where many cities are 300+ miles from an Amazon-served airport.

FINDING 6. Amazon now has a balanced network of airports in the Northeast that places more emphasis on Connecticut's Hartford Bradley International and New York's John F. Kennedy International airports and less on Pennsylvania's Allentown Lehigh Valley International Airport. Amazon is also making a concerted push at Virginia's Richmond International Airport, which relieves pressure on Baltimore-Washington International Airport and positions the company to better serve the Mid-Atlantic region.

Boeing 737-8CN at California's Ontario International Airport on December 17, 2020. Ontario has seen steady growth since our first report in June 2020 (Peiwen Chen)

Hartford Bradley has emerged as a stellar performer, growing from a mere two flights in May 2020 to six in August 2020 and eight this month. Allentown has gradually diminished, reduced to 4.3 flights per day. Activity at New York's JFK Airport has remained stable at about 8.8 flights per day. This triad offers a well-balanced system that puts the enormous population between Philadelphia and southern Maine within three hours of an Amazon airport.

On the southern half of the

Northeastern Corridor, growth at Richmond International is providing added connectivity to the Mid-Atlantic region and eastern Tennessee. This airport had no Amazon flights last May but now averages four daily. Activity at Baltimore-Washington International, long an Amazon stronghold, has also inched up, from averaging 9.5 to eleven flights.

FINDING 7. Amazon Air has reduced transpacific flights and appears to be relying almost entirely on charters and other contractual arrangements to support its supply chain across the Pacific. Offseason transoceanic international flying has been largely reduced to a semi-regular roundtrip between Amsterdam and Chicago.

Amazon Air's shift from transoceanic flights on international routes appears to reflect the company's desire to use its fleet for shorter-hop flights supporting inventory and packaging movements between warehouses on the same continent. In August of 2020, planes registered to Amazon Air made semi-regular trips across both the North Atlantic and Pacific. Among those flights were periodic Shanghai, China to U.S. trips as well as periodic service from Incheon, Korea. In the new sample, only Amsterdam – Chicago O'Hare flights, operated on roughly half the days observed, took to the skies.

This shift may be attributable to Amazon's increased leverage when negotiating rates with cargo airlines amid the slump in general air cargo shipments reported last autumn. Alternatively, it may reflect the tendency for January and February to be perennially soft times for online retail purchases, making transoceanic flights less imperative this time of year. We expect that a small number of transoceanic flights will return come peak season, but that this will remain a niche operation.

Our conversations with analysts suggest that there is a broad consensus that the "value-added" benefit of Amazon Air's fleet is greatest on flights making trips *within* Europe and North America, particularly on routes supporting rapid inventory and package movement among its many warehouses and fulfillment centers. The need for such flight connections is growing as Amazon pushes for more next-day delivery. For shipments across the oceans linking manufacturers to its warehouses, conventional cargo airlines using larger airplanes appear better suited for the task.

SHORT-TERM OUTLOOK AND PREDICTIONS

The remainder of 2021 promises to bring more strategic moves by Amazon Air and likely a gradual "densification" of its network as well. Such initiatives will advance its push to expand overnight package delivery options. We anticipate several general moves by late May 2021:

- Amazon will push daily flight operations upward another 15% over the next five months so that it regularly tops 160 daily flights by late June 2021. Such growth will be critical to Amazon's expansion of next-day delivery options. This growth will likely take the form of perhaps 7 – 8 more planes added to its fleet
- Amazon Air's expanding operations will allow for significant expansion in next-day delivery of packages throughout the United States, a process abetted by new 767 freighters coming online
- Amazon will grow the intra-Europe network significantly, starting with the addition of a third plane operated under contract by ASL. This will likely continue with more 737s and the addition of new

routes beyond the existing countries served, possibly in the Republic of Ireland, the United Kingdom, the Benelux countries, and Eastern Europe

- Amazon Air will increasingly position itself to support the delivery requirements of third parties, who need to ship packages and parcels for goods not purchased on the Amazon platform. The CVG hub, together with nearby Wilmington, will allow Amazon to increasingly handle third-party business-to-consumer shipments. Amazon's interest in, and timetable for, third-party delivery is unclear, although we expect it will make a move within 18 months.

We anticipate activities at particular airports to include:

- Growth at Cincinnati CVG that will push its activity from fewer than 30 flights per day today to around 50 flights per day by year's end, made possible by the opening of its massive new facilities anticipated for this autumn
- The introduction of significant flight operations at Southern California's San Bernardino International Airport, with some activity possibly shifting from Ontario International, within the next few months
- Expansion at both Cologne and Leipzig, Germany, as it lays the groundwork for significant expansion in Europe, that will include the addition of new airports in countries not yet served
- Expansion to airports that fill gaps in its coverage, such as possible service to Upstate New York, the Carolinas, and Salt Lake City, which will give it improved coverage in areas where travel times from its airports are presently six hours or more.

SEE OUR SEPTEMBER 2020 REPORT FOR AN ASSESSMENT OF THE JUXTAPOSITION OF FLIGHTS AND WAREHOUSES

Boeing 737-8AS at Madrid, Spain on January 17, 2021 by Adrian Nowakowski

APPENDIX: Takeoffs & Landings at Airports Served by Amazon Air

Airport	Thursday April 23	Six Day August '20 Average	Thursday January 21	Monday January 25	Tuesday January 26	Wednesday February 3	Friday February 4	Saturday, February 5	Six day Feb '21 Average	Net Change Aug '20-Feb '21
Allentown Lehigh Valley Int'l (ABE)	6	**5.0**	5	2	4	4	7	4	4.3	**-0.7**
Amsterdam Airport Schipol (AMS)	0	**0.7**	0	0	0	1	2	2	0.8	**0.2**
Anchorage Ted Stevens Int'l (ANC)	4	**2.0**	2	2	2	2	2	2	2.0	**0.0**
Atlanta Hartsfield-Jackson International (ATL)	0	**2.0**	4	2	3	2	2	2	2.5	**0.5**
Austin-Bergstrom International (AUS)	0	**4.0**	4	4	4	4	5	4	4.2	**0.2**
Baltimore-Washington Marshall Int'l (BWI)	6	**9.0**	10	10	12	10	11	10	10.5	**1.5**
Chicago O'Hare International (ORD)	0	**2.7**	4	2	2	4	5	4	3.5	**0.8**
Chicago Rockford International (RFD)	15	**16.5**	17	15	15	16	16	16	15.8	**-0.7**
Cincinnati/Northern Kentucky Int'l (CVG)	24	**25.7**	28	27	30	28	26	28	27.8	**2.2**
Dallas-Ft. Worth International (DFW)	0	**0.0**	1	0	0	0	0	0	0.2	**0.2**
Denver International (DEN)	4	**3.7**	4	5	4	4	4	4	4.2	**0.5**
Fort Worth Alliance (AFW)	8	**16.7**	19	20	18	15	15	16	17.2	**0.5**
Honolulu Daniel K. Inouye International (HNL)	4	**4.3**	3	4	4	4	4	4	3.8	**-0.5**
Houston George Bush Intercontinental (IAH)	9	**10.2**	11	10	9	10	10	10	10.0	**-0.2**
Incheon International, Korea (ICN)	1	**0.0**	0	0	0	0	0	0	0.0	**0.0**
Kahului (OGG)	2	**2.2**	2	2	1	2	2	2	1.8	**-0.3**
Kailua-Kona/Kona International (KOA)	0	**1.7**	1	2	3	2	2	2	2.0	**0.3**
Lakeland Linder International (LAL)	0	**11.5**	10	12	11	12	12	12	11.5	**0.0**
Miami International (MIA)	6	**7.3**	6	8	6	7	7	6	6.7	**-0.7**
Los Angeles International (LAX)	0	**0.0**	2	2	2	2	2	2	2.0	**2.0**
Minneapolis-Saint Paul International (MSP)	2	**3.7**	2	2	2	2	2	2	2.0	**-1.7**
New Orleans, Louis Armstrong Int'l (MSY)	0	**0.0**	2	2	2	2	2	2	2.0	**2.0**
New York John F. Kennedy Int'l (JFK)	0	**8.0**	10	9	8	8	10	8	8.8	**0.8**
Ontario International (ONT)	13	**21.5**	19	22	21	20	19	22	20.5	**-1.0**
Osaka Kansai International Japan (KIX)	0	**0.2**	0	0	0	0	0	0	0.0	**-0.2**
Phoenix Sky Harbor International (PHX)	4	**6.5**	9	10	10	8	10	10	9.5	**3.0**
Portland International (PDX)	6	**8.2**	10	12	11	10	10	10	10.5	**2.3**
Richmond International (RIC)	0	**5.0**	4	4	4	4	4	4	4.0	**-1.0**
Riverside March Air Reserve Base (RIV)	4	**5.7**	5	7	7	6	6	8	6.5	**0.8**
Sacramento International (SMF)	4	**6.2**	5	4	4	6	4	4	4.5	**-1.7**
San Antonio/Kelly Field (SKF)	2	**3.2**	2	2	2	2	2	2	2.0	**-1.2**
San Francisco International (SFO)	2	**2.8**	10	7	6	8	6	5	7.0	**4.2**
San Juan Luis Muñoz Marin Int'l (SJU)	0	**2.7**	2	2	2	2	2	2	2.0	**-0.7**
Seattle-Tacoma International (SEA)	9	**9.3**	13	12	11	12	8	11	11.2	**1.8**
Shangai Pudong Int'l China (PVG)	0	**0.5**	0	0	0	0	0	0	0.0	**-0.5**
Stockton Metropolitan (SCK)	4	**4.0**	6	7	6	6	6	6	6.2	**2.2**
Tampa International (TPA)	16	**11.3**	13	15	14	11	14	12	13.2	**1.8**
Wilmington Air Park (ILN)	13	**13.7**	15	15	16	14	15	14	14.8	**1.2**
Windsor Locks Bradley Int'l (Hartford) (BDL)	2	**6.8**	10	8	8	8	8	6	8.0	**1.2**
Western Europe -- Intra-Europe Network	0	0	16	16	16	16	16	16	16.0	**16.0**
Total takeoffs & landings	**170**	**244.2**	**286**	**285**	**280**	**274**	**278**	**274**	**279.5**	
Total flights	**85**	**122.1**	**143**	**143**	**140**	**137**	**139**	**137**	**139.8**	
Percent of takeoff and landings										
At Cincinnati CVG	14.1%	**10.5%**	9.8%	9.5%	10.7%	10.2%	9.4%	10.2%	**10.0%**	
At CVG, excluding Intra-Europe network	14.1%	**10.5%**	10.4%	10.0%	11.4%	10.9%	9.9%	10.9%	**10.6%**	
At 3 largest hubs	21.8%	**26.1%**	22.4%	22.5%	23.6%	23.4%	21.9%	24.1%	**23.0%**	
At 3 largest hubs exclud. Intra-Europe network	21.8%	**19.3%**	17.8%	18.2%	19.3%	18.6%	17.2%	19.4%	**18.4%**	
At airports not on U.S. Mainland	6.5%	**5.8%**	9.1%	9.8%	10.0%	10.6%	10.8%	10.9%	**10.2%**	

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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 Chaddick Institute's mission to promote public understanding of the evolution of transportation systems. The findings are based entirely on Chaddick Institute's independent analysis of publically available data. Any opinions expressed are those of the authors.
[3] For a discussion of the Leipzig hub, see this *Breakbulk News* article, dated September 26, 2018: https://breakbulk.news/leipzig-halle-airport-germanys-air-cargo-hub/.
[4] Amazon reported in a press release that these jets will be part of its active fleet "by 2022." To see the press release, visit https://finance.yahoo.com/news/amazon-continues-expand-transportation-fleet-140100605.html.
[5] The 81-plane total was reported in this *Business Insider* article, dated January 3, 2020: https://www.businessinsider.com/amazon-adds-12-planes-cargo-fleet-move-against-fedex-ups-2020-6. Planespotters.net indicated the carrier had 58 planes at the time, with another four planned.
[6] For a discussion of the Morgan Stanley predictions, see this *DC Velocity* article, dated November 2, 2020: https://www.dcvelocity.com/articles/47839-amazon-could-launch-third-party-delivery-service-in-us-by-2021-morgan-stanley-says.
[7] For a discussion, see this *DC Velocity* article, dated November 2, 2020: https://www.dcvelocity.com/articles/47839-amazon-could-launch-third-party-delivery-service-in-us-by-2021-morgan-stanley-says.
[8] For a discussion of growth in the Cincinnati areas, see this *Supply Chain Dive* article, dated November 17, 2020: https://www.supplychaindive.com/news/is-amazon-airs-presence-helping-to-make-cincinnati-the-place-to-be-for-sma/588612/.
[9] For a discussion, see this *Supply Chain Dive* article, dated November 17, 2020: https://www.supplychaindive.com/news/is-amazon-airs-presence-helping-to-make-cincinnati-the-place-to-be-for-sma/588612/.
[10] *Ibid.*
[11]For a discussion, see this *CNET* article, dated February 3, 2020: https://www.cnet.com/roadshow/news/amazon-electric-delivery-van-rivian/.