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ANNUAL PRIVATIZATION REPORT: AVIATION

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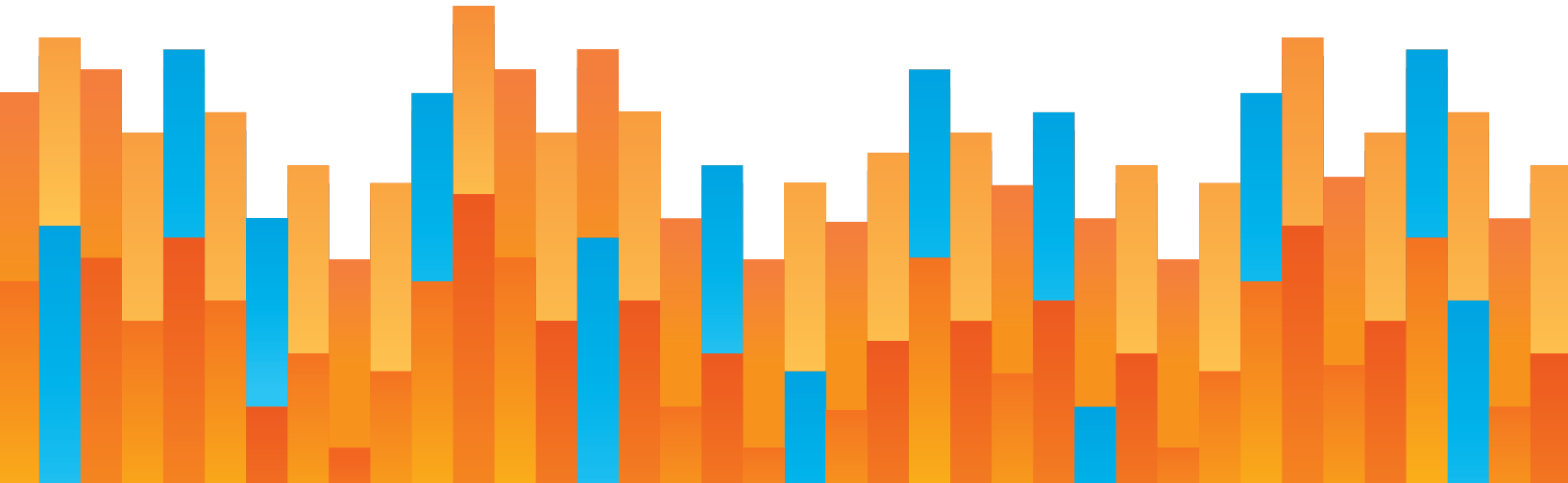

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PART 1

INTRODUCTION

In the second half of the 20th century, the world's airports and air traffic control systems were essentially all run by government departments. Two events in 1987 launched an ongoing wave of organizational and government reforms. Those events were the privatization of the British Airports Authority (BAA) and the corporatization of the ATC functions of the New Zealand government as Airways New Zealand.

> *The improved performance of the privatized airports inspired a global wave of airport privatization and long-term public-private partnerships (P3s) that has resulted in over 100 large and medium-size airports being either sold to investors or long-term leased as revenue-based P3s—in Europe, Asia, Latin America, and elsewhere.*

BAA was privatized as a single entity, comprising the three major London airports plus several other U.K. airports. Later government policy decisions led to selling Gatwick, Stansted, and two Scottish airports to new owners. The improved performance of the privatized airports inspired a global wave of airport privatization and long-term public-

private partnerships (P3s) that has resulted in over 100 large and medium-size airports being either sold to investors or long-term leased as revenue-based P3s—in Europe, Asia, Latin America, and elsewhere. The outlier has been the United States, which has only one P3-leased airport (San Juan International) and a small number of P3 arrangements for airport terminals and other individual facilities.

The corporatization of Airways New Zealand in 1987 also led to a global trend under which more than 60 countries subsequently separated their ATC systems from the government's transport ministry and set them up as self-supporting corporations, regulated for safety at arm's length from the government. Within the first decade of this trend, the leading ATC providers organized a trade association, the Civil Air Navigation Services Organization (CANSO). Today CANSO has 93 full members (providers of ATC services) and 89 associate members (mostly supplier companies). It is the ATC counterpart of the global organizations for airlines (IATA) and airports (ACI).

This report reviews developments worldwide and in the United States regarding private-sector participation in airports, air traffic control, and airport security. While the United States remains an outlier when it comes to airport and ATC organization and governance, interest in airport privatization via long-term P3 leases continues, as does interest in reform of the country's ATC system.

PART 2

AIRPORTS

2.1 AIRPORT PRIVATIZATION OVERVIEW

The term "airport privatization" refers to several different kinds of change from traditional 100% government ownership and operation. The most sweeping form is the sale of the airport's ownership (as in the original BAA privatization) via a public offering of shares. A more common model in most of Europe is the sale of either a majority or minority stake in the airport. In Australia, much of Asia, and Latin America, the most common model is the long-term lease as a public-private partnership (P3). Lease terms typically vary from as short as 25 years to as long as 99 years (Australia). The P3 model is also used for components of an airport, such as a new terminal (or even a new runway, as occurred in Bogota, Colombia). The P3 model is permitted under federal law in the United States, for entire airports as well as airport components.

Trade association Airports Council International in 2018 released a policy paper on worldwide airport privatization trends.[1] A table in that report showed that Europe led the way in the fraction of passenger traffic (75%) at airports with majority or near-majority or greater private-sector investment, with Latin America and the Caribbean next at 66%. North America was lowest, at 1% of airports. For the world overall, 43% of all air travelers use airports with significant private ownership.

[1] Airports Council International, "Policy Brief: Creating Fertile Grounds for Private Investment in Airports," January 2018.

TABLE 1: AIRLINE PASSENGERS BY REGION AND AIRPORT OWNERSHIP TYPE

Region	Percent Private	Percent Government
Africa	11%	89%
Asia-Pacific	47%	53%
Europe	75%	25%
Latin America & Caribbean	66%	34%
Middle East	18%	82%
North America	1%	99%
World	43%	57%

Source: Airports Council International, 2018

More than three decades of growth in airport privatization have led to the emergence of global airport companies, some of which began with airports that were privatized early on, such as London Heathrow and Germany's Frankfurt. When new opportunities arise to bid on shares in airport equity or to develop a new airport or terminal via a long-term P3 agreement, these companies are generally among the bidders, sometimes in partnership with infrastructure investment funds and/or public pension funds.

Table 2 lists the largest investor-owned airport companies, ranked according to their 2019 revenue, derived from airport group financial statements. The total 2019 revenue of the investor-owned airport companies from that table is $47.3 billion, representing 27.5% of 2019 total world airport revenue of $172 million.

TABLE 2: LARGEST INVESTOR-OWNED AIRPORT COMPANIES, BY REVENUE, 2019

Airport Company	HQ Country	Main Airport(s)	Privatiz. Status	2018 Revenue ($M)	2019 Revenue ($M)
Aeroports de Paris	France	Paris--DeGaulle	Partial	5,270	5,264
Aena Aeropuertos	Spain	Madrid	Partial	5,088	4,977
Fraport	Germany	Frankfort, Lima	Partial	4,093	4,150
Heathrow Airport Holdings	UK	Heathrow	Full	3,945	4,083
Vinci Airports	France	Gatwick, Lisbon	Full	2,860	2,947
Airports of Thailand	Thailand	Bangkok	Partial	1,924	2,024
New Kansai Intl. Airport	Japan	Kansai	Full	1,985	1,980
Beijing Capital Airport	China	Beijing	Partial	1,698	1,565
Malaysia Airport Holdings	Malaysia	Kuala Lumour	Partial	1,202	1,259
Flughafen Zürich	Switzerland	Zurich	Partial	1,180	1,218
Manchester Airports	UK	Manchester	Partial	1,163	1,183
Guangzhou Baiyun*	China	Guangzhou	Partial	1,167	1,167
Sydney Airport	Australia	Sydney	Full	1,178	1,140
Atlantia	Italy	Rome	Full	1,208	1,067
Flughafen Wien	Austria	Vienna	Full	941	961

Airport Company	HQ Country	Main Airport(s)	Privatiz. Status	2018 Revenue ($M)	2019 Revenue ($M)
TAV Airports	Turkey	Istanbul	Full	1,430	856
SEA Group	Italy	Milan	Partial	839	849
ASUR	Mexico	Cancun	Full	800	826
GAP	Mexico	Guadalajara	Full	733	759
GMR Airports	India	Delhi	Partial	755	746
Brussels Airport Co.	Belgium	Brussels	Full	701	738
Australia Pacific Airports	Australia	Melbourne	Full	782	728
Corporacion Americas	Argentina	Buenos Aires	Full	822	724
Copenhagen Airports	Denmark	Copenhagen	Partial	689	652
Brisbane Airport Corp.	Australia	Brisbane	Partial	600	584
Athens Intl. Airport	Greece	Athens	Partial	563	581
Dusseldorf Airport	Germany	Dusseldorf	Partial	558	530
Airports. Co. S. Africa	South Africa	Cape Town	Partial	517	494
Auckland Intl. Airport	New Zealand	Auckland	Partial	486	490
OMA	Mexico	Acapulco	Full	351	401
Budapest Liszt Airport	Hungary	Budapest	Full	450	370
Perth Airport	Australia	Perth	Full	404	346
Aeroports de la Cote d'Azur	France	Nice	Partial	329	325
Hamburg Airport	Germany	Hamburg	Partial	317	308
Edinburgh Airport	UK	Edinburgh	Full	271	294
AGS Airports	UK	Glasgow	Full	283	289
SAVE Group*	Italy	Venice	Partial	250	250
Birmingham Airport Holdings	UK	Birmingham	Partial	210	214
				48,042	47,339

***Data for 2019 were not available for these two airports, so 2018 revenue was used as a proxy.**
Source: Individual airport group financial statements for FY 2019

It is also interesting to note how the privatized airports on this list score on the annual Skytrax survey of airline passengers about their airport preferences. The majority of the 39 companies in Table 2 have one or more major airports selected by Skytrax passengers as among the world's 100 best airports. Among these are Kansai (#10 in the Skytrax 100), Zürich (#11), London Heathrow (#12), Frankfurt (#14), Vienna (#16), Melbourne (#17), Copenhagen (#19), Paris de Gaulle (#20), Brisbane (#21), Cape Town (#23), Hamburg (#24), Sydney (#26), Madrid (#27), Auckland (#29), and Guangzhou (#30). By contrast, only two U.S. airports rank in the top 50 Skytrax airports: Houston George Bush (#31) and Cincinnati/Northern Kentucky (#34).[2]

Skytrax respondents also gave high scores to airports in Europe and Asia that have been "corporatized," which means reorganized as a government-owned commercial entity,

[2] Skytrax, "World's Top 100 Airports 2020," https://www.worldsbestairports.com (11 May 2021),

operating under normal accounting rules and sometimes paying taxes like any other business. Among high-scoring airports of this type were Singapore Changi (#1). Tokyo Haneda (#2), Munich (#5), and Amsterdam Schiphol (#9).

2.2 AIRPORT INDUSTRY CHANGES IN 2020

The COVID-19 pandemic imposed unprecedented financial stress on airports worldwide. In 2019, Price Waterhouse Coopers issued a report on rising airport valuations, including a map showing near-term airport privatization/P3 opportunities in 15 countries.[3] Little more than a year later, the concern shifted to the economic survival of airports in the face of unprecedented declines in air travel.

A number of privatized airport companies refinanced some existing debt to take advantage of historically low interest rates, thereby reducing annual debt service costs. Table 3, compiled by data firm *Inspiratia*, provides examples.[4]

TABLE 3: SELECTED 2020 AIRPORT DEBT REFINANCINGS

Airport	Country	Date of Financial Close	Amount
Gatwick Airport	U.K.	April 3, 2020	$368 million
Edinburgh Airport	U.K.	April 29, 2020	$ 95 million
Brussels Airport	Belgium	June 9, 2020	$ 53 million
Nice Airport	France	July 30, 2020	$784 million
Brussels Airport	Belgium	September 28, 2020	$ 23 million
Milan Airport	Italy	October 9, 2020	$355 million
Heathrow Airport	U.K.	December 14, 2020	$999 million

Source: Inspiratia.com

Heathrow Airport soldiered on, coping with 88% fewer passengers in November 2020 than in that month in 2019. It suspended operations in Terminals 3 and 4 early in the pandemic, operating only out of T2 and T5. And in December 2020, it announced that T4 would remain closed throughout 2021.[5] Prior to the start of the pandemic, the company received the news that the U.K. Court of Appeal had decided in favor of a lawsuit filed by Friends of the Earth contending that plans to add a third runway violated U.K. commitments under the

[3] Romil Radia, et al., "Airport Valuations Have Taken Off—The Question Is Where Will They Land?" PwC, February 2019.

[4] Omolola Coker, "Airports Remodeling Revenues," *Inspiratia*, 8 March 2020.

[5] Victoria Moores, "Heathrow T4 to Remain Closed for Another Year," *Aviation Daily*, 14 December 2020.

Paris Agreement on Climate Change. But in December 2020, the U.K. Supreme Court dismissed that finding, ruling unanimously that the government's approval of the new runway included conditions more stringent than the country's Paris Agreement commitments.[6]

Aeroports de Paris (ADP) bought 49% of India's GMR Airports for $1.4 billion just prior to the start of the pandemic.[7] ADP reported a net loss of $1.5 billion in fiscal year 2020 compared with a net profit of $735 million the previous year. In early 2021, ADP announced that it does not expect traffic levels at its Paris airports (Charles de Gaulle and Orly) to return to pre-pandemic levels until 2024-27. For its entire group of airports worldwide, it forecast 2021 traffic to be between 45% and 55% of 2019 levels. Previous government plans to sell most or all of its remaining stake in ADP have gone unmentioned during 2020.

Fraport announced early in 2021 that it has stretched out the schedule to complete its under-construction Terminal 3 to 2026, rather than several years earlier. Less revenue combined with construction delays mean that the main terminal building and two piers should open in 2025 (rather than originally scheduled 2021) and the remainder by 2026 (rather than 2023). Board Chairman Stefan Schulte said that, despite the huge drop in passengers and revenue in 2020, "our long-term growth prospects remain intact."[8]

Vinci Airports earned record revenue of $2.95 billion in 2019. Despite large declines in revenue from its 52 airports during 2020, the company made news announcing new initiatives. The first of these is an exploration of variable charges to aircraft based on their CO_2 emissions. The company designated Lyon–Saint-Exupéry Airport as its testbed for such environmental innovations, including possible hydrogen fueling.[9] Later in the year, Vinci Airports launched operational testing of a full facial recognition service to speed passengers through an airport, again using the Lyon airport as the testbed.[10]

6 Victoria Moores, "London Heathrow Wins Third Runway Appeal," *Aviation Daily*, 18 December 2020.

7 Fernando Moncada Rivera, "ADP Buys Significant Minority Stake in GMR Airports," Inspiratia, 25 February 2020.

8 Alan Dron, "Fraport Pushes Frankfurt Terminal 3 Readiness to 2026," *Aviation Daily*, 23 March 2021.

9 Thierry Dubois, "Global Airport Operator Mulls CO2-Based Fees for Airlines," *Aviation Daily*, 22 January 2020.

10 Thierry Dubois, "Vinci Airports Launches Full Facial Recognition Service," *Aviation Daily*, 9 October 2020.

London City Airport, which had remained closed during much of 2020, took advantage of the downtime to complete major portions of its master plan, including adding a full-length taxiway, eight new aircraft stands, and new passenger facilities, as well as continued development of its remote tower (which frees up additional real estate at the land-limited airport). The company projects that it will handle 11 million annual passengers by mid-to-late 2030s, more than double its 2019 count of 4.1 million.[11]

In other developments, infrastructure investment fund F2i bought a majority stake in the Olbia Costa Smeralda Airport in Sardinia, along with partner Alisarda Group. The remaining 20% of the airport remains owned by pre-existing shareholders, including the regional authority of Sardinia and the chambers of commerce of two Sardinian cities.[12] And Canada's giant infrastructure investor, Brookfield, quietly acquired a 0.16% stake in Sydney Airport in mid-2020, prior to the airport raising $1.45 billion in new equity in August.[13]

2.3 GLOBAL AIRPORT PRIVATIZATIONS AND P3 CONCESSIONS

Due to the near-collapse in airline traffic, airport privatization and P3s were far less common in 2020 than in 2019.

2.3.1 EUROPE

Bulgaria's first airport privatization, which was agreed to in July 2019, finally went into operation in early 2021. The Meridiam, Strabag, and Munich Airport consortium signed the concession agreement for the Sofia airport in July 2020, but only began operating it under the 35-year concession in April 2021. The team will construct a new Terminal 3 within the first decade of the concession.[14]

The government of **Greece** announced in 2018 that it would sell its remaining 30% stake in Athens International Airport, after renegotiating and extending the concession with the airport's original developer. Early in 2020, the Hellenic Republic Asset Development Fund announced nine shortlisted candidates, including major players ADP, Ferrovial, Macquarie,

11 Victoria Moores, "London City Airport Traffic to Double in the 2030s," *Aviation Daily*, 15 December 2020.

12 Fernando Moncada Rivers, "F2i Scoops Up Regional Italian Airport," *Inspiratia*, 27 October, 2020.

13 Kate Burgess, "Brookfield Takes Stake in Sydney Airport," *Inframation News*, 12 November 2020.

14 Fernando Moncada Rivera, "Meridiam Consortium Takes Over Sofia Airport," *Inspiratia*, 21 April 2021.

Global Infrastructure Partners, and Vinci Airports.[15] Prior to the pandemic, analysts had expected the stake would be valued based on an EBITDA multiple of 15 to 20 times. But with the pandemic suppressing demand for air travel, the government appears to be waiting for an air travel recovery before proceeding further.

Slovenia issued a request for expressions of interest (EOI) for a concession of the Maribor Edvard Rusjan Airport (MERA) in early 2020. The initial schedule called for the concession to be awarded and in place by the end of the year, so that the local consulting firm managing the airport, DRI, could step down.[16] No further news has been forthcoming during the pandemic.

In the **U.K.**, privately owned London Gatwick Airport received approval from the Civil Aviation Authority to begin using its northern (second) runway for landings and takeoffs. Historically, use of that runway had only been allowed in emergencies or when the southern runway was out of service, due to inadequate spacing between the two. Vinci Airports, Gatwick's majority owner, will continue to seek planning permission to put the runway into routine use.[17] In other U.K. news, the Department for Transport has approved Manston Airport's plans to reopen the airport as a cargo hub. The airport has been closed since 2014 but was acquired by RiverOak Strategic Partners with a plan to provide air cargo capacity to supplement that of the main London Airports.[18]

2.3.2 LATIN AMERICA

Bolivia, changing from a socialist government that nationalized the country's previously privatized airports, has moved back to privatization. In March 2019 it issued a request for expressions of interest to upgrade Viru Viru International Airport in Santa Cruz. The project will cost approximately $280 million. From a shortlist of three bidders, the government selected ADP to negotiate the 30-year concession.[19]

15 Fernando Moncada Rivera, "Shortlist for Athens Airport Sale," *Inspiratia*, 3 February 2020.

16 Fernando Moncada Rivera, "EOI for Slovenia Airport," *Inspiratia*, 25 February 2020.

17 Zak Bently, "Gatwick to Continue with Second Runway Plans as it Clears CAA Hurdle," *Infrastructure Investor*, 6 May 2020,

18 Tony Osborne, "UK Government Green Lights Manston Freight Airport Plans," *Aviation Daily*, 13 July 2020.

19 Tony Baini, "Bolivia Picks Groupe ADP for Airport Concession," *Latin Finance,* 2 October 2019.

Brazil continued an aggressive program of P3 concessions in airports, toll roads, and other infrastructure. Following concessions for three groups of mid-size airports in 2019, which yielded $630 million in up-front fees, the government offered 22 more airports in three regional groups in early 2021. In a sign of continuing interest from airport companies and investors, the government raised another $600 million in up-front payments. Brazilian infrastructure company CCR won two of the three sets of airports (15 airports, including Curitiba) while Vinci Airports won the third group of seven airports.[20] The win increased Vinci's airport portfolio to 52. The company stressed that it will expand the cargo capacity of Manaus airport, the country's third-largest cargo airport.[21]

Chile continued its long record of P3 infrastructure with two new projects in 2020. In May, the Ministry of Public Works reached financial close on a 15-year concession for the Chacalluta airport in Arica. The winning team of Agunsa and Sacyr have committed to doubling the size of the passenger terminal, upgrading its capacity to 1.1 million passengers per year.[22] In 2019, Sacyr sold a 49% interest in seven Chilean concessions, in part to enable investments in new projects such as Chacalluta.[23] Given Chile's long use of P3s for infrastructure, its other recent activity was offering a third concession for another small airport, La Florida de la Serena Airport. The new concession is for 21 years and calls for tripling the capacity of the terminal to handle 1.3 million annual passengers. The Public Works Ministry in this case received only one proposal, from Chilean company Cointer and U.S. financier BlackRock.[24]

Peru was an early airport privatization pioneer. Lima Airport Partners (LAP), a Fraport-led consortium that in 2001 was awarded a 30-year concession to modernize the Jorge Chavez International Airport in Lima, negotiated a 10-year extension in 2017. Based on that, in 2018 it committed to a $1.5 billion plan to expand the airport to cope with continued growth to an expected 35 million annual passengers. The project includes expanding a terminal and adding a second runway. In February 2019, LAP hired Morgan Stanley to sell the stakes held by minority partners in the consortium, and in May Fraport increased its

20 Aluisio Alves, "Brazil Raises $600 Million in Privatization Auction of 22 Airports," *Reuters*, 7 April 2021.

21 Helen Massy-Beresford, "Vinci Wins Concession to Run Seven Brazilian Airports, *Aviation Daily*, 14 April 2021.

22 Inframation Deals, Chacalluta Arica Airport (Second Tender), *Inframation News.com/Deals* (21 May 2020).

23 Fernando Moncada Rivera, "Sacyr Sells Stake in Seven Chilean Concessions," *Inspiratia*, 9 April 2019.

24 Fernando Moncada Rivera, "BlackRock Team Only Bidder for Chile Airport," *Inspiratia*, 1 February 2021.

share to from 70% to 80.01%.[25] In 2020, with airport revenues severely depressed by the pandemic, LAP obtained a $450 million financing package from a group of international lenders, including BBVA and the Bank of Nova Scotia.[26]

2.3.3 ASIA AND PACIFIC

Australia's Sydney Airport appears to be attracting investor interest for its post-pandemic prospects. The investor-owned company raised A$2 billion in equity in summer 2020 and has retained its BBB+ credit rating, according to an article in *Inframation News*.[27] The article also suggested some degree of shareholder dissatisfaction if the airport declines to pay dividends (when it is operating at a loss!). It noted in passing that the largest shareholder is pension fund UniSuper (with 15.3%) and also highlighted the tiny purchase of shares by Brookfield in 2020. The article went on to compare Sydney's valuation (trading at 22-23X EBITDA) compared with major European airports such as Aeroports de Paris (13-14X) and Flughafen Zürich (11X). The article also noted some legal obstacles to investing in airports in Australia's state capital cities (such as Melbourne and Sydney): a foreign ownership maximum of 49% and a limitation on the same investor holding major stakes in more than one capital city airport.

India continued its ongoing airport privatization program in 2020, despite the pandemic. In April, it awarded GMR Airports a 40-year concession to develop and operate a new airport in Bhogapuram to replace civilian air services now being provided at Vishakapatnam Naval Airfield. The new airport's initial capacity will be six million annual passengers, compared with the 2.75 million being handled at the Naval Airfield.[28] In a second development, Adani Enterprises announced a deal under which it is acquiring the debt of GVK, which held 50.5% of the equity in Mumbai International Airport (MIAL). Adani also aims to acquire the 23.5% stake in MIAL held by Airports Company of South Africa and Bidvest. The deal also includes MIAL's 74% equity stake in Mumbai's second airport, currently under development.[29] Also in India, Flughafen Zürich signed a 40-year concession to finance,

25 Fernando Moncada Rivera, "Fraport Ups Stake in Lima Airport." *Inspiratia.* 29 May 2019.

26 Fernando Moncada Rivera, "Lima Airport Borrows $450M for Upgrades," *Inspiratia*, 15 September 2020.

27 Kate Burgess, "Case Study: Is Sydney Airport on the Radar for Global Investors?" *Inframation News*, 21 March 2021.

28 Fernando Moncada Rivera, "GMR Gets Award Letter for Airport Concession," *Inspiratia*, 16 April 2020.

29 Adrian Schofield, "Adani Set to Take Control of Mumbai Airports," *Aviation Daily*, 3 September 2020.

develop, and operate the planned second airport for Delhi—the Delhi Noida International Airport. The new airport's planned capacity is 12 million passengers, with construction planned to begin in 2021.[30]

Japan's planned privatization of the Hiroshima Airport has been delayed to sometime in 2021 due to the pandemic. Two teams were shortlisted in October 2019, but a winner has not been announced. The 30-year concession was originally intended to lead to the winning company taking over in July 2020, but the constraints of the pandemic have caused continuing delays. The last available projection started the concession in mid-July 2021.[31]

The **Philippines** announced two major airport privatization projects in 2019, both related to increased airport capacity for Manila, with one resulting in a successful P3 agreement. San Miguel Corporation (SMC) was awarded a 50-year concession for the new Bulacan Airport, with an eventual four runways and capacity for 100 million annual passengers, at an estimated cost of $14 billion.[32] In 2020, San Miguel announced several projects for supporting infrastructure, including an eight km airport toll road linked to the existing North Luzon Expressway, the Metro Rail Transit Line 7 from Quezon City to Bulacan, and several other projects.[33] The other new airport project for Manila—to be located on government land at Sangley Point on the southern shore of Manila Bay—was also announced as a long-term P3 concession. The winning bidder, China Communications Construction Co. (CCCC), was rejected in early 2021 on grounds that its documentation was "deficient in three or four items" and apparently was not fully committed to the $10 billion project.[34]

2.3.4 MIDDLE EAST AND AFRICA

Turkey's $11 billion New Istanbul Airport, procured as a 25-year P3 concession, opened to traffic in April 2019 and celebrated its first anniversary as the pandemic began to hit. Its

30 Kurt Hofmann, "Zurich Airport Signs On to Build Airport Near Delhi," *Aviation Daily*, 12 October 2020.

31 Ji Hyun Kim, "Covid-19 Grounds Hiroshima Airport Privatisation Till July 2021, *Infrastructure Investor*, 5 May 2020.

32 Rose Carr, "San Miguel to Build US$14bn Airport," *Inspiratia,* 2 August 2019.

33 Miguel R. Camus, "SMC Unveils New Toll Road, Railway Proposals for P740-B Airport City," *Philippine Daily Inquirer*, 16 November 2020.

34 Chen Chuanren, "Philippine Province Scraps $10B China-Backed Airport Project," *Aviation Daily*, 1 February 2021.

initial phase includes two runways and a terminal with capacity for 90 million annual passengers. The master plan calls for it to have six runways and capacity for 150-200 million passengers. The reduced air traffic may have helped airport company Istanbul Grand Airport (IGR) with ongoing planning to streamline both aircraft ground traffic and arriving and departing air traffic in the normally congested Istanbul airspace, with two other significant airports nearby.[35]

The only 2020 airport privatization in Africa took place in **Guinea** in February 2020. ADP and Africa50 signed a 25-year concession agreement to expand Gbessia Conakry International Airport. The government will own one-third of the concession company, with ADP and Africa50 each owning another third. The project includes construction of a new terminal with the capacity to handle a million annual passengers, double the airport's current capacity.[36]

2.4 U.S. AIRPORT PRIVATIZATION AND PUBLIC-PRIVATE PARTNERSHIPS

European-type sale of government-owned airports is not legal in the United States (except for general aviation airports that serve private planes). The original 1996 federal Airport Privatization Pilot Program permitted a limited number of long-term P3 leases of commercial airports. Under that law, only two airports were leased. Stewart International Airport, located 60 miles north of New York City, was leased in 2000 to a U.K. company that failed to make that airport financially viable; Stewart was subsequently acquired by the Port Authority of New York and New Jersey. The P3 lease of San Juan International Airport in 2013, however, was a success, leading to large-scale refurbishment and increased airline satisfaction.[37]

As recommended in the White House's 2018 infrastructure proposals, Congress replaced the Pilot Program with a new Airport Investment Partnership Program (AIPP), as part of the FAA reauthorization bill enacted in October 2018. Rather than the Pilot Program's limitation to 10 airports, all commercial airports can now engage in long-term P3 leases. In addition, the AIPP provides for planning grants of up to $750,000 for any jurisdiction that wants to use

35 Thierry Dubois, "A Giant in the Making," *Aviation Week*, 1-14 June 2020.

36 Ott Tammik, "Concession Signed for Guinea Airport," *Inspiratia*, 20 February 2020.

37 John Tierney, "Making New York's Airports Great Again," *City Journal*, Winter 2017.

the program to lease its airport. But the original pilot program's provision giving a super-majority veto to the airlines at any airport that applies remains in the revised legislation.

2.4.1 WHOLE-AIRPORT PRIVATIZATION AND P3 LEASES

St. Louis Lambert Field P3 Lease: Although the prospect of a P3 lease of the St. Louis airport generated extensive interest from global airport companies, infrastructure investment funds, and public pension funds in 2019, the city's mayor abruptly terminated the process in December of that year. The process had gone as far as detailed presentations from 10 pre-qualified teams and a pro-forma agreement with the airlines serving the airport. Based on local reporting, the termination reflected political opposition from government and business leaders in the surrounding counties, who had been pushing for creating a regional airport authority (essentially, wresting control of the airport from the city government).[38] Supporters of the airport lease subsequently gathered signatures to put a measure on the November 2020 ballot requiring the city to proceed with the lease process, hoping to share in the estimated $1 billion in up-front proceeds. But that effort failed to gain enough signatures in the COVID-19 environment, and proponents Carpenters Union and St. Louis NAACP ended the effort in September.[39]

A whole-airport P3 lease was considered for the Charlotte County, Florida's **Punta Gorda Airport** in autumn 2020. Based on presentations outlining the success of San Juan, Puerto Rico airport's P3 lease by Partners Group and a former official of Aerostar Airport Holdings, the County Airport Authority passed a resolution in favor of considering an application to the FAA's Airport Investment Partnership Program (AIPP).[40] That resolution was withdrawn a week later as premature, at which point the Airport Authority authorized its consultant, Vasey Aviation Group, to continue exploring a long-term lease of the airport. But AIPP requires super-majority approval of airlines using the airport in question, and Punta Gorda's sole airline, Allegiant, sent a letter to the board in December stating its opposition. That ended the AIPP effort.[41]

38 Robert Poole, "St. Louis Mayor Cancels Lambert Airport P3 Lease," *Aviation Policy News*. January 2020.

39 Mark Schlinkmann, "Lambert Privatization Plan Yanked from Nov. 3 St. Louis Ballot," *St. Louis Post-Dispatch*, 3 September 2020.

40 Eugene Gilligan, "Florida County Considers Airport P3," *Inframation News*, 8 October 2020.

41 Eugene Gilligan, "Florida County Ends Consideration of Airport P3," *Inframation News*, 28 January 2021.

Tweed New Haven Airport: Since early 2021, this Connecticut airport has been negotiating a long-term P3 contract with its airport management company, AvPORTS. The project would finance lengthening its main runway to accommodate start-up airline Avelo's larger 737 aircraft, and upgrade the terminal. It would also have the option to finance, build, and operate a replacement terminal. If this deal goes through, it would be the first time that an airport's contract manager became its financial partner, presuming that it receives federal approval under AIPP.[42]

Airglades, Florida Airport Privatization: The general aviation airport in Hendry County, Florida holds a slot in the original FAA Pilot Program. With the full support of the County Commission, Airglades International Airport (AIA) LLC has spent years developing a plan to expand the airport into a cargo reliever airport for land-constrained Miami International Airport, 100 miles to the south. AIA built a coalition of agricultural interests, air cargo interests, aviation suppliers, and local organizations in support of its plan to buy and operate the airport in its greatly expanded form. In August 2019, the FAA gave its final approval of the privatization plan, and AIA announced commitments from importers of perishable commodities from Latin America. Following the FAA approval, it also announced the selection of AvPORTS as the new airport manager and that Star America Infrastructure Partners would be investing equity in the project.

2.4.2 WHY THE U.S. LAGS BEHIND

There is continued speculation about why the United States is such an outlier compared with most of the rest of the world on airport privatization and long-term P3s. The Congressional Research Service released a new report on the subject in early 2021. After comparing the global trend with the very limited use of the recent and current federal program, CRS analysts suggested that unequal tax-exempt treatment of municipal revenue bonds for existing airports versus the taxable treatment of revenue bonds for private partners could be a causal factor.[43]

[42] Sean Broderick, "Avelo, Tweed New Haven Airport Team Up on Expansion Plans," *Aviation Daily*, 7 May 2021.

[43] Congressional Research Service, "Airport Privatization: Issues and Options for Congress," Report R43545, 11 March 2021.

A more optimistic outlook is offered in a report from PJ Solomon investment advisors. Their report suggests that U.S. airport managers are unable to operate efficiently "due to inefficient procurement policies, lack of flexibility in credit raising, and the bureaucracies that often come from a system with a large and not-always-directly-aligned set of stakeholders."[44] They suggest that the interests of risk-averse muni bond holders generally prevail over those of airlines, who will be at risk for ensuring airports' financial viability. Hence, they suggest that it is in the airlines' interest to support private capital investment in and management of airports via mechanisms such as AIPP. This is in addition to this program being "the only mechanism for an airport sponsor to realize substantial financial benefits that may be used outside the airport environment."

In 2020, *The Atlantic*, a major U.S. think magazine, published an article by journalist Joe Guinto summarizing the global trend of airport privatization and P3 leasing and suggesting that hard-pressed U.S. airports' governmental owners consider cashing out the asset value of their airports.[45] Guinto had published a cover story in *D Magazine* in 2019 making a case for privatizing the Dallas/Ft. Worth International Airport (DFW).[46] Both articles cited extensive investor interest in acquiring U.S. airports.

In a sign of continued investor interest in whole-airport P3 leases, Oaktree Capital Management (which played a key role in the San Juan airport P3) has formed an alliance with global airport company Royal Schiphol Group to focus on investment prospects under the federal AIPP framework. They will also seek opportunities for P3s to develop and operate specific facilities at U.S. airports.[47]

44 Tim Bath and Shawn Kinder, "Unlocking Value in the Airport-Airline Ecosystem," PJ Solomon, January 2021.

45 Joseph Guinto, "Privatizing Airports Is a No-Brainer," *The Atlantic*, August 2020.

46 Joseph Guinto, "Why We Should Sell DFW Airport, *D Magazine*, March 2019.

47 Eugene Gilligan, "Oaktree and Dutch Airport Operator Seek US Opportunities," *Inframation News*, 11 November 2020.

2.4.3 P3S FOR INDIVIDUAL AIRPORT PROJECTS

> *If there is an ongoing revenue stream generated by the project itself, the airport owner can base the P3 financing, in whole or in part, on that revenue stream, generally with the P3 company at risk if the revenue comes in below forecast.*

While whole-airport P3 leases have still not become a U.S. phenomenon, recent years continue to see projects that use long-term design-build-finance-operate-maintain (DBFOM) agreements to add large, costly facilities to airports. Among these are new or expanded terminals, parking facilities, consolidated rental car centers, and in one case, an automated people mover. These projects are financed in one of two ways. If there is an ongoing revenue stream generated by the project itself, the airport owner can base the P3 financing, in whole or in part, on that revenue stream, generally with the P3 company at risk if the revenue comes in below forecast. If there is not such a revenue stream (as in the case of the LAX automated people mover), then the project can be financed by a guaranteed stream of payments from the owner to the P3 entity over the life of the agreement. This kind of DBFOM is typically called an "availability-payment" structure, since the payments are generally somewhat variable based on the facility's up-time.

New Terminals

Long-term P3s for new airport terminals have a several-decade U.S. history. Among the earliest are the passenger terminals at Orlando Sanford Airport and Terminal 4 at Kennedy International in New York. More-recent projects include renovating the south terminal at Austin Bergstrom into a no-frills terminal for ultra-low-cost carriers and replacing the outdated central terminal at New York's LaGuardia Airport, which is nearing completion.[48] These projects are generally financed based on revenues generated by the terminal, so they are considered revenue-risk DBFOM P3s.

[48] Aileen Cho, "Final Destination In Sight for $8B LaGuardia Modernization," *Engineering News-Record*, 26 October, 2020.

Under way currently are major new terminals at both Newark Liberty and Kennedy International. One of the several projects at JFK—Terminal One—is a $7.4 billion DBFOM P3. The equity investors are Carlyle, Ullico, and JLC Infrastructures, working with airline partners Terminal One Group Association (Air France, Japan Airlines, Korean Air, and Lufthansa). The pandemic's greatly reduced airline revenues led to delays in financing this project, and its lead design-build contractor (AECOM) withdrew from the project, leading to an RFQ being released by the project team in January 2021.[49] The new $2.7 billion Terminal One at Newark is being procured conventionally by the Port Authority, but it will be operated and maintained by a subsidiary of Munich Airport International, which has also advised on the terminal's design.

Another terminal revamp, the planned $1.8 billion DBFOM under which Ferrovial Airport was to redesign and expand the landside Great Hall terminal at Denver International Airport, was terminated for convenience in August 2019. Lengthy negotiations between the parties reached a settlement in March 2020, under which the city (owner of DEN) agreed to pay Ferrovial $183.6 million.[50] In November, the airport released scaled-back plans to finish the renovation without adding a new TSA screening checkpoint.[51]

On a much smaller scale was the development of a first-ever airline terminal at Paine Field in the northern suburbs of Seattle. Propeller Airports entered into a long-term P3 agreement with airport owner Snohomish County. After winning FAA approval, construction began in 2018, with airline service by Alaska and United starting early in 2019. Unfortunately, the 2020 collapse in air traffic due to the pandemic led to serious decreases in revenue. In May, Propeller decided to shut the terminal down, so it could expeditiously resurface the ramp area without any aircraft getting in the way. After a 10-week hiatus, it re-opened in August.[52] Despite its difficult 2020, the airport's new service and new terminal has won a strong fan base. For the second year in a row, it was voted one of America's 10 best small airports in a *USA Today* readers' poll.

49 Jon Berke, "JFK Terminal One Sponsors Launch RFQ for Lead DB Contractor," *Inframation News*, 22 January 2021.

50 Olivia McFadden," Denver Airport Finalizes Contract Termination with SPV," *Inframation News*, 23 March 2020.

51 Jon Murray, "Denver Airport Unveils Scaled-Down Plans to Finish Great Hall Terminal Renovation," *The Denver Post*, 24 November 2020.

52 Geoff Baker, "Paine Field Set to Reopen Saturday," *Seattle Times*, 1 August 2020.

Consolidated Rental Car Facilities

> *Two major airports are developing consolidated car rental centers under long-term DBFOM P3 agreements.*

Two major airports are developing consolidated car rental centers under long-term DBFOM P3 agreements. At Los Angeles International, the $2 billion facility is being developed by Fengate Asset Management and PCL Investments and financed based on LAX's commitment to 28 years of availability payments. Across the country in Newark, the new consolidated car rental center itself has a revenue source in the form of a $7/day rental car customer facility charge to finance the project. Hence, it is a revenue-risk P3, and its financing is not an obligation of the airport. This project, developed by Fengate, Conrac Solutions Capital, and Related Fund Management, is also under way and was featured in a detailed article in *Airport Business* magazine.[53]

Cargo Facilities

Two airports announced plans to develop new cargo facilities under a P3 model during 2020. The Atlanta Department of Aviation released a Request for Information (RFI) for a Modern Air Cargo Terminal facility at Hartsfield-Jackson International Airport in June. After receiving significant response, it issued an RFP on January 7, 2021 for a DBFOM project for the new facility. Six teams had responded to the RFI, including AFCO and Balfour Beatty.[54] AFCO had recently been selected to develop cargo facilities at Laredo International Airport.

The Anchorage, Alaska International Airport received an unsolicited proposal to develop and operate a $500 million cargo facility. IC Alaska Airport has proposed a 55-year deal

[53] Joe Petrie, "Port Authority Embraces P3 Development for Newark's New ConRAC Facility," *Airport Business*, August-September 2020.

[54] Eugene Gilligan, "Atlanta Airport Issues RFP for Cargo Facility P3," *Inframation News*, 13 January 2021.

under which it would build a 360,000 sq. ft. cargo facility with 14 aircraft hardstands, paying $0.18/sq. ft. per year over the 55-year period.[55]

Other Airport P3 Facilities

San Diego International Airport is seeking a P3 developer/operator for an airport lounge, open on a fee basis to all airline passengers, unlike airline-membership lounges. The Airport Authority issued an RFP in early 2021. The project would use approximately 18,000 sq. ft. in Terminal 2 West, and the Authority has a number of specific requirements for the facility.[56]

The Phoenix-Mesa Gateway Airport in Mesa, Arizona unveiled plans in January 2021 for a long-term P3 to develop a 400-acre retail and entertainment development on the airport's vacant east side, including a new terminal, once traffic grows enough to support a larger facility. The Gateway East project will be accessible from the new SR 24 freeway, currently being built.[57]

The San Bernardino County Transportation Authority seeks to connect its Rancho Cucamonga Metro Rail station with Ontario International Airport, located in the Inland Empire region east of Los Angeles. The only responder to the agency's RFQ was Elon Musk's Boring Company, which submitted a proposal for a 6.4 km tunnel, estimated to cost $83 million.[58] HNTB is advising the agency on the project.

In Toronto, Ports Toronto is seeking an investor for its downtown Billy Bishop Airport. It has issued an RFI to interested parties, looking for a financial partner that would operate the airport under lease and ensure the airport's long-term viability. Billy Bishop is served by Air Canada and Porter Airlines. Both have suspended service for most of the pandemic.[59]

55 Andrew Vitelli, "Private Firm Proposes Cargo Facilities at Alaska Airport," *Inframation News*, 21 November 2020.

56 Olivia McFadden, "San Diego Seeks Proposals for Airport Lounge P3," *Inframation News*, 25 March 2021.

57 Robert Poole, "Major Project Planned at Phoenix-Mesa Gateway Airport," *Aviation Policy News*, February 2021.

58 Jon Berke, "Additional Details Disclosed on Boring Co.'s Proposed Airport Project," *Inframation News*, 8 February 2021.

59 Jon Berke, "Billy Bishop Operator Seeks Financial Partners," *Inframation News*, 31 March 2021.

Contract Management

Separate from whole-airport P3 leases is contracting out airport operations and management. This approach has been used for decades, with FAA's blessing, most often for general-aviation airports but also for small to medium-size air carrier airports such as Albany, New York and Burbank, California. Several new developments in airport contract management occurred in 2020.

The Gary/Chicago Airport, located in Gary, Indiana, received its first commercial air carrier service when UPS opened a base at the airport.[60] UPS began Next Day Air Service at the airport on Nov. 2, 2020. Its agreement with the airport, which is managed by AvPORTS, includes office space in the airport's passenger terminal, 150,000 sq. ft. of ramp space, plus hangar space for support equipment. The airport continues to seek passenger air service for those wanting a more convenient alternative to Chicago's Midway and O'Hare airports.

Starting January 1, 2020, the aforementioned Stewart International Airport in New York State turned over operations and management to private firm Future Stewart Partners under a 10-year contract with airport owner Port Authority of New York and New Jersey. FSP is a joint venture of AvPORTS and Groupe ADP. The latter company sees this contract as an opportunity to showcase its expertise in transforming customers' airport experience in the United States.[61]

Puerto Rico's Public-Private Partnership Authority announced in early 2021 that it plans to seek a contract operator or operators for its nine regional airports.[62]

60 Gary/Chicago International Airport, "Highly Anticipated UPS Operations Begin at Gary/Chicago International Airport," 3 November 2020.

61 "FSP Takes on NY Stewart Contract," *International Airport Review*, February/March 2000.

62 "Puerto Rico P3 Authority Searches for Airport Operator," *Inframation News*, 11 February 2021.

PART 3

AIR TRAFFIC CONTROL

3.1 AIR NAVIGATION SERVICE PROVIDERS (ANSPS)

Historically, most of the world's governments provided air traffic control (ATC) services as part of the transport ministry, whose aviation division served as both the aviation safety regulator and the operator of the ATC system. That remains the organizational form in the United States, with the FAA providing both of those functions as part of the U.S. Department of Transportation (DOT).

Globally, that model has undergone major change since 1987, when the reformist government of New Zealand removed its ATC system from the transport ministry by "corporatizing" it as Airways New Zealand, a self-supporting government corporation. Within 10 years, more than a dozen other countries had done likewise, and the fledgling industry created a trade association, the Civil Air Navigation Services Organization (CANSO) as its counterpart to the global organizations representing airlines (IATA) and airports (ACI). CANSO introduced a new term to describe these providers: air navigation service provider (ANSP), which has become standard terminology worldwide.

> *The revenue source for ANSPs is globally accepted ATC user fees, based on the charging principles promulgated by the International Civil Aviation Organization (ICAO), a UN agency.*

The revenue source for ANSPs is globally accepted ATC user fees, based on the charging principles promulgated by the International Civil Aviation Organization (ICAO), a UN agency. Prior to ATC corporatization, those revenues were nearly always paid by airlines and other airspace users to the respective national governments. In most cases, once an ANSP has been corporatized, the user-fee revenue flows directly to the ANSP as its primary source of revenue. This makes it possible for the corporatized ANSPs to issue revenue bonds based on their projected revenue streams, just as airports and toll roads do.[63]

Table 4 lists all ANSP members of CANSO, separated into organizational categories. The first four are the ones outside of government. Nav Canada is a nonprofit private corporation to which the Canadian government has delegated all ATC responsibilities for both domestic and oceanic airspace. ENAV is the partly-privatized ANSP of Italy, with 49% of its shares traded on stock markets. Serco is an investor-owned U.K. company that provides ATC services to governments on a contractual basis. And NATS is the partly-privatized ANSP of the U.K., with 42% of its shares owned by airlines and pension funds, 4% by Heathrow Airport, and 5% owned by employees—with the balance of 49% owned by the government.

TABLE 4: AIR NAVIGATION SERVICE PROVIDERS, BY TYPE OF ORGANIZATION

Country	ANSP	Organization Type	Notes
Canada	Nav Canada	Nonprofit corporation	
Italy	ENAV	Part investor-owned	
UK	NATS	Part investor-owned	
UK	Serco	Shareholder-owned	
Albania	ALBCONTROL	State-owned company	
Argentina	DGCTA	State-owned company	
Armenia	ARMATS	State-owned company	
Australia	Airservices Australia	State-owned company	

[63] Robert Poole, "Air Traffic Control as a Quasi-Private Corporation," Robert Clark and Simon Hakim (eds.), *Public-Private Partnerships*, Springer, 2019.

Country	ANSP	Organization Type	Notes
Austria	Austro Control	State-owned company	Also regulates
Belgium	Belgocontrol	State-owned company	
Botswana	CAAB	State-owned company	
Bulgaria	BULATSA	State-owned company	
Cambodia	CATS	State-owned company	
Croatia	Croatia Control	State-owned company	
Curaçao	DCANSP	State-owned company	
Czech Republic	ANS CR	State-owned company	
Denmark	Naviair	State-owned company	
Egypt	NANSC	State-owned company	
Estonia	EANS	State-owned company	
Fiji	Airports Fiji Ltd.	State-owned company	
Finland	Finavia Corp.	State-owned company	
Georgia	Sakaeronavigatsia	State-owned company	
Germany	DFS	State-owned company	
Hungary	HungaroControl	State-owned company	Also regulates
Iceland	ISAVIA	State-owned company	
India	Airports Authority of India	State-owned company	
Indonesia	AirNav Indonesia	State-owned company	
Iran	Iran Airports Company	State-owned company	
Ireland	IAA	State-owned company	Also regulates
Israel	Israel Airports Authority	State-owned company	
Kazakhstan	Kazaeronavigtsia	State-owned company	
Latvia	LGS	State-owned company	
Lithuania	Oro Navigacija	State-owned company	
Macedonia	M-NAV	State-owned company	
Maldives	Maldives Airports Co.	State-owned company	
Malta	MATS	State-owned company	
Moldova	MoldATSA	State-owned company	
Mozambique	Aeroportos de Mocambique	State-owned company	
New Zealand	Airways New Zealand	State-owned company	
Nigeria	NAMA	State-owned company	
Norway	Avinor	State-owned company	
Papua New Guinea	PNG Air Service	State-owned company	
Portugal	Nav Portugal	State-owned company	
Romania	ROMATSA	State-owned company	
Russia	State ATM Corporation	State-owned company	Also regulates
Serbia & Montenegro	SMATSA	State-owned company	
Slovak Republic	LPS SR	State-owned company	
Slovenia	Sovenia Control	State-owned company	
South Africa	ATNS	State-owned company	
Spain	ENAIRE	State-owned company	
Sri Lanka	AASL	State-owned company	
Sweden	LFV	State-owned company	
Switzerland	Skyguide	State-owned company	
Thailand	AEROTHAI	State-owned company	
Turkey	DHMI	State-owned company	
Uganda	CAA Uganda	State-owned company	
Ukraine	UkSATS	State-owned company	

Country	ANSP	Organization Type	Notes
Vietnam	VATMC	State-owned company	
Zambia	NACL	State-owned company	
Bangladesh	CAAB	Civil aviation authority	Financially autonomous
Cyprus	DCA Cyprus	Civil aviation authority	
Dominican Republic	IDAC	Civil aviation authority	
Ghana	Ghana CAA	Civil aviation authority	
Greece	HCAA	Civil aviation authority	
Japan	JCAB	Civil aviation authority	
Jordan	CARC	Civil aviation authority	Financially autonomous
Kenya	Kenya CAA	Civil aviation authority	
Kingdom Saudi Arabia	GACA	Civil aviation authority	
Mongolia	CAA of Mongolia	Civil aviation authority	
Myanmar	DCA Myanmar	Civil aviation authority	
Nepal	CAA Nepal	Civil aviation authority	
Swaziland	SWACAA	Civil aviation authority	
Singapore	CAAS	Civil aviation authority	
Taipei FIR	ANWS	Civil aviation authority	
Tanzania	TCAA	Civil aviation authority	
Trinidad & Tobago	Trinidad & Tobago CAA	Civil aviation authority	
Tunisia	OACA	Civil aviation authority	
United States	FAA	Civil aviation authority	
Azerbaijan	AZANS	Government department	
Brazil	DECEA	Government department	
France	DSNA	Government department	Financially autonomous
Mexico	SENEAM	Government department	
Netherlands	LCNL	Government department	
Poland	PANSA	Government department	
United States	DOD Policy Board, Aviation		
Belgium	MUAC	Intergovernmental	
Honduras	COCESNA	Intergovernmental	6 countries
Senegal	ASECNA	Intergovernmental	17 countries
Angola	ENANA-EP	uncategorized	
Haiti	OFNAC	uncategorized	
Luxembourg	LANA	uncategorized	
Sudan	Sudan ANS	uncategorized	
Dubai	DANS	uncategorized	

Source: Civil Air Navigation Services Organization (2015) plus author analysis

Next in the table are 55 ANSPs that are wholly-owned government corporations, such as Airservices Australia, Germany's DFS, and the pioneering Airways New Zealand. Four of these corporations also have aviation regulatory responsibilities, which conflicts with

ICAO's 2001 recommendation that calls for the organizational separation of ATC provision and aviation safety regulation.[64]

Next in the table are 20 of the old-style civil aviation authorities, usually part of the transport ministry and with aviation safety regulation in the same entity as provision of ATC services. These are nearly all developing countries such as Bangladesh, Kenya, Myanmar, and Swaziland. But also included are several developed countries that have not corporatized ATC, including Japan, Singapore, and the United States. Another seven are self-described as government departments, the largest of which are in Brazil and France. The last five in the table were listed by CANSO as "uncategorized."

Prior to those are three intergovernmental entities that operate as multi-jurisdictional ANSPs for specific airspaces. Maastricht Upper Airspace Control Center (MUAC) provides ATC services above 24,500 ft. for Belgium, Luxembourg, Netherlands, and northwestern Germany. COCESNA provides ATC services for the six countries of Central America. And ASECNA provides ATC services for 17 countries in Africa. All three charge ICAO-based user fees and operate as corporatized ANSPs.

Table 4 permits one to answer the question: How many ANSPs operate as corporations funded by user fees? The usual answer is 62, consisting of the non-governmental first four, the 55 government corporations, and the three intergovernmental ANSPs. In terms of *countries* served by such ANSPs, however, the total is higher; adding the six countries served by COCESNA and the 17 served by ASECNA brings the net total to 85.

3.2 GLOBAL SPACE-BASED ATC SURVEILLANCE

A basic function of an ATC system is *surveillance*—keeping track of where planes are in real time. Historically, air traffic control over most populated countries has, since World War 2, relied largely on radar, later supplemented by transponders that report altitude and other basic information in real time. But there is no radar in the oceans, in mountainous terrain (e.g., the Alps, the Himalayas, the Rockies), and in polar regions, all of which are traversed by aircraft, including airliners. Surveillance there has long been carried out by "procedural" methods, which means periodic reports from pilots to ATC of their estimated positions based on the plane's inertial navigation system. Since those updates are both imprecise and

[64] ICAO, *Safety Oversight Manual*, Doc. 9734, Part A, Paragraph 2.4.9. 2001

only periodic, ATC protocols require very large spacing between oceanic flight tracks and between planes flying the same flight track.

> *Historically, air traffic control over most populated countries has, since World War 2, relied largely on radar, later supplemented by transponders that report altitude and other basic information in real time. But there is no radar in the oceans, in mountainous terrain (e.g., the Alps, the Himalayas, the Rockies), and in polar regions, all of which are traversed by aircraft, including airliners.*

This began to change in 2019, when an investor-owned company—Aireon—started offering near-real-time global surveillance via satellite. The company contracted with satellite company Iridium to place its transponders on all 66 satellites in its new Iridium-Next constellation that was launched mostly in 2018. Since most ANSPs are now implementing ground-based surveillance using a system called ADS-B (Automatic Dependent Surveillance-Broadcast), business jets and airliners flying oceanic, mountainous, and polar routes are increasingly equipped with ADS-B transponders that broadcast the plane's identity, GPS position, speed, and other data every three seconds. The new satellites detect that signal and retransmit it to domestic ANSP control centers that subscribe to Aireon's services. The space-based information then shows up on controllers' screens, just as do ADS-B transmissions in domestic airspace.

Aireon's service, which went live in March 2019, can now offer radar-like surveillance to the 70% of the globe where this has been lacking. But this is only available to ANSPs that subscribe to the service. With the addition of the Port Moresby Flight Information Region of Pacific airspace in March 2021, Aireon reported that its system is in use over 248 million sq. km. of the earth's service, nearly 49% of the total.[65] Subscribers include the ANSPs of Canada, Denmark, the Dutch Caribbean, Hong Kong, Iceland, India, Ireland, Singapore, the

[65] Aireon, "NiuSky Pacific Begins Operational Usage of Aireon Data, news release, 20 March 2021.

U.K. and three multi-country providers: Eurocontrol's MUAC, the six COCESNA countries of Central America, and the 17 countries of ASECNA.

> *Aireon's service, which went live in March 2019, can now offer radar-like surveillance to the 70% of the globe where this has been lacking.*

Aireon is a joint venture of Iridium and five ANSPs: ENAV (Italy), IAA (Ireland), NATS (U.K.), Nav Canada, and Naviair (Denmark). The first to implement oceanic ADS-B service were Nav Canada and NATS across the North Atlantic. While that is technically a trial, ICAO agreed that the two ANSPs could reduce the lateral spacing (between tracks) and longitudinal spacing (nose to tail on a given track) for the trial period, with further reductions likely once performance has been measured and analyzed. Results during 2019 showed significant savings in time and fuel (and hence CO_2 emissions), as well as safety benefits from controllers able to quickly identify deviations from assigned tracks or assigned altitudes. Significantly reduced traffic levels during 2020 enabled NATS and Nav Canada to experiment with "free route airspace" rather than restricting traffic to the traditional Organized Track Structure. As of 2021, the OTS will be abandoned on days when traffic levels allow, which will let airlines select the best flight plan for each individual flight, thanks to space-based ADS-B surveillance.[66]

To the extent that Aireon has a competitor, it is Inmarsat, which operates a communications mechanism known as ADS-C. Among other communications services, it has long provided airlines with position reporting at 10- to 14-minute intervals, by contract (the C in ADS-C). Inmarsat has proposed an "enhanced" version that would transmit reports every 3.2 minutes (compared with every three *seconds* for space-based ADS-B).[67] Inmarsat was originally an international satellite communications agency, but its commercial services were privatized in 1999, and it was listed on the London Stock Exchange in 2005.

[66] Tony Osborne, "Use of Transatlantic OTS Being Scaled Back," *Aviation Daily*, 4 February 2021.

[67] GAO-19-532, "FAA's Analysis of Costs and Benefits Drove It Plans to Improve Surveillance in U.S. Oceanic Airspace," Government Accountability Office, July 2019.

In 2019 it was acquired by a joint venture of infrastructure investment funds: Apax Partners and Warburg Pincus plus two Canadian pension funds, CPPIB and OTPP.[68]

In 2019, FAA signed a research agreement with Aireon aimed initially at exploring the use of its ADS-B data in the Caribbean. This focused on using a modified version of the ERAM system at Miami Center to control traffic between Miami and San Juan, but FAA also modified the ATOP software used in its New York, Oakland, and Anchorage oceanic Centers for experimental use in their oceanic airspaces. In January 2020 *Aviation Daily* reported that FAA was developing a one-to-three-year roadmap to expand its use of space-based ADS. And on November 12, 2020, FAA and Aireon announced an agreement under which the agency will use the company's ADS-B data to analyze possible uses in managing both domestic and oceanic air services.[69] Observers expect FAA to formally subscribe to Aireon's services in the near future.

3.3 DIGITAL, REMOTE AIR TRAFFIC CONTROL TOWERS

> *Instead of a tall building with a staffed control cab on top, the center evaluated carrying out surveillance functions using cameras and other sensing devices at various airport locations, with the control cab and large display screens on the ground.*

In 2007 the FAA research center in Atlantic City, New Jersey conducted a demonstration project on a new kind of airport control tower. Instead of a tall building with a staffed control cab on top, the center evaluated carrying out surveillance functions using cameras and other sensing devices at various airport locations, with the control cab and large display screens on the ground. Besides saving the cost of constructing and maintaining the tall building, the demonstration showed that controllers would have increased visibility (especially at night and in rain or fog when infrared cameras provided better views) and

[68] "Inmarsat Acquired by Private Equity Consortium for $3.4bn." *Air Traffic Management*, 25 March 2019.

[69] Robert Poole, "FAA to Use Aireon Space-Based ADS-B Data," *Aviation Policy News*, November 2020.

decreased workload.[70] Despite these very positive results, no further FAA work on the subject has been reported, and no FAA program to implement remote towers materialized.

Drawing on these findings, technology companies and corporatized ANSPs overseas began developing and testing remote tower concepts. LFV in Sweden and Avinor in Norway were among the first to implement remote tower programs, and the first remote tower to be certified for operational use was developed for LFV by Saab-Sensis Corporation and became operational in 2015. In the years since then, remote towers have been planned or implemented in Australia, Brazil, Denmark, Germany, Hungary, and the U.K., among other countries. Germany, Sweden, and Norway have subsequently implemented remote tower *centers* in which controllers can manage air traffic at a number of airports from a single location, providing additional cost savings. Such centers are already in operation in Germany, Norway, and Sweden and are in the planning stages in other countries.

During 2020 there were a number of new remote tower developments in Europe.

- Sweden's LFV opened the world's first new airport designed to be managed via a remote tower, the Scandinavian Mountain Airport.
- Norway's Avinor opened its remote tower center at Bodo, designed to handle air traffic at up to 15 small airports. At the end of 2020, Avinor announced that two additional airports were being controlled from the center at Bodo.
- In Germany, DFS opened its remote tower center at Leipzig and it began controlling traffic at Saarbrücken; two other airports were to be added in 2020, but those actions were delayed by the pandemic.
- Danish ANSP Naviair announced plans to develop a remote tower center at the country's second-largest airport, Billund. It will be designed to provide tower services for a number of other Danish airports, except Copenhagen.
- Belgian ANSP Skeyes announced plans to establish remote tower services to serve six airports, including the main hub in Brussels.
- In October, Spanish ANSP ENAIRE announced its entry into remote towers, with a remote tower to serve the island of Minorca. And airport company AENA announced a project for the Vigo Airport.

[70] Daniel Hannon, et al, "Feasibility Evaluation of a Staffed Virtual Tower," *Journal of Air Traffic Control,* 55, no. 1. 2013.

- At the end of 2020, NATS (the U.K. ANSP) announced that its remote tower project serving London City Airport had completed operational testing and was certified for full operation on May 1, 2021. The project's 164 ft. mast at the airport replaces the physical tower and hosts 16 high-definition cameras and other sensors. The new control room is 100 miles to the south, at NATS's Swanwick Center.

By contrast, remote tower progress in the United States has been very slow. In the 2018 FAA reauthorization bill, Congress authorized a pilot program under which the agency would develop and test five remote towers at five different locations. As this is being written in spring 2021, no funding has been appropriated by Congress to begin this program. Meanwhile, two U.S. remote tower projects are still awaiting FAA certification, one in Leesburg, Virginia and the other at Loveland, Colorado. They are funded by a combination of state funds and private investment, not by FAA.[71]

3.4 U.S. AIR TRAFFIC CONTROL REFORM

Efforts to have the United States join the global trend by corporatizing its ATC system began in earnest during the Clinton administration, when the idea was proposed by Vice President Gore's reinventing government workshop and then studied in depth by a task force in the Office of the Secretary of Transportation.

Efforts to have the United States join the global trend by corporatizing its ATC system began in earnest during the Clinton administration, when the idea was proposed by Vice President Gore's reinventing government workshop and then studied in depth by a task force in the Office of the Secretary of Transportation. That effort failed, due to only lukewarm support from airlines, strong opposition from the private plane community, and

[71] Robert Poole, "U.S. Getting Further Behind on Remote Towers," *Aviation Policy News,* January 2020.

lack of a champion in Congress. Various partial reforms were attempted during the George W. Bush administration, but they got no further.

In 2012 the Business Roundtable organized an ATC reform group to develop a business plan for a nonprofit, user-funded, stakeholder-governed ATC corporation similar to Nav Canada (the world's second-largest ANSP, after FAA's Air Traffic Services division).[72] That effort found a congressional champion in Rep. Bill Shuster (R, PA), then chairman of the House Transportation & Infrastructure Committee.

The committee held hearings on the subject in 2014, with strong support from Airlines for America and the National Air Traffic Controllers Association. The bill drafted by the Republican majority was approved by the committee in 2016, but it was strongly opposed by private-plane groups AOPA and NBAA, as well as all federal employee unions except the controllers.

The bill was revised in 2017 to address concerns raised by small airports and private plane groups, and it was approved by the T&I Committee in 2018. But House GOP leadership did not bring it to the floor, lacking the votes to ensure passage, due in part to an unfilled White House commitment to lobby wavering GOP members.[73] There was also no companion ATC provision in the Senate bill, due to intense lobbying of rural-state senators by the anti-corporatization coalition led by private-plane groups AOPA and NBAA. The overall FAA reauthorization bill was enacted later in 2018 with no ATC reform section.

[72] Poole, "Air Traffic Control as a Quasi-Private Corporation."

[73] Lauren Gardner, "How ATC Got Grounded," *Politico,* 2 April 2018.

PART 4

AIRPORT SECURITY

When Congress mandated a federal take-over of airport security in late 2001 in the wake of the 9/11 terrorist attacks, it allowed room for some degree of private-sector provision (besides the role of producing items like walk-through screening devices and baggage scanners). One concerned the provision of passenger and baggage screening; the other concerned assisting the new agency (TSA) with implementing a "trusted traveler" program.

4.1 CONTRACT SCREENING

In response to the 2001 House bill emphasizing use of federally certified security companies rather than a new cadre of federal employees, the Senate compromised on its preference for 100% federal employees by allowing some airports to opt out, with TSA approval, by hiring TSA-approved security companies to do the screening. The first step was a five-airport pilot program under which only San Francisco, Kansas City, Rochester, Tupelo, and Jackson Hole could use approved security screening companies. After the pilot program was judged successful (by the DHS Office of Inspector General and the Government Accountability Office), the program was opened up to other airports. TSA created the Screening Partnership Program (SPP), under which the 22 airports in Table 5 currently provide passenger and baggage screening using TSA-approved contractors.

TABLE 5: AIRPORTS WITH PRIVATE SCREENING UNDER SPP, 2021

Airport	State
Atlantic City International Airport	New Jersey
Bozeman Yellowstone International Airport	Montana
Charles M. Schulz-Sonoma County Airport	California
Dawson Community Airport	Montana
Glacier Park International Airport	Montana
Greater Rochester International Airport	New York
Havre City-County Airport	Montana
Jackson Hole Airport	Wyoming
Kansas City International Airport	Missouri
Key West International Airport	Florida
L.M. Clayton Airport	Montana
Orlando Sanford International Airport	Florida
Portsmouth International Airport	New Hampshire
Punta Gorda Airport	Florida
Roswell International Air Center	New Mexico
San Francisco International Airport	California
Sarasota-Bradenton International Airport	Florida
Sidney-Richland Municipal Airport	Montana
Sioux Falls Regional Airport	South Dakota
Tupelo Regional Airport	Mississippi
Wokel Field/Glasgow International Airport	Montana
Yellowstone Airport	Montana

Source: Transportation Security Administration, www.tsa.gov (accessed 18 May 2021)

While that number has grown a bit year after year, there were no additions in 2020 to the 22 airports that had private screeners in 2019. Many observers and a growing number of airports point to a complicated and time-consuming process, in which TSA holds all the cards. The normal situation for contract provision of services is that the government agency wishing to contract issues a request for proposals (RFP) and reviews bids from competing firms. In the case of airport screening, the normal process would be that airports would send their RFP only to firms that have been certified by TSA (which maintains this list on its website), and the airport would select the one that best meets its needs. TSA might then have final approval authority, in addition to its ongoing role as the aviation security regulator.

Instead, the airport must go hat in hand to TSA stating its desire to change, and in response to the airport's detailed request, TSA decides which company it thinks is the best fit and assigns it to the airport—take it or leave it. Also, the contract is between TSA and the company, rather than between the airport and the company.

In 2018, Sen. Mike Lee (R, UT) introduced a bill to reform the Screening Partnership Program. His Screening Partnership Reform Act (S.3441) would have shortened the time allowed for TSA to review an airport's request to switch to contract provision from 120 days to just 30 days. That would be reasonable, since TSA would no longer be tasked with figuring out which company to assign to the airport. The airport would do that itself, subject to subsequent approval by TSA. Also, the bill required TSA to include the full cost to the federal government of its screening operation, when comparing the cost-effectiveness of contract screening with TSA screening at that airport. Currently, TSA does not include employee benefits such as insurance and pension fund contributions, which are real costs for the private companies.

Lee's bill did not get very far, and he has not reintroduced it. There would be real benefits from an expanded contract screening effort. Tracy Miller of the Mercatus Center at George Mason University pointed some out in an op-ed distributed by Tribune News Service in the wake of the January 2019 federal government shutdown (during which TSA screeners did not get paid, but contract screeners did).[74] These include:

- Better screening performance, as attested by red-team tests by the DHS Office of Inspector General and the GAO;
- Ease of firing low-performing screeners;
- Staffing properly to meet peaks and valleys in checkpoint passenger volume; and,
- Cost savings, due to better matching of staffing to demand, as documented in a comparison of LAX (TSA screening) and SFO (contract screening).[75]

4.2 TRUSTED TRAVELER

The 2001 legislation creating TSA also called for the government to initiate a trusted traveler program, under which air travelers who volunteered could be pre-screened (analogous to getting a low-level security clearance). Those who succeeded would be recognized when they arrived at the airport checkpoint and subjected to streamlined screening compared with ordinary travelers.

[74] Tracy Miller, "Why Should a Government Shutdown Affect Airport Security?" Tribune News Service, 24 January 2019.

[75] House Transportation & Infrastructure Committee, "TSA Ignores More Cost-Effective Screening Model," 3 June 2011.

For nearly a decade, TSA resisted creating such a program. In hopes of jump-starting the process, a group of private investors created a company, CLEAR, intending to recruit would-be participants and obtain biometric identifiers for them (iris scan and/or fingerprints). The business plan called for the company to submit applications to TSA from people it had signed up, which it expected TSA to send to the FBI for review, as it was already doing with airport employees who needed regular access to secure portions of the airport. TSA refused to do this, so the company tried to market itself as simply verifying passenger identity. But without actual clearance to get streamlined screening, the value proposition was poor, and the company filed for bankruptcy.

When TSA finally introduced PreCheck in 2011, investors under the name Alclear bought the assets of the bankrupt company, this time offering to supplement PreCheck by allowing its members to skip the long lines at checkpoints and then receive either PreCheck or regular screening, depending on their membership status. TSA agreed to this, and the new CLEAR began marketing it to individual airports. That was slow going when only a few airports offered the service, but a critical mass appeared to be reached by 2019, when CLEAR announced an agreement with St. Louis as its 35th airport with this service.

TABLE 6: AIRPORTS OFFERING CLEAR SERVICE AS OF 2020

Airport Code	Airport Name
AUS	Austin Bergstrom
ATL	Hartsfield-Jackson Atlanta International
BWI	Baltimore Washington International
BHM	Birmingham
BOS	Boston Logan
ORD	Chicago O'Hare International
MDW	Chicago Midway
CVG	Cincinnati/Northern Kentucky
CLE	Cleveland Hopkins
DAL	Dallas Love Field
DFW	Dallas/Ft. Worth International
DEN	Denver International
DET	Detroit Metro
IAH	Houston Intercontinental
HOU	Houston Hobby
LAS	Las Vegas McCarran
LAX	Los Angeles International
MSP	Minneapolis/St. Paul
BNA	Nashville
EWR	Newark Liberty
MSY	New Orleans
JFK	New York, Kennedy International
LGA	New York, LaGuardia

Airport Code	Airport Name
HPN	New York, Westchester
MCO	Orlando International
PHX	Phoenix
SAC	Sacramento
STL	Lambert St. Louis
SLC	Salt Lake City
SAT	San Antonio
SJC	San José Mineta
SEA	Seattle-Tacoma International
IAD	Washington Dulles International
DCA	Washington Reagan National

Source: CLEAR website, accessed 24 May 2021

Shortly before the pandemic began, in February 2020, TSA announced that PreCheck membership had reached 10 million. While impressive, that number was far below the agency's long-time goal of 25 million by 2019.

In another PreCheck-related development, TSA finally opened up the market for PreCheck recruitment to two additional companies besides long-time monopoly provider Morpho Trust (recently renamed IDEMIA). Joining it as of 2020 were Alclear and Telos Identity Management Solutions. TSA acted after Congress mandated, in the 2018 FAA bill, that TSA use at least two companies to market PreCheck and vet applicants.

ABOUT THE AUTHOR

Robert W. Poole, Jr. is director of transportation policy and the Searle Freedom Trust Transportation Fellow at Reason Foundation, a public policy think tank based in Los Angeles and Washington, D.C.

He was among the first to propose the commercialization of the U.S. air traffic control system, and his work in this field has helped shape proposals for a U.S. ATC corporation. A version of his nonprofit corporation concept was implemented in Canada in 1996. He has advised the Office of the Secretary of Transportation, the White House Office of Policy Development, the National Performance Review, the National Economic Council, and the National Civil Aviation Review Commission on ATC commercialization. He is a member of the Air Traffic Control Association and of the GAO's National Aviation Studies Advisory Panel. In 2012-13 he was a member of the Business Roundtable task force on ATC reform, and in 2014-15 he was part of the Eno Center for Transportation working group on ATC reform. In 2018 he received the Eno Center's Thought Leader Award for his work on ATC corporatization.

Poole's Reason studies helped launch a national debate on airport privatization in the United States. He advised both the FAA and local officials during the 1989-90 controversy over the proposed privatization of Albany (NY) Airport. His policy research on this issue helped inspire the privatization of Indianapolis airport management under Mayor Steve Goldsmith and Congress' 1996 enactment of the Airport Privatization Pilot Program.

In aviation security, Poole advised the White House and House Republican leaders on what became the Aviation & Transportation Security Act of 2001, enacted in response to the 9/11 attacks. He has authored a number of Reason policy studies on aviation security and is the author of a paper on risk-based aviation security for the OECD's International Transport Forum.

Poole has testified on airports, aviation security, and air traffic control on a number of occasions before House and Senate aviation and homeland security subcommittees, and he has spoken on these subjects before numerous conferences. He has also done consulting work on several airport privatization feasibility studies. Poole also edits a monthly Reason Foundation e-newsletter on aviation policy issues. He received his B.S. and M.S. in mechanical engineering at MIT and did graduate work in operations research at NYU.