

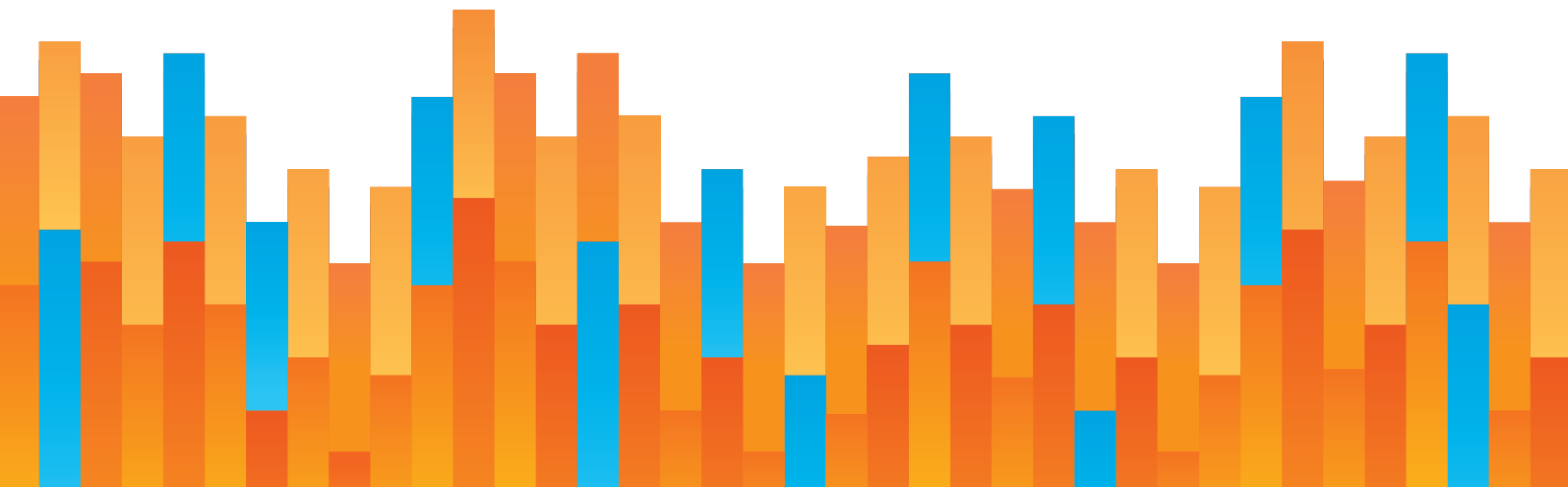


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ANNUAL PRIVATIZATION REPORT 2024: AVIATION

by Marc Scribner

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PART 1

INTRODUCTION

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

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The improved performance of the privatized airports inspired a global wave of airport privatization and long-term public-private partnerships (P3s).

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BAA was privatized as a single entity comprising the three major London airports plus several other airports in the United Kingdom. Later government policy decisions led to selling Gatwick, Stansted, and two Scottish airports to new private 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 two P3-leased airports (San Juan International and Tweed New Haven) 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 called the Civil Air Navigation Services Organization (CANSO). Today CANSO has 93 full members (providers of ATC services) and 91 associate members (mostly supplier companies).¹ CANSO is the ATC counterpart of the global organizations for airlines (IATA) and airports (ACI).

This brief reviews developments in the United States and worldwide regarding private-sector participation in airports and air traffic control. 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.

¹ Civil Air Navigation Services Organization, "Member directory," CANSO website, <https://canso.org/our-members/member-directory> (last accessed 7 Feb. 2024).

PART 2

AIRPORTS

2.1

AIRPORT PRIVATIZATION OVERVIEW

The term “airport privatization” refers to several different types of changes compared to 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 few as 25 years to as many 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 Bogotá, Colombia). In the U.S., the P3 model is permitted under federal law for entire airports as well as airport components.

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In 2018, trade association Airports Council International released a policy paper on worldwide airport privatization trends.² As Table 1, which was recreated from the report, shows, Europe led the way in the fraction of passenger traffic (75%) at airports with majority or near-majority 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 passenger air traffic moves through airports with significant private investment.

TABLE 1: AIR PASSENGER TRAFFIC BY REGION AND AIRPORT OWNERSHIP

Region	Percent Private	Percent Government
Europe	75%	25%
Latin America & Caribbean	66%	34%
Asia-Pacific	47%	53%
Middle East	18%	82%
Africa	11%	89%
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 2022 revenue, derived from airport group financial statements. The total 2022 revenue of the investor-owned airport companies is \$38.9 billion, representing 32.5% of 2022 total world airport revenue of \$119.8 billion.³ This reflects a significant recovery of global airport revenue from the pandemic-caused collapse in air travel, which reached a low of \$66.3 billion in 2020. The 2022 revenue share of 32.5% is above the pre-pandemic share in 2019, when investor-owned airport companies collected \$48.3 billion—or 26.6%—of \$181.7 billion total global airport revenue.

² Airports Council International, “Policy Brief: Creating Fertile Grounds for Private Investment in Airports,” Jan. 2018.

³ Airports Council International, “2024 Airport Economics Report,” March 2024.

TABLE 2: LARGEST INVESTOR-OWNED AIRPORT COMPANIES BY REVENUE, 2022

Airport Company	HQ Country	Main Airport(s)	Privatiz. Status	2022 Revenue (\$M)	2021 Revenue (\$M)	2020 Revenue (\$M)	2019 Revenue (\$M)
Aeroports de Paris	France	Paris—DeGaulle	Partial	\$5,016	\$3,166	\$2,611	\$5,264
Aena Aeropuertos	Spain	Madrid	Partial	\$4,475	\$2,728	\$2,740	\$4,977
Heathrow Airport Holdings	U.K.	Heathrow	Full	\$3,525	\$1,639	\$1,606	\$4,083
Fraport	Germany	Frankfurt, Lima	Partial	\$3,418	\$2,443	\$2,049	\$4,150
Vinci Airports	France	Gatwick, Lisbon	Full	\$2,867	\$1,354	\$1,209	\$2,947
Corporación Americas	Argentina	Buenos Aires	Full	\$1,379	\$326	\$607	\$1,558
Manchester Airports	U.K.	Manchester	Partial	\$1,245	\$624	\$256	\$1,183
ASUR	Mexico	Cancún	Full	\$1,160	\$464	\$451	\$826
GAP	Mexico	Guadalajara	Full	\$1,156	\$402	\$474	\$759
TAV Airports	Turkey	Antalya	Full	\$1,125	\$398	\$368	\$856
Flughafen Zürich	Switzerland	Zürich	Partial	\$1,105	\$248	\$694	\$1,218
Mundys	Italy	Rome	Full	\$994	\$212	\$496	\$1,067
SEA Group	Italy	Milan	Partial	\$822	\$800	\$337	\$849
GMR Airports	India	Delhi	Partial	\$810	\$489	\$494	\$746
New Kansai Intl. Airport	Japan	Kansai	Full	\$759	\$129	\$525	\$2,084
Flughafen Wien	Austria	Vienna	Full	\$742	\$191	\$408	\$961
Malaysia Airport Holdings	Malaysia	Kuala Lumpur	Partial	\$710	\$782	\$462	\$1,259
Sydney Airport	Australia	Sydney	Full	\$700	\$707	\$619	\$1,140
OMA	Mexico	Acapulco	Full	\$612	\$195	\$207	\$401
Guangzhou Baiyun	China	Guangzhou	Partial	\$576	\$748	\$800	\$1,193
Brussels Airport Co.	Belgium	Brussels	Full	\$521	\$264	\$249	\$738
Athens Intl. Airport	Greece	Athens	Partial	\$510	\$32	\$237	\$581
Copenhagen Airports	Denmark	Copenhagen	Partial	\$508	\$238	\$259	\$652
Airports of Thailand	Thailand	Bangkok	Partial	\$480	\$213	\$1,039	\$2,024
Düsseldorf Airport	Germany	Düsseldorf	Partial	\$375	\$443	\$229	\$530
Australia Pacific Airports	Australia	Melbourne	Full	\$367	\$453	\$629	\$728
Brisbane Airport Corp.	Australia	Brisbane	Partial	\$341	\$535	\$570	\$584
Beijing Capital Airport	China	Beijing	Partial	\$323	\$664	\$549	\$1,565
Budapest Liszt Airport	Hungary	Budapest	Full	\$300	\$117	\$142	\$370
Aeroports de la Côte d'Azur	France	Nice	Partial	\$282	\$147	\$161	\$325
SAVE Group	Italy	Venice	Partial	\$273	\$99	\$86	\$241
Perth Airport	Australia	Perth	Full	\$247	\$312	\$331	\$346
Edinburgh Airport	U.K.	Edinburgh	Full	\$234	\$829	\$93	\$294
Hamburg Airport	Germany	Hamburg	Partial	\$232	\$164	\$146	\$308
Airports. Co. S. Africa	South Africa	Cape Town	Partial	\$229	\$782	\$486	\$494
AGS Airports	U.K.	Glasgow	Full	\$201	\$86	\$98	\$289
Auckland Intl. Airport	New Zealand	Auckland	Partial	\$190	\$595	\$407	\$490
Birmingham Airport Holdings	U.K.	Birmingham	Partial	\$81	\$436	\$219	\$214

Source: Individual airport group financial statements for FY 2022.

Many privatized airports on this list score highly on the annual Skytrax survey of airline passengers' airport preferences. The majority of the 38 companies in Table 2 have one or more major airports selected by Skytrax passengers as among the world's 100 best airports. Among those included in the top 25 Skytrax airports are Paris de Gaulle (#5), Zürich (#8), Madrid (#10), Vienna (#11), Rome Fiumicino (#13), Copenhagen (#14), Kansai (#15), Melbourne (#19), Düsseldorf (#21), London Heathrow (#22), Brisbane (#23), Guangzhou (#24), and Frankfurt (#25). By contrast, only five U.S. airports rank in the top 50 Skytrax airports: Seattle-Tacoma (#18), Houston Hobby (#32), Houston George Bush (#35), Cincinnati/Northern Kentucky (#46), and San Francisco (#48).⁴



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, operating under normal accounting rules and sometimes paying taxes like any other business.



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, 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 (#3), and Munich (#7).

One consequence of airport privatization has been the emergence of airport groups that manage multiple airports. A 2022 study commissioned by ACI identified 27 airport groups comprised of 425 airports, which collectively handle 29% of global passenger traffic and 23% of global cargo tonnage.⁵ The report found numerous ways in which the airport group model adds value, such as economies of scale, economic resilience, and increased ability to finance capital improvements.

⁴ Skytrax, “World’s Top 100 Airports 2023,” <https://www.worldairportawards.com/worlds-top-100-airports-2023/> (7 March 2024).

⁵ Airports Council International, ICF, and Oxford Economics, “Value creation by Airport Groups: A study on the airport group operating model and its benefits to the aviation ecosystem,” ACI Study, July 2022.

2.2

AIRPORT INDUSTRY CHANGES IN 2023

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.⁶ Little more than a year later, the concern shifted to the economic survival of airports in the face of unprecedented declines in air travel.

“*ACI’s latest traffic forecast projects global passenger volume to reach 9.4 billion passengers in 2024, 102.5% of the 2019 level.*”

Air travel recovery has rebounded much more rapidly than many had initially expected. ACI’s latest traffic forecast projects global passenger volume to reach 9.4 billion passengers in 2024, 102.5% of the 2019 level.⁷ Latin America/Caribbean and North America led the initial recovery, but Asia/Pacific, Europe, and the Middle East nearly caught up by the end of 2023. While the gap continues to narrow between the 2019 “business as usual” forecast and current recovery projections, even ACI’s optimistic scenario does not completely erase the anticipated losses from COVID-19 by the end of its medium-term forecast in 2027.

Airport P3 transactions have also rebounded from their 2020 nadir. Data from *Infralogic* are presented in Table 3, which shows 2022 surpassing 2019 in total transaction value and number of projects reaching financial close. Both the number and value of projects reaching financial close in 2023 were down sharply from 2022, but last year’s \$17.67 billion in airport P3 deal value is still well above the \$11.18 billion low point in 2020.

⁶ Romil Radia, et al., “Airport Valuations Have Taken Off—The Question Is Where Will They Land?” PwC, Feb. 2019.

⁷ Airports Council International, “Global passenger traffic expected to recover by 2024 and reach 9.4 billion passengers,” ACI Advisory Bulletin, 27 Sept. 2023.

TABLE 3: GLOBAL AIRPORT P3 CLOSED TRANSACTIONS, 2019–2023

	2023	2022	2021	2020	2019
Value (\$B)	\$17.67	\$65.79	\$35.54	\$11.18	\$51.10
Projects	51	69	57	43	67

Source: *Infralogic* (2024) and author’s calculations.

In addition to the projects reaching financial close, *Infralogic* data for 2023 show 11 airport P3s were launched with a total transaction value of \$4.70 billion, compared to six canceled projects worth \$1.64 billion. For P3s moving within the project pipeline, 26 projects worth \$18.42 billion selected their preferred proponents, signaling the beginning of procurement contract negotiations that more likely than not will lead to financial close.⁸

With respect to the type of transaction, the largest fraction of projects was “greenfield,” or newly constructed airport facilities, which accounted for 43% of total transaction value and 44% of projects in 2023. In contrast, privatization of existing government airport facilities accounted for 3% of transaction value and 5% of projects in 2023. Sales of stakes in existing airport P3 concessions—known as mergers and acquisitions (M&A)—and refinancings also accounted for a significant share of total transaction value and projects. Table 4 presents 2023 airport P3 transactions by type.

TABLE 4: GLOBAL AIRPORT P3 TRANSACTIONS BY TYPE, 2023

Type	Value (\$B)	% of Total	Projects	% of Total
Greenfield	\$20.19	43%	60	44%
Refinancing	\$12.54	27%	26	19%
M&A	\$9.29	20%	33	24%
Additional Financing	\$3.41	7%	10	7%
Privatization	\$1.23	3%	7	5%
Total	\$46.66	100%	136	99%

Source: *Infralogic* (2024) and author’s calculations. Percentages may not sum to 100% due to rounding.

⁸ Author’s calculations using *Infralogic* (2024) data.

2.3

GLOBAL AIRPORT PRIVATIZATIONS AND P3 CONCESSIONS

Airport privatization and P3s sharply declined in concert with global passenger traffic in 2020. Since then, rebounding air travel seems to have spurred recovery in worldwide airport privatization and P3 activity.

2.3.1 EUROPE

France's Beauvais Airport received two bids at the September 2023 deadline to replace the current 15-year concession with a 30-year concession. The new concession has an estimated valuation of €4 billion. The government owner SMABT began talks with potential new concessionaires in August 2022. The first bidder is a consortium consisting of Chambre de Commerce et d'Industrie (CCI) des Hauts-de-France, Groupe NGE, and Transdev. The other bidding team consists of Bouygues, Egis, TIIC, and ACA.⁹ Final bids are expected in early 2024. The airport is located 50 miles north of Paris and in 2022 was the 10th busiest airport in France with 4.6 million passengers, primarily leisure travelers served by low-cost airlines.

In other French airport privatization news, France's Transport Ministry in December 2023 invited qualified teams to submit expressions of interest in a long-term P3 to extend the runway and refurbish the terminal of Nantes Atlantique Airport, the largest airport in western France.¹⁰ This announcement followed the September cancellation of a proposed €450 million concession of the airport "on the grounds of insufficient competition."¹¹ The previous concession process yielded a single final offer from incumbent operator Vinci Airports.

The government of **Greece** netted an estimated €785 million from the January 2024 initial public offering for the 30% stake in Athens International Airport held by the Hellenic Republic Asset Development Fund (HRADF), the Greek privatization agency.¹² German airport company AviAlliance, which already owned a 40% stake, exercised its right to buy an additional 10% stake at a 20% premium to the IPO price. This gives AviAlliance a controlling stake in Athens International. HRADF had initially proposed selling its 30%

⁹ Antonio Fabrizio, "Two horse race for Paris airport concession renewal," *Infralogic*, 17 Oct. 2023.

¹⁰ Antonio Fabrizio, "New tender for Nantes airport concession launched," *Infralogic*, 15 Dec. 2023.

¹¹ Antonio Fabrizio, "France scraps Nantes airport tender, plans relaunch," *Infralogic*, 3 Oct. 2023.

¹² Nick Roumpis, "Athens Airport IPO hugely oversubscribed," *Infralogic*, 2 Feb. 2024.

stake in 2018, but the transaction was put on hold following the pandemic-induced collapse in air travel. Athens International Airport is Europe's 18th busiest, with 28 million passengers in 2023.

In October, the government of **Poland** selected IFM Investors and Vinci to develop a new major airport 25 miles outside of Warsaw, Centralny Port Komunikacyjny (CPK) Airport.¹³ Per the agreement, the consortium would invest €1.8 billion for a 49% stake in the airport, with state-owned CPK retaining the remaining 51% stake. The initial plan calls for two parallel runways and 40 million annual passenger capacity. The site can be expanded to three parallel runways and 65 million annual passengers. The airport is envisioned as part of an overall transportation expansion, including high-speed rail and a major transport hub linking highway, rail, and air travel. However, significant uncertainty was introduced in January 2024, when the new Polish government dismissed the entire board of the proposed project, including its CEO.¹⁴



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In the **United Kingdom**, infrastructure investor Ardian and Saudi Arabia's Public Investment Fund (PIF) announced in November they would purchase Ferrovial's 25% stake in London Heathrow Airport for an estimated \$3 billion. In January 2024, other Heathrow shareholders exercised their tag-along rights and now want to sell a combined 35% in the airport worth an estimated \$4.1 billion. Ferrovial will now need to find a buyer for the 35% stake before it can sell its 25% stake to Ardian and the PIF, leading Ferrovial to say "there can be no certainty" that the Heathrow transaction will take place.¹⁵

¹³ Alexander MacLeod, "Poland selects IFM, Vinci for EUR 1.8bn airport investment,"

¹⁴ Aaron Karp, "Polish Government Dismisses New Warsaw Airport's Supervisory Board, CEO," *Aviation Week*, 22 Jan. 2024.

¹⁵ Brendan Malkin, "Ferrovial's Heathrow stake sale to Ardian, PIF facing uncertainty," *Infralogic*, 16 Jan. 2024.

In other U.K. airport news, Esken announced in March it was exploring a sale of troubled London Southend Airport.¹⁶ This transaction was complicated due to a £125 million loan from U.S. private equity firm Carlyle Group made to Esken in 2021, £20 million of which could be converted to a 30% equity stake in London Southend. After nearly a year of negotiations, Carlyle and Esken reached an agreement in March 2024 to convert the loan to equity in the airport, with Carlyle taking an 82.5% stake and Esken retaining 17.5%.¹⁷

2.3.2 LATIN AMERICA AND CARIBBEAN

In the **Bahamas**, the government in November awarded a P3 to upgrade and operate the Bimini Airport.¹⁸ Bimini Airport Development Partners, a joint venture of Phoenix Infrastructure and Plenary Group, will partner with airport operating company Avports. The project would extend the airport runway to 8,000 feet from its current 6,000 feet. This project is separate from a Bahamian government plan to use P3s to upgrade 14 other airports in the Bahamas.

In July, the government of **Barbados** authorized a P3 for operating and upgrading Grantley Adams International Airport.¹⁹ The government of Dubai will invest \$165 million and partner with Chile-based Agunsa to operate the airport, a cargo hub, and expand airlift and hotel capacity.

In November, **Brazil's** seventh round of airport concessions was concluded. This most recent round competitively awarded concessions for 15 airports to AENA Brasil, Noa Airports, and Pax Airports.²⁰ The companies have agreed to invest \$1.48 billion during the 30-year terms of these concessions. As a result of the seven rounds of airport concessions, there are now 11 operators managing 59 airports in Brazil, handling 93% of all passenger traffic and 99% of cargo traffic in the country.

¹⁶ Andras Puskas, "Esken mulls sale of Southend Airport," *Infralogic*, 2 March 2023.

¹⁷ Rory Gallivan, "Carlyle agrees to Southend Airport takeover," *Infralogic*, 6 March 2024.

¹⁸ Robert Poole, "Bimini Airport to Get Upgraded Terminal via P3," *Aviation Policy News*, 15 Nov. 2023.

¹⁹ Press Release, "Barbados signs Grantley Adams international airport PPP MoU," *Infalogic*, 19 July 2023.

²⁰ Press Release, "Brazil concludes seventh round of airport concessions," *Infralogic*, 4 Dec. 2023.



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In other Brazilian airport P3 news, in May, Zurich Airports won the auction for a 30-year concession of São Gonçalo do Amarante International Airport located outside Rio Grande do Norte's capital city Natal.²¹ Zurich Airports offered a \$64 million one-time concession fee, besting a bid from XP Investimentos, which amounted to a 41% increase over the minimum concession fee. The company began operating the airport in February 2024 and plans to invest \$10 million in terminal upgrades over the next five years.²²

The **Dominican Republic's** airport P3 landscape saw some major developments. Vinci Airports won a 30-year extension of its six-airport concession contract in December.²³ As part of the agreement, Vinci subsidiary Aerodom will make an upfront payment to the government of \$775 million and invest \$830 million in airport improvements over the life of the contract, including \$250 million for a new terminal in Santo Domingo. In addition, the planned \$2.2 billion Cabo Rojo International Airport in Pedernales province will be developed as a long-term P3 concession after receiving environmental approval in May.²⁴ The Dominican authorities received seven offers in response to a November request for proposals and expect to select a winning bidder in 2024.²⁵

²¹ Gabriela Valente, "Zurich Airports wins Natal Airport retender auction," *Infralogic*, 19 May 2023.

²² Press Release, "Zurich Airport starts operating Brazil's Natal Airport," *Infralogic*, 21 Feb. 2024.

²³ Press Release, "VINCI Airports and the Government of the Dominican Republic extend airport concession contract for 30 additional years," Vinci Airports, 22 Dec. 2023.

²⁴ Eva Llorens, "Dominican Republic's Pedernales Airport PPP gets environmental license," *Infralogic*, 30 May 2023.

²⁵ Eva Llorens, "Dominican Republic receives seven offers for Cabo Rojo Airport," *Infralogic*, 7 Feb. 2024.

“
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In contrast, the proposed Bávaro International Airport near Punta Cana was dealt a surprising blow in January 2024 when Dominican President Luis Abinader repealed the July 2020 presidential decree authorizing the controversial new airport.²⁶ The airport project had been halted since 2022 due to several ongoing legal challenges. President Abinader’s possibly fatal blow to Bávaro International followed Mexican airport operator ASUR’s purchase of a 25% stake in July for \$66 million.²⁷

In **Honduras**, the National Airport Service is seeking a P3 to reconstruct the runway and expand airside and terminal capacity at Juan Manuel Gálvez Airport on Roatán, an island off the coast and a growing tourist destination. The previous 20-year concession expired in 2020 and was held by Grupo Terra, but Honduran law did not permit a concession extension. A government official told *Infralogic* in February 2024 that the National Airport Service had received seven concession offers, saying they are “well-known firms locally and outside Honduras,” but declined to name the companies.²⁸

Paraguay is likely to make a second privatization attempt of Silvio Pettirossi International Airport in the capital city of Asunción. Prior to the presidential election in April, the two leading candidates both pledged to modernize the airport via a long-term P3 concession.²⁹ The winner, President Santiago Peña, is a member of the Colorado Party, which previously supported a failed \$130 million concession of the airport a decade ago.

²⁶ Eva Llorens, “Dominican President shoots down Bávaro Airport construction,” *Infralogic*, 12 Jan. 2024.

²⁷ Eva Llorens, “ASUR to pay USD 66m for Bavaro International Airport stake,” *Infralogic*, 25 Ju. 2023.

²⁸ Eva Llorens, “Honduras gets seven offers for Roatan Airport project,” *Infralogic*, 14 Feb. 2024.

²⁹ Eva Llorens, “Paraguay to put Silvio Pettirossi Airport under private management after election,” *Infralogic*, 26 Apr. 2023.

2.3.3 ASIA AND PACIFIC

Australia saw two large airport P3 transactions launch in July 2023. First, three owners of Queensland Airports (The Infrastructure Fund, and two pension funds ART and State Super), which owns four regional airports in the northeast state (Gold Coast, Townsville, Mt. Isa, and Longreach), announced they were planning to sell stakes totaling 40% of the company.³⁰ The Infrastructure Fund, which is managed by Macquarie, then decided to sell its entire stake, bringing the total stake sale to 74% of Queensland Airports worth an estimated \$1.35 billion.³¹ Because of a law requiring that 49% of Queensland Airports be held by Australian investors, global infrastructure firms have partnered with local investors to bid. KKR has partnered with Skip Capital, owned by Australian billionaire Scott Farquar, and Global Infrastructure Partners has agreed to bid together with real estate trust Dexu Group.³² Australian fund manager Palisade Investment Partners is also reportedly interested in the company. First round bids were due in March 2024.

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Second, The Infrastructure Fund hired UBS in July to prepare for a sale of its 7% stake in Perth Airport.³³ As it moved to a formal auction in October, it was joined by fellow shareholder ART, Australia’s second largest pension fund, bringing the total Perth Airport stake sale to 9%. *Infralogic* reports that recent mergers of pension funds have led to a larger fraction of investment in airports than is considered prudent, which has motivated both the Perth and Queensland airports sales.³⁴

³⁰ Shaun Drummond, “Queensland Airports stakes for sale,” *Infralogic*, 28 July 2023.

³¹ Shaun Drummond, “KKR allies with Skip Capital on Queensland Airports,” *Infralogic*, 25 Oct. 2023.

³² Shaun Drummond, “GIP and Dexu partner for Queensland Airports bid,” *Infralogic*, 21 Dec. 2023.

³³ Shaun Drummond, “Perth Airport owners may sell stakes,” *Infralogic*, 31 July 2023.

³⁴ Shaun Drummond, “Perth Airport stake sale moves to auction,” *Infralogic*, 13 Oct. 2023.

In **New Zealand**, the Auckland Council agreed in June to sell 7% of its 18% stake in Auckland International Airport.³⁵ The sale took place at the end of August and generated \$498 million for the city.³⁶ The mayor of Auckland has supported selling the city's entire stake, with the council's partial sale viewed as a necessary compromise. However, a poll released in December found strong public support for the mayor's plan, with 61% of Auckland residents in favor of selling the city's remaining airport shares.³⁷ In addition to Auckland, the Wellington City Council voted in November to begin a public consultation on a potential sale of its 34% stake in Wellington International Airport, New Zealand's second largest.³⁸ The city's shares have an estimated value of \$163 million.

The **Pakistan** Civil Aviation Authority announced in August that it is seeking a P3 concession to upgrade and operate Islamabad International Airport.³⁹ The scope of the 15-year concession would include modernizing the apron, passenger terminal, parking decks, and cargo and maintenance facilities. Responses to the request for proposal were due November 8.

In the **Philippines**, a consortium led by San Miguel Corporation (SMC) in February 2024 won the bidding to modernize and operate Ninoy Aquino International Airport in Manila under a P3 concession.⁴⁰ The project is estimated to cost \$3 billion and will expand the airport's capacity from the current 31 million annual passengers to 62 million. SMC will finance, develop, and operate expanded terminals for 15 years, with a potential 10-year extension. Per the consortium's winning bid, the government will collect 82% of airport revenue over the life of the concession, with SMC providing an upfront payment of \$537 million.⁴¹ In 2023, the Philippine government opted not to privatize Ninoy Aquino International, but it reconsidered after receiving an unsolicited proposal in April from U.S.-based Global

³⁵ Shaun Drummond, "Auckland Council agrees to partial sale of airport stake," *Infralogic*, 9 June 2023.

³⁶ Sonu Mohanty, "Auckland Council sells NZD 836m block of airport shares," *Infralogic*, 1 Sept. 2023.

³⁷ Sonu Mohanty, "Aucklanders back mayor's proposal to lease port," *Infralogic*, 1 Dec. 2023.

³⁸ Sonu Mohanty, "Wellington City Council plans public consultation on airport sale," *Infralogic*, 10 Nov. 2023.

³⁹ Rouhan Sharma, "Pakistan authority seeks concessionaire for Islamabad International Airport," *Infralogic*, 9 Aug. 2023.

⁴⁰ Ramon Royandoyan, "San Miguel-led group wins \$3bn Philippines airport revamp," *Nikkei*, 16 Feb. 2024.

⁴¹ Krista Montealegre, "San Miguel consortium highest bidder for Ninoy Aquino airport," *Infralogic*, 9 Feb. 2024.

Infrastructure Partners valuing the concession at \$1.8 billion.⁴² Bidding on the concession opened in August and attracted interest from investors around the world.



In 2023, the Philippine government opted not to privatize Ninoy Aquino International, but it reconsidered after receiving an unsolicited proposal in April from U.S.-based Global Infrastructure Partners valuing the concession at \$1.8 billion.



2.3.4 MIDDLE EAST AND AFRICA

In November, **Angola's** Ministry of Transport announced it was seeking a concessionaire for its new Antonio Agostinho Neto International Airport, which serves the capital Luanda.⁴³ The airport cost more than \$3 billion and was built at public expense, with the government hoping to recover costs through a concession. The concession term would last 25 years, with an option to extend it by an additional 15 years. Angolan officials said several international investors had expressed interest but declined to name the firms. According to local news reports, interested companies include Vinci Airports, Fraport, and the Airports Company South Africa.

The government of **Malawi** is considering a P3 concession to modernize Chileka International Airport near the commercial hub city Blantyre, the country's second-largest airport.⁴⁴ Officials estimate the project will cost \$102 million to extend the runway and install navigation equipment to meet minimum International Civil Aviation Organization standards and serve wide-body aircraft. As of August, the Ministry of Transport and Public Works was holding initial conversations with international investors but had yet to formally launch a concession.

⁴² Sonu Mohanty, "Consortium submits USD 1.8bn upgrade proposal for Manila airport," *Infraclogic*, 27 Apr. 2023.

⁴³ Antonio Fabrizio, "International investors circling Angola airport concession," *Infraclogic*, 28 Nov. 2023.

⁴⁴ Ntando Ncube, "Malawi seeking investors for Chileka airport PPP," *Infraclogic*, 17 Aug. 2023.

In late 2023, **Saudi Arabia**'s National Center for Privatization began preparing two regional airport P3 concessions that combined will require more than \$1 billion in investment.⁴⁵ The first 30-year design-build-finance-operate-maintain concession to expand the airport near Abha was launched in January.⁴⁶ A similar announcement for a new airport near Taif is anticipated later in 2024. In February, 100 firms had submitted expressions of interest for the 30-year Abha concession, including Aeroports de Paris and Turkey's TAV Airports, both of which already operate airport concessions in Saudi Arabia.⁴⁷

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 Airport 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 in 2007. The P3 lease of San Juan's Luís Muñoz Marín International Airport in 2013, however, was a success, leading to large-scale refurbishment and increased airline satisfaction.⁴⁸

European-type sale of government-owned airports is not legal in the United States (except for general aviation airports that serve private planes).

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 Federal Aviation Administration (FAA) reauthorization law enacted in October 2018. Rather

⁴⁵ Alexander MacLeod, "USD 1bn+ Saudi airport PPPs to launch soon," *Infralogic*, 13 Dec. 2023.

⁴⁶ Alexander MacLeod, "Saudi Arabia launches Abha airport PPP," *Infralogic*, 11 Jan. 2024.

⁴⁷ Alexander MacLeod, "BlackRock eyes Saudi's Abha airport PPP," *Infralogic*, 7 Feb. 2024.

⁴⁸ John Tierney, "Making New York's Airports Great Again," *City Journal*, Winter 2017.

than the limit of 10 airports in the pilot program, long-term P3 leases are now available to all commercial airports. In addition, the AIPP provides for planning grants of up to \$750,000 for any jurisdiction that wants to make use of the program to lease its airport. But the original pilot program's provision requiring super-majority approval from an airport's incumbent airlines remains in place.

2.4.1 WHOLE-AIRPORT PRIVATIZATION AND P3 LEASES

In September 2021, the New Haven Board of Elders approved a new 43-year lease of the city's **Tweed New Haven Airport**.⁴⁹ In August 2022, the Tweed New Haven Airport Authority approved an agreement with its longtime management company Avports to enter into a 43-year design-build-finance-operate-maintain (DBFOM) P3 concession.⁵⁰ The FAA completed the required environmental assessment for the project in December 2023, meaning that if all mitigations are accepted, Tweed New Haven will become the first commercial airport on the U.S. mainland to operate under a long-term P3.⁵¹ Interestingly, the Tweed New Haven Airport Authority and Avports structured the agreement so that it does not require approval under the FAA's Airport Investment Partnership Program.

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... if all mitigations are accepted, Tweed New Haven will become the first commercial airport on the U.S. mainland to operate under a long-term P3.

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Other than the San Juan, Puerto Rico airport's entry into the pilot program in 2013, only the Airglades, Florida Airport has been approved to enter AIPP. The south Florida general aviation airport received final FAA approval in October 2019. Another Florida airport is now seeking to enter AIPP, with **Avon Park Executive Airport** in the south-central Florida city of

⁴⁹ Eugene Gilligan, "Connecticut City Board Supports Airport P3," *Infralogic*, 28 Sep. 2021.

⁵⁰ Liam Ford, "Board OKs First Full P3 for US Commercial Airport," *Infralogic*, 18 Aug. 2022.

⁵¹ Sophia Muce, "Feds Give Okay to Tweed Expansion with 'Finding of No Significant Impact,'" *Connecticut Examiner*, 22 Dec. 2023.

Avon Park applying to the program in September 2023.⁵² The city plans to lease the airport for 30 years to Florida Airport Management, which had previously managed the airport under contract with the city. As part of the proposed concession, the company would complete 13 improvement projects that were estimated to cost \$14.3 million in 2015.



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.



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 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 treatment of revenue bonds (tax-exempt municipal bonds for existing airports versus taxable revenue bonds for private partners) could be a causal factor.⁵³

A more optimistic outlook was offered in a report from PJ Solomon investment advisors. Their 2021 report found 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.”⁵⁴ They suggest that the interests of risk-averse municipal bondholders generally prevail over those of airlines, who will be at risk for ensuring airports’ financial viability. Hence, they suggest that it is in the interest of airlines to support private capital investment in 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.”

⁵² Airport Investment Partnership Program, *Notice of receipt of application of Avon Park Executive Airport (AVO), Avon Park Florida*, Federal Aviation Administration, 88 Fed. Reg. 65422 (22 Sept. 2023).

⁵³ Congressional Research Service, “Airport Privatization: Issues and Options for Congress,” Report R43545, 11 March 2021.

⁵⁴ Tim Bath and Shawn Kinder, “Unlocking Value in the Airport-Airline Ecosystem,” PJ Solomon, Jan. 2021.

A study released by Reason Foundation in August 2021 suggests there is good cause for continued investor interest.⁵⁵ The study used valuations from the sale and lease of airports worldwide in recent decades to estimate the potential market value of major U.S. airports owned by city, county, and state governments. It estimated the potential market value of 31 large and medium U.S. airports at \$131 billion, including Los Angeles International (\$17.8 billion), San Francisco International (\$11.9 billion), Dallas/Ft. Worth International (\$11.9 billion), and Atlanta’s Hartsfield-Jackson (\$9.2 billion). And these estimates are possibly too conservative. The report’s high-end valuations are based on 20 times earnings before interest, taxes, depreciation, and amortization (EBITDA), a widely used measure of annual cash flow.

2.4.2 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 not become a U.S. phenomenon, recent years continue to see projects that use long-term 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 an 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”

⁵⁵ Robert Poole, “Should Governments Lease Their Airports?” Reason Foundation Policy Study, Aug. 2021.

structure, since the payments are generally somewhat variable based on the facility's uptime.

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 City. More-recent projects include the \$8.9 billion Terminal One project and \$4.2 billion Terminal 7 project at JFK, both of which reached financial close in 2022. The replacement of the outdated central terminal at New York's LaGuardia Airport opened to great fanfare in December 2021 and won the 2021 UNESCO's best new airport facility competition, as well as being featured in a glowing profile of "the team that fixed LaGuardia" in an October 2022 article in *The Wall Street Journal*.⁵⁶ These projects are generally financed based on revenues generated by the terminal, so they are considered revenue-risk DBFOM P3s.



The replacement of the outdated central terminal at New York's LaGuardia Airport opened to great fanfare in December 2021 and won the 2021 UNESCO's best new airport facility competition.



In July, American Airlines and the Port Authority of New York and New Jersey announced the latest P3 terminal project at JFK.⁵⁷ To modernize Terminal 8, American selected JFK T8 Partners to develop the \$125 million project. JFK T8 Partners is a joint venture led by URW, which also includes Phoenix Infrastructure Group and Holt Construction, with Phoenix putting in a 30% equity stake. The commercial redevelopment includes a new great hall and accommodation for more than 60 retail and dining offerings.

⁵⁶ Ben Cohen, "LaGuardia Airport Is No Longer the Worst. This Team Fixed It." *The Wall Street Journal*, 15 Sep. 2022.

⁵⁷ Press Release, "American Airlines announces JFK International terminal 8 commercial redevelopment," *Infralogic*, 13 July 2023.

Smaller-scale terminal P3s are also showing promise. In August, Avports finalized a 40-year P3 agreement with the city of Manassas, Virginia to finance, develop, and operate an airline-focused passenger terminal at Manassas Regional Airport, a general aviation airport.⁵⁸ The city government will continue to manage the airport, but Avports will be responsible for the terminal and the commercial airliner parking ramp. Under the P3 agreement, Avports is responsible for all costs of attracting and serving commercial airline service. It will also pay annual ground and building rent to the city.

In July, the Virgin Islands Port Authority (VIPA) issued a request for proposals from the four bidders it had shortlisted in April to finance and modernize the two international airports in St. Croix and St. Thomas: daa International, Vantage Airport Group, Vinci Airports, and the consortium VIports Partners (comprising Aecon, Tikehau Star Infra, and Avports).⁵⁹ The expansion and modernization projects are expected to cost \$200 million for both airports. In March 2024, VIPA announced that the VIports Partners consortium had won the concession.⁶⁰

Consolidated Rental Car Facilities

In October, *Infralogic* reported that Denver International Airport is considering some degree of private financing for the construction of its new consolidated rental car center.⁶¹ If it opts to develop the new consolidated rental car facility under a long-term concession agreement, Denver International would join Los Angeles International and Newark in using P3s to modernize rental car facilities.

Cargo Facilities

In July, Los Angeles International selected LAX Community Partners to develop a P3 cargo facility.⁶² The consortium is led by global investment manager Realterm and JLC, which is a joint venture between Magic Johnson Enterprises and Loop Capital. The project will modernize and expand 27 cargo buildings totaling 2.6 million square feet.

⁵⁸ Eugene Gilligan, "Avports to invest up to USD 125m in Virginia passenger terminal," *Infralogic*, 23 Aug. 2023.

⁵⁹ Eva Llorens, "US Virgin Islands issues airport P3 RFPs to shortlisted firms," *Infralogic*, 7 July 2023.

⁶⁰ Press Release, "VIPA Board Selects Airports P3 Partner," Virgin Islands Port Authority, 26 March 2024.

⁶¹ Eugene Gilligan, "Denver airport to consider private financing for ConRAC," *Infralogic*, 31 Oct. 2023.

⁶² Eugene Gilligan, "LAX names development, design teams for cargo modernization P3," *Infralogic*, 26 July 2023.

In November 2022, the Phoenix Aviation Department issued a revenue contract solicitation for a P3 cargo facility project following approval by the city council.⁶³ The Phoenix Sky Harbor International P3 project will finance, develop, and operate a new cargo complex on a 28-acre site on the airport's northwest corner. In April 2023, the city approved a plan to proceed with the project in multiple phases, which would involve one or more developers in each phase. Demolition work was scheduled for early 2024 with a goal to begin redevelopment by late 2025.⁶⁴

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.

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The P3 Authority has had great success with its 40-year P3 lease of San Juan International, which included a large up-front payment and annual lease payments plus revenue-sharing.

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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.⁶⁵ The P3 Authority has had great success with its 40-year P3 lease of San Juan International, which included a large up-front payment and annual lease payments plus revenue-sharing. The regional airports are far smaller, so Puerto Rico initially sought only operating contracts. The Puerto Rico Ports Authority later expressed interest in a revenue-sharing concession instead due to concern about committing to \$10 million in annual management fees. But mayors from 14 southern cities urged the creation of a local airport authority to take over and contract out

⁶³ Eugene Gilligan, "Phoenix Advances Airport Cargo P3," *Inframation News*, 7 Nov. 2022.

⁶⁴ Phoenix Aviation Advisory Board, "Notice of Public Meeting," City of Phoenix, 19 Oct. 2023.

⁶⁵ "Puerto Rico P3 Authority Searches for Airport Operator," *Infralogic*, 11 Feb. 2021.

management for one of the nine, Mercedita Airport in Ponce.⁶⁶ This local political opposition ultimately led to the Ports Authority abandoning its attempt at a concession for the nine airports in September 2022.⁶⁷ However, in August 2023, the P3 Authority announced it was undertaking a feasibility study of a possible concession of the same nine regional airports.⁶⁸

⁶⁶ Eva Llorens, “Puerto Rico Mayors Pitch Alternative for Mercedita Airport,” *Infralogic*, 13 Sep. 2021.

⁶⁷ Eva Llorens, “Government Drops Proposed PPP for Nine Regional Airports,” *Infralogic*, 19 Sep. 2022.

⁶⁸ José Orlando Delgado Rivera, “El plan de privatización de aeropuertos regionales debe estar listo para fin de año,” *El Nuevo Día*, 2 Aug. 2023.

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).

That model has undergone major change since 1987 outside of the U.S., starting 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 airport and ATC charging principles promulgated by the International Civil Aviation Organization (ICAO), a United Nations 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.⁶⁹



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Table 5 provides a list of all full member ANSPs 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 5: AIR NAVIGATION SERVICE PROVIDERS, BY TYPE OF ORGANIZATION

Country	ANSP	Organizataion 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	
Austria	Austro Control	State-owned company	Also regulates
Belgium	Belgocontrol	State-owned company	

⁶⁹ Robert Poole, “Air Traffic Control as a Quasi-Private Corporation,” eds. Robert Clark and Simon Hakim, *Public-Private Partnerships*, Springer: 2019.

Country	ANSP	Organizataion Type	Notes
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	AirNav Ireland	State-owned company	
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 Moçambique	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	Slovenia Control	State-owned company	
South Africa	ATNS	State-owned company	
Spain	ENAIRES	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	
Vietnam	VATMC	State-owned company	
Zambia	NACL	State-owned company	
Bangladesh	CAAB	Civil aviation authority	Financially autonomous
Cyprus	DCA Cyprus	Civil aviation authority	

Country	ANSP	Organizataion Type	Notes
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	
Kingom 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	LVNL	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 (2024) 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.⁷⁰

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,

⁷⁰ ICAO, *Safety Oversight Manual*, Doc. 9734, Part A, Paragraph 2.4.9, 2006.

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.”

In addition to those are three intergovernmental entities that operate as multi-jurisdictional ANSPs for specific airspaces. Maastricht Upper Airspace Control Center (MUAC) provides ATC services at altitudes above 24,500 feet for Belgium, Luxembourg, the Netherlands, and northwestern Germany. COCESNA provides ATC services for six Central American countries. And ASECNA provides ATC services for 17 countries in Africa and two overseas departments and regions of France, Réunion and Mayotte. All three charge ICAO-based user fees and operate as corporatized ANSPs.

Table 5 answers 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 83.

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

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 generally equipped with ADS-B transponders that broadcast the plane's identity, GPS position, speed, and other data every three seconds. That signal is detected by the new satellites and retransmitted 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 it is only available to ANSPs that subscribe to the service.



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 it 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 in over 248 million sq. km. of the earth's service—nearly 49% of the total.⁷¹ Subsequent additions brought Aireon's subscriber coverage to over half of the world's airspace as of March 2024.⁷² Subscribers include the ANSPs of Azerbaijan, Canada, Denmark, the Dutch Caribbean, Hong Kong, Iceland, India, Ireland, Portugal, Singapore, South Africa, the U.K., and three multi-country providers: Eurocontrol's MUAC, the six COCESNA countries of Central America, and the 17 African countries of ASECNA.

Aireon is a joint venture of Iridium and five ANSPs: ENAV, AirNav Ireland, NATS, Nav Canada, and Naviair (Denmark). The first to implement oceanic ADS-B service were Nav Canada and NATS across the North Atlantic. While that was 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 period of the trial, with further reductions likely once performance has been measured and analyzed. Results during 2019 showed significant savings in time and fuel (and hence CO₂ emissions), as well as safety benefits

⁷¹ Press Release, "NiuSky Pacific Begins Operational Usage of Aireon Data," Aireon, 20 March 2021.

⁷² Emily Feliz, "Aireon to Begin Development of Space-Based VHF Communications Services to Augment its Industry-Leading Surveillance System," Aireon, 7 March 2024.

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 (OTS). In 2021, the two ANSPs operated without OTS for 20 days, on which airlines submitted their preferred flight tracks for approval.⁷³ The next step is to completely eliminate OTS.

Aireon’s competition until recently has come from 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).⁷⁴ 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. 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.⁷⁵ In 2023, Inmarsat was sold to U.S. satellite communications company Viasat.⁷⁶



The first five satellites were launched via a SpaceX Falcon 9 launch vehicle from Cape Canaveral in January and were successfully activated in LEO later that month.



The competitive landscape may be changing. Canberra-based Skykraft reached an agreement with Airservices Australia to launch and operate a 200-satellite constellation to improve ADS-B coverage in Australia and its oceanic airspace. The first five satellites were launched via a SpaceX Falcon 9 launch vehicle from Cape Canaveral in January and were

⁷³ Tony Osborne, “ANSPs Start Scaling Back North Atlantic Organized Track Structure,” *Aviation Daily*, 9 Feb. 2022.

⁷⁴ 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.

⁷⁵ “Inmarsat Acquired by Private Equity Consortium for \$3.4bn.” *Air Traffic Management*, 25 March 2019.

⁷⁶ Kerry Reals, “Viasat completes Inmarsat acquisition,” *FlightGlobal*, 5 June 2023.

successfully activated in LEO later that month.⁷⁷ Skykraft launched a second batch of satellites on a Falcon 9 from California's Vandenberg Space Force Base in June, bringing the total to 10.⁷⁸ The service will include controller-pilot VHF communications in addition to ADS-B surveillance. Subsequent launches to complete the initial satellite constellation are scheduled for 2024, with space-based ADS-B service to go live in 2025.⁷⁹

In addition, it was announced in May 2021 that Spanish ANSP Enaire had teamed with Indra in creating a new company called Startical, whose aim is to develop a space-based system to provide both ADS-B surveillance and VHF communications between pilots and controllers.⁸⁰ The plan would make use of a constellation comprising at least 240 satellites in low-Earth orbit. The company said in September 2023 that it plans to put its first demonstrator satellite into orbit "around 2025."⁸¹

In 2019, the 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 En Route Automation Modernization (ERAM) system at Miami Center to control traffic between Miami and San Juan, but the FAA also modified the Advanced Technologies and Oceanic Procedures (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 the FAA was developing a one- to three-year roadmap to expand its use of space-based ADS-B. And in November 2020, the 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.⁸² FAA has so far declined to subscribe to Aireon's space-based ADS-B service.

⁷⁷ Press Release, "Australia's largest ever satellite constellation now active," Skykraft, 12 Jan. 2023.

⁷⁸ Press Release, "Skykraft lifts off with another Air Traffic Management satellite stack for 2023," Skykraft, 13 June 2023.

⁷⁹ Press Release, "Skykraft secures >\$100M of investment to transform Air Traffic Management," Skykraft, 19 Oct. 2023.

⁸⁰ Graham Warwick, "Spain Plans Space-Based Surveillance Communications Constellation," *Aviation Daily*, 2 June 2021.

⁸¹ Juan Pons, "Indra and ENAIRE want Startical to pioneer integrated air traffic control worldwide," *Atalayar*, 29 Sept. 2023.

⁸² Robert Poole, "FAA to Use Aireon Space-Based ADS-B Data," *Aviation Policy News*, Nov. 2020.

3.3 DIGITAL, REMOTE AIR TRAFFIC CONTROL TOWERS

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 FAA evaluated carrying out tower 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 decreased workload.⁸³ Despite these very positive results, the FAA declined to pursue remote tower deployments.

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, Romania, and the U.K., among others. 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. An August 2023 market forecast from Kings Research projected the global remote tower market to grow from \$129 million in 2022 to \$1.3 billion by 2030.⁸⁴

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⁸³ Daniel Hannon, et al., “Feasibility Evaluation of a Staffed Virtual Tower,” *Journal of Air Traffic Control*, Vol. 55, No. 1, 2013.

⁸⁴ “Remote Towers Market: Global Industry Analysis and Forecast 2023-2030,” Kings Research, Aug. 2023.

During the past year, there were several new remote and digital tower developments in Europe.

- In July, London Heathrow announced an agreement with NATS to develop a replacement virtual contingency facility, which is to be operational in 2025.⁸⁵ Since 2009, an existing virtual contingency facility has offered the ability to operate 70% of airport ATC activity in the event of a major outage. The replacement facility initially will use newer technology to offer the same 70% backup capacity, but a planned second phase would bring it to 100%.
- In September, it was reported that DFS Aviation Services (a division of DFS, the German ANSP) contracted with Lithuania's ANSP Oro Navigacija to conduct a feasibility study of using remote/digital towers at four airports (Kaunas, Palanga, Šiauliai, and the capital Vilnius).⁸⁶
- In October, *Air Traffic Management* reported that Searidge will install an advanced remote/digital tower at Farnborough Airport in the U.K.⁸⁷ It will provide controllers with customizable views of the entire airfield based on ADS-B surveillance and head-up labeling of objects in view. In particular, the new facility will allow controllers to monitor all ground vehicles (in addition to aircraft) thanks to ADS-B tags. These features will be especially important during low-visibility conditions such as fog.
- In February 2024, Frequentis DFS Aerosense was awarded a contract to install a virtual tower validation system at Munich Airport.⁸⁸ Once up and running, the system will be used to evaluate the viability of remote/digital towers at larger hub airports such as Munich.

By contrast, remote tower progress in the United States has been very slow. In the 2018 FAA reauthorization, Congress authorized a pilot program under which the agency would develop and test five remote towers at five different locations, but did not provide funding. Two U.S. remote tower projects have begun the FAA certification process, one in Leesburg,

⁸⁵ Noah Bovenizer, "New back-up air traffic control centre for Heathrow," *Airport Technology*, 20 July 2023.

⁸⁶ "Oro Navigacija considers remote tower technology," *Air Traffic Management*, 7 Sept. 2023.

⁸⁷ "Hybrid remote tower expands in the UK," *Air Traffic Management*, 4 Oct. 2023.

⁸⁸ Press Release, "FREQUENTIS DFS AERSENSE to install validation system for a virtual tower at Munich Airport," DFS Aviation Services, 27 Feb. 2024.

Virginia, and the other at Loveland, Colorado, near Fort Collins. They have been funded by a combination of state funds and private investment, not by the FAA.⁸⁹

In addition to these two projects, two others are in preliminary planning stages.

In Selma, Alabama, local officials have proposed a remote tower center at Craig Field, a former Air Force base. If approved, this would be the first remote tower center in the U.S.⁹⁰ The Selma Economic Development Authority has reached agreements with Advanced ATC, Inc., a firm founded by former FAA air traffic control managers, and Spain's Indra, which has developed and deployed remote/digital towers in Europe.

In North Carolina, the city of Concord signed a P3 agreement with Norwegian technology provider Kongsberg in April 2022 to replace the aging conventional control tower at Concord-Padgett Regional Airport with a modern remote tower.⁹¹ Kongsberg stated that it planned to begin the FAA certification process in 2023.

In November 2021, the FAA issued an "operational viability decision" on the Saab Remote Tower System at Leesburg authorizing it to continue managing traffic without a backup mobile tower.⁹² This was not official certification, but it did trigger the type certification process between Saab and the FAA, which would allow the Leesburg remote tower to be approved as a non-federal system within the National Airspace System. Congress included \$4.9 million in FY 2022 appropriations to fund contract controllers for type certification at Leesburg, as well as fund operational viability testing at Fort Collins.⁹³

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... in February 2023, the FAA announced it would terminate the operations of the Leesburg remote tower on June 14.

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⁸⁹ Robert Poole, "Remote Towers: Europe Many, U.S. Zero," *Aviation Policy News*, 21 May 2021.

⁹⁰ Robert Poole, "More Remote Towers Coming to the United States," *Aviation Policy News*, 27 June 2022.

⁹¹ Press Release, "Kongsberg and the City of Concord Complete First Milestone Toward Air Traffic Management Modernization," Kongsberg Gruppen, 20 Apr. 2022.

⁹² Robert Poole, "More on FAA and Remote Towers," *Aviation Policy News*, 22 Nov. 2021.

⁹³ Consolidated Appropriations Act, 2022, H.R. 2471, Division L Explanatory Statement, 15 March 2022.

However, in February 2023, the FAA announced it would terminate the operations of the Leesburg remote tower on June 14.⁹⁴ Saab had sent a letter to the FAA in 2022 announcing that it was pulling out of the project after nine years. The company told *The Washington Post* that it “determined there is no reasonable path for approval” under the FAA’s shifting certification requirements.⁹⁵ The FAA’s primary internal advocate of the technology, its former vice president of air traffic services, had also been reassigned to another role within the agency in 2022.

Following the news out of Leesburg, it was reported that the Fort Collins remote tower project was “on life support.”⁹⁶ Vendor Searidge pulled out of the Colorado tower project in October. The local project sponsors have brought in Frequentis and Raytheon in an attempt to salvage progress made to date and complete system design approval, but FAA is no longer supporting the project.⁹⁷

While less advanced than Leesburg or Fort Collins, Friedman Memorial Airport in Hailey, Idaho also reconsidered a remote tower after running into problems at FAA. The board of Friedman Memorial announced in April 2021 that it planned to develop a request for proposals for a digital remote tower and seek FAA approval to enter its pilot program. In January 2022, Friedman Airport selected a Frequentis/Raytheon partnership as the main technology vendor. But the airport ultimately decided to pursue a conventional brick-and-mortar tower, citing FAA’s costly requirement to obtain certification at the Tech Center in Atlantic City and federal funding made available only to conventional tower projects.⁹⁸

These latest setbacks suggest the FAA bureaucracy is resistant to remote and digital tower technology, and that further congressional intervention is likely necessary to break this logjam. Both the House’s and Senate’s proposed FAA reauthorization bills in 2023 included provisions designed to clear a path for remote towers.

⁹⁴ Robert Poole, “Is FAA Giving Up on Remote Towers?” *Aviation Policy News*, 23 March 2023.

⁹⁵ Lori Aratani, “This air traffic control system helped to grow flights. Now it’s being shut down.” *The Washington Post*, 11 Apr. 2023.

⁹⁶ David Hughes, “Colorado Airport’s Remote Tower on Life Support,” *Aviation International News*, 11 Apr. 2023.

⁹⁷ Bill Carey, “Colorado Advances Digital Tower Effort Dropped by FAA,”

⁹⁸ Emily Jones, “Friedman reports ‘very healthy’ revenues ahead of major capital projects,” *Idaho Mountain Express*, 17 Jan. 2024.

3.4

U.S. AIR TRAFFIC CONTROL REFORM

Efforts to have the United States corporatize its ATC system, joining the global trend, began in earnest during the Clinton administration. The idea was proposed by Vice President Al Gore's National Partnership for Reinventing Government, and then studied in depth by a task force in the Office of the Secretary of Transportation. That effort failed due to lukewarm support from airlines, strong opposition from the private plane community, and the 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).⁹⁹ 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 Aircraft Owners and Pilots Association (AOPA) and National Business Aviation Association (NBAA), as well as all federal employee unions except the air traffic 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 Republican leadership did not bring it to the floor, lacking the votes to ensure passage, due in part to an unfulfilled White House commitment to lobby wavering Republican members.¹⁰⁰ 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. FAA reauthorization was enacted later in 2018 with no ATC reform title. ATC governance reform was not considered by Congress as it debated the latest FAA reauthorization in 2023.

⁹⁹ Robert Poole, "Air Traffic Control as a Public Utility," Reason Foundation Policy Study, 15 June 2023.

¹⁰⁰ Lauren Gardner, "How ATC Got Grounded," *Politico*, 2 April 2018.

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