ANNUAL PRIVATIZATION REPORT: AVIATION

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PART 1

INTRODUCTION

Three decades ago, airports and air traffic control were organized as government departments essentially everywhere in the world. Two landmark events in 1987 began a momentous change in this status quo. First, the reformist government of New Zealand, led by Labor Finance Minister Roger Douglas, converted the air traffic control system from a tax-funded entity (part of the Ministry of Transport) into a free-standing government corporation, supported by charges levied on aircraft making use of ATC services. That led to a paradigm shift, under which some 60 countries corporatized or privatized their ATC systems in the 30 years that followed. Also in 1987, the reformist U.K. Conservative government of Prime Minister Margaret Thatcher privatized (via a public share offering) the British Airports Authority, operator of the three largest London airports. This, too, led to a paradigm shift under which airports around the world have been sold or long-term leased in the subsequent 30 years.

This report reviews developments in airports, air traffic control, and airport security in 2018, with an emphasis on corporatization, privatization, and long-term public-private partnerships. It includes discussion of the changing patterns of ownership among the major private-sector operators and funders of airports, and the implications of these paradigm shifts on investment and modernization of aviation infrastructure.

PART 2

AIRPORTS

2.1 AIRPORT PRIVATIZATION OVERVIEW

Broadly speaking, “airport privatization” can mean any of three different ways of involving the private sector. Most common in Western Europe is the sale of either 100% or a significant fraction of ownership shares. Most of the U.K. privatizations sold 100% of the airports, whereas most of those in Germany sold a minority stake, with other stakes retained by national and/or state governments. A second approach is competitive bidding for a long-term lease of an entire airport, managed by the winning team as a long-term public-private partnership (PPP). This approach is common in most Latin American and Caribbean countries and was also the primary mode used in Australia. A third approach is the use of a long-term PPP to design, build, finance, operate, and maintain (DBFOM) a major facility at an airport, such as a terminal, a runway, or a parking/rental car facility. This approach has had a recent growth spurt in the United States and has been used for major facilities at airports in some other countries.

Airports Council International in 2018 released a policy paper on airport privatization trends worldwide.[1] Table 1, adapted from this report, shows that, as of 2017, 43% of world air passenger traffic was handled by airports with private-sector investment. That fraction was highest in Europe (75%) and lowest in North America (1%).

TABLE 1: AIR PASSENGER TRAFFIC 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.

The three-decade growth of airport privatization has led to the creation of global airport companies, the largest of which now manage and invest in dozens of airports. A number of these companies are interested in bidding on sale or PPP lease opportunities that open up in various countries, often in concert with infrastructure investment funds.

Table 2 ranks the largest investor-owned airport companies according to their revenue in 2017. Of the world's 100 largest airport companies, as tracked by *Flight Airline Business*, 40 are partially or entirely privately owned.[2]

As can be seen from the table, the world's four largest airport groups are investor-owned, as are 11 of the world's 25 largest. By total revenue, the top 15 investor-owned companies, with total revenue of $24.3 billion, account for over 27% of the $89.4 billion 2017 revenue of the world's 100 largest airport groups.

There is empirical evidence that privatized airports are more "passenger-friendly." That research finding is borne out by the last column in Table 2, which provides rankings from the 2018 Skytrax survey of global airport travelers on their highest-ranked airports.[3] Twenty-seven of the 40 largest investor-owned companies have a major airport in the Skytrax top 100. As a point of comparison, only 13 U.S. airports made it into the Skytrax top 100, with only four in the top half (Denver at #29, Cincinnati at #34, Houston Bush at #48, and Atlanta at #50). Of the top 100 airports in the Skytrax survey, 39 have private investment.

TABLE 2: LARGEST INVESTOR-OWNED AIRPORT COMPANIES, 2017

Airport Company	Global Rank	HQ Country	Main Airport(s)	2017 Revenue ($M)	Privatization Status	2018 Skytrax Rank
Aena Aeropuertos	1	Spain	Madrid	4,582	Partial	43
Aeroports de Paris	2	France	Paris, CDG	4,112	Partial	37
Heathrow Airport Holdings	3	UK	Heathrow	3750	Full	8
Fraport	4	Germany	Frankfurt	3,337	Partial	10
New Kansai	12	Japan	Kansai	1863	Full	13
Airports of Thailand	15	Thailand	Bangkok	1648	Partial	36
Beijing Capital	16	China	Beijing	1422	Partial	33
TAV Airports	19	Turkey	Istanbul	1314	Full	
Sydney Airport Group	23	Australia	Sydney	1140	Full	20
Aeroporti di Roma	24	Italy	Rome	1136	Full	85
Manchester Airports Group	25	UK	Manchester	1094	Partial	
Malaysia Airports Holdings	26	Malaysia	Kuala Lumpur	1086	Partial	44
Flughafen Zürich	28	Switzerland	Zürich	1058	Partial	9
Gatwick Airport	30	UK	Gatwick	1022	Full	54
Guangzhou Baiyun	31	China	Guangzhou	1005	Partial	
Aeroportos de Portugal	35	Portugal	Lisbon	892	Full	57
Flughafen Wien	36	Austria	Vienna	856	Full	17
GMR Airports	37	India	Delhi	842	Partial	66
SEA Group	39	Italy	Milan	825	Partial	
Aeropuertos Argentina	43	Argentina	Buenos Aires	757	Full	
Copenhagen Airports	45	Denmark	Copenhagen	678	Partial	19
ASUR Aeropuertos Del Suresta	47	Mexico	Cancún	663	Full	
GAP Groupo Aeroportuario del Pacifico	48	Mexico	Guadalajara	655	Full	
Australia Pacific Airports	50	Australia	Melbourne	643	Full	27
Brussels Airport Co.	51	Belgium	Brussels	624	Full	91
Düsseldorf Airport	54	Germany	Düsseldorf	549	Partial	30
Airports Co. South Africa	55	South Africa	Cape Town	536	Partial	21
Brisbane Airport	58	Australia	Brisbane	512	Partial	22
Athens International Airport	64	Greece	Athens	493	Partial	
Auckland International	66	New Zealand	Auckland	450	Patial	24
Perth Airport	70	Australia	Perth	399	Full	59
Budapest Airport	72	Hungary	Budapest	390	Full	90
OMA, Operadora Mexicana de Aeropuertos	83	Mexico	Acapulco	307	Full	
Hamburg Airport	84	Germany	Hamburg	301	Partial	25
Aeroports de la Cote d'Azur	85	France	Nice	300	Partial	98
AGS Airports	87	UK	Glasgow	272	Full	
Edinburgh Airport	92	UK	Edinburgh	240	Full	
SAVE Group	94	Italy	Venice	226	Partial	
Aeroports de Lyon	97	France	Lyon	212	Partial	
Birmingham Airport Holdings	98	UK	Birmingham	208	Partial	86
Total Revenues				$42,399		

2.2 AIRPORT INDUSTRY CHANGES IN 2018

One of the most significant developments in 2018 was the rise of France's Vinci Airports into a major global airports provider. In mid-year, Vinci acquired 100% of Airports Worldwide—which held 12 airport concessions and operating contracts—from Canadian pension fund OMERS. Besides expanding its scope, the deal gave Vinci its first U.S. operations, including the long-term concession for the Orlando Sanford Airport terminals and management contracts for Hollywood Burbank and Ontario (CA) International. Non-U.S. acquisitions from OMERS include 100% of Belfast International, 91% of Skvasta Airport in Sweden, and close to 50% of concessions for the two largest airports in Costa Rica. Adding its pre-OMERS concessions and contracts, which included airports in France, Latin America, and Japan, Vinci had responsibilities at 45 airports in 11 countries, serving more than 180 million annual passengers.

As if that were not enough, at year-end Vinci acquired, from Global Infrastructure Partners (GIP), 50.01% of the shares in London Gatwick Airport, for $3.7 billion, which achieved financial close in May 2019.[4] Gatwick currently handles 46 million annual passengers, bringing Vinci Airports' total to 226 million. The purchase price represented 20 times the airport's earnings before interest, taxation, depreciation and amortization (EBITDA).

The Gatwick transaction makes Vinci Airports the world's second-largest (by passengers) airport company, and will move it into the top ranks of companies by revenue in future revenue-based league tables such as Table 2. The move also increased investor interest in the European airports sector.[5]

Among other noteworthy corporate and infrastructure fund transactions in 2018 were the following:

- Ontario Teachers' Pension Plan (OTPP) sold part of its interest in two U.K. airports, Birmingham and Bristol.[6] Two Australian pension funds—T Corp and Sunpower Superannuation Fund—bought 30% of Bristol Airport and 14.4% of OTTP's minority stake in Birmingham Airport.
- Fraport sold 10% of its 40-year concession to upgrade and operate 14 regional airports in Greece.[7] The buyer was Marguerite Fund, which invests in infrastructure projects on behalf of European development banks.

- Infrastructure fund Meridiam and Aeroports de Paris paid $267 million to acquire a majority interest in the 25-year concession for Jordan's Queen Alia International Airport.[8] The sellers were two Middle Eastern investment funds.
- U.K. infrastructure fund InfraRed sold its 80% stake in Canada's Iqaluit International Airport to a Canadian fund, Concert Infrastructure.[9] The other owners are Bouygues (10%), Sintra (5%), and Winnipeg Airport Authority (5%). Nunavut Airport Services, a division of the Winnipeg Airport Authority, operates the facility. The airport was developed under a 34-year DBFOM concession awarded in 2013.
- Airports investor AMP Capital purchased French fund manager Ardian's 49% stake in London's Luton Airport, for a sum exceeding $1 billion.[10]
- Manchester Airports Group, which includes Manchester, London Stansted, and East Midlands Airport, sold the Bournemouth Airport to RCA, a division of the Rigby Group, at the end of 2017.[11]
- In August, fourth-ranked Fraport agreed to sell its 30% stake in Flughafen Hanover-Langenhagen Airport to iCON Flughafen, a division of iCON Infrastructure Group, for $124 million.[12] As is typical of German airports, the remaining 70% is owned by the city of Hanover and the state of Lower Saxony. Hanover is Germany's ninth-busiest airport.
- In October, *Infrastructure Investor* reported that the Canada Pension Plan Investment Board (CPPIB) was looking into buying 42% of GIP's stake in London Gatwick Airport,[13] a move that was apparently pre-empted by the year-end Vinci transaction noted previously. Other investors in the airport include the Abu Dhabi Investment Authority, California's CalPERS public pension fund, Australia's Future Fund, and the National Pension Service of Korea.
- Finally, in another indication of growing investor interest in airports, in November Carlyle Group announced a joint venture with Munich Airport International (MAI) to focus on the North American airport market.[14] Called Reach Airports, the new company in early 2019 hired as its CEO Ginger Evans, who was the aviation director for the city of Chicago as it developed and implemented a major runway and terminals modernization program. Amit Rikhy, a veteran of Canadian airport manager Vantage Airport Group, runs Carlyle Airport Group Holdings and oversees Reach Airports for Carlyle.

2.3

GLOBAL AIRPORT PRIVATIZATIONS AND PPP CONCESSIONS

Between the Vinci Airports purchase of a majority stake in London Gatwick and the impending privatization of Groupe ADP in France, Europe attracted the largest amount of interest in airport transactions in 2019.[15] But significant transactions continue to occur in Latin America and Asia too, as airport privatization and PPPs continue to be a global phenomenon. Herewith, a recap of activity by geographical area. The special case of the United States is addressed in section 2.4.

2.3.1 EUROPEAN AIRPORTS

As noted above, Europe continues to be a major focus of interest for airport investors.[16] Here is a country-by-country recap of announced and implemented transactions in 2018.

Bulgaria re-launched the privatization process for Sofia Airport in mid-2018, after a previous effort had failed to attract much investor interest. The government enacted a revised PPP concessions law in 2017, which will apply to the Sofia procurement. It is offering a 35-year concession, including a requirement for the winner to add a third terminal by the 10th year.[17] Companies reported to be interested include a team of Meridiam and Flughafen Zürich, another of IFM with Manchester Airports Group, and potentially ADP, Bouygues, Fraport, GMR Infrastructure, Macquarie, and Vinci.[18]

The biggest news in **France** is that the long-planned privatization of ADP Groupe was back on, as of early 2019, when the French parliament adopted the government's "Loi Pacte" reform bill, which includes offering the government's 50.6% stake in the company (estimated to be worth $10 billion).[19] The plan is to offer a 70-year PPP concession of the company, which owns and operates the three main Paris airports and operates a total of 34 airports on four continents. A new obstacle surfaced in May 2019, when a court announced that opponents have the right to try for a referendum on whether the ADP lease should go forward.[20] ADP has announced that it plans to invest $6.7 billion in the Paris airports to prepare for an expected doubling of traffic over the next 20 years.[21] Other French airports that may be offered to investors include Marseille Provence and Montpellier, following privatizations of Lyon, Nice, and Toulouse in 2015 through 2016.[22] There is also discussion that a further stake in Toulouse may be offered in 2019, including possibly the national government's 10% stake.

In **Germany**, Fraport in August received a building permit from the city of Frankfurt for a new pier that will be integrated into its future Terminal 3 at Frankfurt International Airport. Construction of this Pier G began in spring 2019, with an opening planned for summer 2021.[23]

The 30-year concession for **Greece**'s Athens International Airport, which was to have expired in 2026, is being extended until 2045. To negotiate the agreement, original concession company AIA agreed to pay a much-needed $1.2 billion to the financially stressed Greek government. It also agreed to invest $3.2 billion in expanding the airport's capacity to cope with projected growth. The government is expected to sell its existing 30% stake in the airport in 2019.[24] Separately, in September, Fraport broke ground on the new terminal it agreed to build at Thessaloniki Airport. The company is also reconstructing the runway and apron areas, and installing a modern baggage-handling system. Thessaloniki is one of 14 airports in Fraport's Greek regional airports concession.

Italy's latest airport privatization process kicked off in November for Trieste Airport in the northern part of the country. The regional government is selling a 55% stake in the airport. In January 2019, an apparent winning bid was submitted by F2i, which holds controlling stakes in the Alghero, Naples, and Turin airports.[25] On the expected privatization agenda for 2019 is Catania-Fontanarossa Airport in Sicily.[26]

Montenegro has begun the privatization process for its Podgorica Airport, with an expected concession length of 25-30 years. A formal Request for Qualifications was expected in the first quarter of 2019. Companies reported to be interested include Incheon International Airport Corporation, TAV Airports, and Vinci Airports.[27]

In **Portugal**, Vinci (which owns 95% of ANA, Airports of Portugal), announced in January 2019 that it will invest $1.32 billion to expand the existing Lisbon airport and to convert a former military base near Lisbon into an airport for low-cost carriers.[28] This dual-hub system is intended to cope with rapid passenger growth in Portugal in coming decades.

Romania is planning to privatize Cluj International Airport, whose traffic is almost double that of previously privatized Ljubljana Airport.[29]

Serbia launched the process to privatize Nikola Tesla Airport in Belgrade in March 2018, with Vinci Airports besting three other bidders for a 25-year concession that achieved financial close in December. The company paid an up-front concession fee of $574 million and has agreed to airfield and terminal upgrades of $435 million.

In the **U.K.**, privatized London Gatwick's owners announced a $1.48 billion expansion plan in June, aiming to reach a capacity of 53 million annual passengers by 2023.[30] The largest project in the plan is to extend Pier 6 to provide six additional gates and aircraft stands. Gatwick has also begun work on a new master plan to replace the one adopted in 2012, and has requested government permission to use its taxiway that is parallel to its single runway for aircraft take-offs. Also in the U.K., a stake in privatized Edinburgh Airport is expected to be put on sale in 2019.

2.3.2 LATIN AMERICAN AND CARIBBEAN AIRPORTS

Argentina pioneered airport privatization in South America, having leased its 35 largest airports in 1998 to Aeropuertos Argentina 2000 (AA 2000). During 2018 the number of passengers handled by these airports increased 6.7%, to 38 million. AA 2000 has been shifting international services to Ezeiza, one of the two major airports serving Buenos Aires. A $175 million expansion of that airport is under way, aiming to quadruple the square footage of its terminals, while adding a new parking structure and improved taxiways.[31]

Brazil's new conservative government announced that it would privatize all remaining state-owned airports, aiming to generate $1.7 billion over the next several years.[32] It held a March 15, 2019 auction of 30-year concessions for three groups of regional airports, which yielded $630 million in up-front fees. Flughafen Zürich won the concession for the southeast airports, and AENA won the northeast set; a consortium of local firms won the center-west airports.[33] The winners have committed to invest at least $390 million in these airports over the next five years. Further airport auctions are promised in 2020 and 2021.

Chile has entered numerous infrastructure concessions, and one of its largest was for the Arturo Merino Benitez Airport serving the capital city, Santiago. In 2015 a consortium of ADP, Vinci Airports, and Astaldi Concessioni won a new 20-year concession to expand and modernize the airport. As part of that project, in December 2018 the consortium opened a new, five-gate terminal expansion; a $900 million international terminal with a capacity of 30 million annual passengers is under construction, scheduled to open by early 2021.[34] Despite the heavy focus on Santiago, Chile is not neglecting its regional airports. In April 2018, it awarded a six-year concession for improvements and operation of the country's fourth-largest airport, El Tepual.[35] French infrastructure company Sacyr was the winning bidder. In January 2019, the government awarded a 15-year concession to a Sacyr team to expand and improve the Chacalluta de Arica regional airport near the Peruvian border. It will include doubling the square footage of the passenger terminal and adding more boarding gates, administrative buildings, and a new control tower.[36]

Years ago, **Colombia** awarded separate concessions for the terminal and the runways at El Dorado International Airport, the country's largest, in capital city Bogotá. In 2018 the government announced a $2.3 billion program to upgrade El Dorado, add a second airport for Bogotá, and upgrade nine regional airports. The plan was announced by state infrastructure agency ANI, and will make use of PPP concessions. The second airport was proposed by the concession company for El Dorado, and would be built 15 to 20 km from the city center and sized for 2.9 million annual passengers.[37]

After several attempts to develop a workable concession model for the country's second-largest airport—Kingston—the government of **Jamaica** succeeded in 2018. The preferred bidder, Grupo Aeroportuario del Pacifico (GAP), was announced in September 2018. The 25-year concession requires GAP to expand and modernize the Norman Manley International Airport. Financial close on the concession is expected sometime in 2019. GAP operates 12 airports in Mexico, its home country, under 50-year concessions.[38]

In **Mexico**, the new government of President Andrés Manuel López Obrador (known as AMLO) cancelled the $13 billion new airport for Mexico City that was already one-third completed. Buyers of $6 billion of airport revenue bonds (backed by revenues from the existing Mexico City Airport) were offered a buyout of up to $1.8 billion, and the eventual outcome for bond-holders is unclear.[39] The need for a replacement of the capacity-constrained existing airport had been documented in a study by MITRE Corporation, which recommended the chosen construction site. The new government is proceeding instead with a three-airport model that includes adding some additional capacity at the existing airport, adding $3.8 billion in commercial facilities at the Santa Lucia military air base, and expanding the existing small commercial airport at Toluca.[40] Despite stiffing the airport bond-holders, the government expects that its planned $7.7 billion, 500 km Tren Maya rail project will attract private investment for 90% of its cost.[41]

Peru is another success for airport concessions. In 2001 Lima Airport Partners (LAP), originally consisting of Fraport and two other firms, won a 30-year concession for the Jorge Chavez International Airport serving the capital city. Since then, the airport's passenger volume has increased by 500%, overwhelming its design capacity of 10 million passengers per year. In 2017 LAP negotiated a 10-year extension of its concession. This enabled it to commit to a $1.5 billion expansion plan to add a second runway and a new terminal complex, bringing annual capacity to 35 million per year. The new investment will dwarf the $400 million that LAP has invested thus far under the 2001 concession.[42] Peru has also begun procurement for a concession to upgrade and operate eight regional airports, with an estimated capital investment of $600 million. Conceptual proposals are being sought during the first half of 2019.[43]

2.3.3 ASIAN AND AUSTRALIAN AIRPORTS

India's airport program includes both privatization of existing airports and DBFOM PPPs to develop all-new airports. Of the latter category, two major efforts took place in 2018. The larger of these concerned the long-planned second airport for Mumbai, the Navi Mumbai International Airport. In January 2018, the government's City & Industrial Development Corporation of Maharashtra signed a long-term concession agreement with winning bidder GVK Power & Infrastructure. The concession is for 30 years, with a possible 10-year extension, with financial close on the $2.3 billion project achieved in July 2018.[44] The new airport's initial capacity will be 10 million annual passengers, with an eventual capacity of 60 million.

The second greenfield airport project is for the Bhogapuram Airport in Andhra Pradesh, for which seven teams submitted qualifications for the 40-year DBFOM concession.[45] The top-ranked bidder was GMR Airports Ltd., but in February 2019 the government cancelled the bidding process, after the Airports Authority of India objected to the competition that the new airport would provide to its existing Vizag Airport, which bidders had assumed would be shut down once the new airport opened.[46]

India's program of privatizing existing airports via long-term PPP leases, which has included the major hubs of Delhi and Mumbai in recent years, continued in 2018. In November, the government announced that it would privatize six regional airports by March 2019: Ahmedabad, Guwahati, Jaipur, Lucknow, Mangaluru, and Trivandrum.[47] There was spirited bidding, based on the per-passenger charge each company proposed to charge. In the end, Adani Group emerged as the winner of all six.[48] The concession term for each will be 50 years.

Japan's ongoing airport privatization program continued in 2018. The largest such long-term PPP concession (at $2.37 billion)—for New Kansai and Osaka International Airports—

reached financial close in January 2016, with a 44-year term. Several much smaller airport PPPs were finalized in 2016 (Sendai Airport) and 2017 (Kobe and Takamatsu Airports). Reaching financial close in 2018 was the 30-year concession for Fukuoka International Airport, won by a joint venture of Singapore's Changi International Airport and Mitsubishi Corporation.[49] The government that year announced future concessions for the airports of Kumamoto and Hokkaido.[50]

In September 2018, Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) shortlisted three teams for the concession of the seven Hokkaido airports. The three teams are led by HKK, Vinci-Orix, and ADP.[51] Only one of the seven airports—New Chitose International—is profitable, leading to expectations of a bid in the vicinity of $1.36 billion for the set of seven. Selection of the winner could be as early as July 2019.[52] Another, much-smaller concession is in MLIT's pipeline: a 30-year concession of the Hiroshima Airport, which serves around three million annual passengers, is expected to be offered in 2021.[53]

Russia saw an important PPP development at the end of 2018. Since the demise of the Soviet Union, all three airports serving Moscow have been operated by investor-owned companies, but they have not had responsibility for capital investments. But on Dec. 25, 2018 the government air transport agency, Rosaviatsiya, signed a 49-year concession agreement with Moscow Sheremetyevo International Airport (SVO) under which the company can now invest in the airport's infrastructure. SVO has announced plans to invest $890 million to improve runways, taxiways, and aprons. Rosaviatsiya plans to sign concession agreements with the other two Moscow airports—Domodedovo and Vnukovo—in 2019.[54]

Vietnam has been taking steps toward airport privatization. In 2017, the state-owned Airports Corporation of Vietnam (ACV) signed a preliminary agreement under which Aeroports de Paris (ADP) would take a 20% stake in the company (which operates Vietnam's seven international airports and 15 domestic ones). That deal was not completed. But December 2018 saw the official opening of Vietnam's first privately operated airport: Van Don International. It was developed by real estate company Sun Group under a build-operate-transfer (BOT) model. The airport is projected to handle half a million passengers in 2019 and 2.5 million in 2020.[55]

ADP's Julien Coffinier, managing director for the Asia Pacific region, says the company is monitoring possible airport privatization opportunities in India, Indonesia, and the Philippines.[56]

Australia privatized its major airports two decades ago via long-term PPP concessions. With the country's largest airport, Sydney, being capacity constrained, a big question for several years was whether concession-holder Sydney Airport Group would seek to be the developer/operator of the long-planned second airport. That question was resolved in 2016 when the company opted not to pursue the new airport. The New South Wales government in 2017 created Western Sydney Airport Co. (WSA) as a state-owned enterprise. In mid-2018 WSA awarded contracts to (1) level the airport site, and (2) manage and oversee construction. The first went to a joint venture of Contractors and Lendlease and the latter to Bechtel. Construction of the single-runway airport is expected to begin in 2020, with an opening date in 2026. The airport's initial capacity will be 10 million passengers per year.[57] Whether WSA will be privatized after construction is completed remains to be seen.

A good example of the benefits of private investment is the ongoing growth and expansion of Australia's major west coast airport, Perth.[58] Like most of the major airports, it was leased in 1997 for 99 years—in this case to Perth Airport Pty Limited. As of 2018, the airport is in the middle of a major expansion program that has already invested A$1 billion to expand its international terminal to add domestic service and open a new domestic-only terminal on one side of the airport. Two other terminals operate on the other side, but the master plan calls for consolidating them all into a single horseshoe-shaped terminal. Those plans are pegged at another A$2.5 billion, with ultimate addition of a second parallel runway, converting the existing crosswind runway to a taxiway. The company is also doing extensive retail and commercial development on its extensive land area.

Queensland represents a cross-section of airport companies. The largest is Brisbane Airport Corporation (BAC), privatized via a 99-year lease in 1997. BAC is owed primarily by public pension funds and infrastructure investment funds. Queensland Airports Limited owns four regional airport concessions, the largest of which is Gold Coast Airport, 56 miles south of Brisbane. With rapid passenger growth (6.6 million in 2018, expected to double by 2037), the company is investing A$370 million in terminal expansion.[59] About 50 miles north of Brisbane, Sunshine Coast Airport was leased in 2017 for 99 years by the Sunshine Coast Regional Council. Operator Palisade Investment Partners Limited also manages the airports at Alice Springs, Darwin, and Tennant Creek. At Sunshine Coast, it is investing A$303 million in runway and terminal expansion.[60] Further north, Cairns Airport Pty Limited is part of another company, the North Queensland Airport Group.

2.3.4 MIDDLE EAST AIRPORTS

The biggest news in this region is the opening of **Turkey**'s New Istanbul Airport, developed under a 25-year DBFOM concession at a cost of €10.2 billion. Originally planned for October 31, 2018 (when a ceremonial opening took place), the actual opening occurred on April 6, 2019, with the overnight transfer of equipment and planes from Istanbul's Atatürk Airport (which is to be closed) to the new airport, located on the eastern side of the Istanbul metro area.[61] The new airport opened with two long runways, the world's largest terminal under one roof (planned for 90 million passengers/year), a major air cargo facility, a hotel and convention center, and extensive retail.[62] The master plan calls for expansion , to six runways and four terminal buildings by 2028, with a capacity of 150–200 million annual passengers.

Another important development took place in **Jordan**. In June 2018, the Queen Alia Airport underwent a significant ownership reshuffle. Halfway through a 25-year concession, two of the original investors in the Airport International Group (AIG)—Abu Dhabi's Invest AD (38%) and Kuwait's Noor Financial Investment Co. (24%), along with two contractors (9.5%)—recycled their investment for other purposes. In response, two other investors increased their shares. ADP became the majority owner at 51%, and also brought in two new investors, Meridiam (32%) and IDB Infrastructure (12.25%). Jordanian fund Edgo Investment Holdings continued, at a reduced share of 4.75%, down from 9.5%.[63] Since the concession was signed in 2007, annual passenger numbers have doubled, to 7.9 million in 2017. AIG plans a large expansion of the terminal that can handle 12 million annual passengers.

2.3.5 IATA'S ATTACK ON PRIVATE AIRPORT INVESTMENT

For the past two years, trade association Airlines for Europe (A4E) has been characterizing airports as monopolies in need of price regulation; as noted previously in this report, most of the large and medium airports in Europe are privatized in some manner, so this allegation is aimed at them. This attack was amplified starting in February 2018 when the CEO of the International Air Transport Association (IATA), Alexandre de Juniac, began giving speeches attacking airport privatization, saying "We have yet to see an airport privatization that has, in the long term, delivered on the promised benefits of greater efficiency for airlines and a better experience for our customers." And adding, "Our view is that the ownership is best left in public hands."

Readers of the previous sections of this report may well be mystified by these attacks, since there is growing concern throughout aviation, especially in Europe, that capacity constraints (in airports and air traffic control) represent the greatest threat to continued growth in air travel. And privatization—whether by outright sale (and price regulation) in the U.K. or via long-term PPP lease concessions in most of the rest of the world—has led to large-scale capital investment in expanding terminals and adding new runways.

Here are some cases in point, just from Europe:

- New runways approved for privatized London Heathrow and Vienna—and in operation at Frankfurt.
- Major terminal expansions planned or under way at London Gatwick, Luton, Stansted, Frankfurt, Lisbon, Paris (CDG), Sofia, and others.

In response to the A4E and IATA campaigns, Airports Council International released a report on private investment in airports.[64] One finding was that an increase in capital spending often follows privatization. In a calculation based on ACI's extensive airports database, the study found that the average capital expenditure per workload unit (2012–2016) was $5.40 at privatized airports versus $4.76 at public airports. The report also included case studies of selected privatized airports on annual passenger growth rates, before and after their privatization. Four examples are:

	Annual growth pre-privatization	**Annual growth post-privatization**
Guayaquil, Ecuador	3.8%	4.0%
Top 4 GAP airports, Mexico	4.3%	5.0%
Cebu, Philippines	7.4%	9.3%
Kuala Lumpur, Malaysia	6.8%	7.5%

Possible reasons for increased growth include expanded terminals, more airline choices, and better retail services. Possible reasons for IATA opposition could include dislike of added capacity becoming available for low-cost competitors and/or a preference for taxpayers rather than airlines to pay for capacity expansion.

2.4 U.S. AIRPORTS

2.4.1 FEDERAL AIRPORT PPP PROGRAM

Significant liberalization of the federal law concerning airport privatization took place in 2018. The harbinger of change was the February 2018 White House infrastructure proposal.[65] It called for revising the 1996 Airport Privatization Pilot Program in several ways:

1. Removing the limit of only 10 airports that could participate;
2. Eliminating the restriction to only one "large hub" airport, as defined by FAA passenger counts;
3. Removing the double super-majority airline approval requirement, replacing it with a simple majority of airlines serving the airport.

In addition to those three changes, the infrastructure financing portion of the report called for expanding the scope of tax-exempt Private Activity Bonds beyond surface transportation to include airports, removing the federal and state volume caps on PABs, and allowing PABs to be used to finance the lease of existing infrastructure assets, rather than only financing the development of new (greenfield) infrastructure.

In October 2018, Congress passed a five-year FAA reauthorization bill, which includes reforms of the Airport Privatization Pilot Program. It removed the 10-airport limit and the "only one large hub" restriction but did not change the airline approval requirement. And following global practice, the revised law now permits the airport owner to retain a part-interest in the airport. Since the program never permitted the sale of commercial airports, only their long-term PPP lease, Congress renamed the liberalized program the Airport Investment Partnership Program, a more accurate term. The revised law also explicitly exempts the airport owner from having to repay federal airport grants as a condition of leasing the airport. Finally, it also allows the FAA to make grants of up to $750,000 for any jurisdiction that wishes to analyze whether and how to go about engaging in a long-term PPP lease of its airport.

As of the end of 2018, three airport owners held slots in the pre-existing Pilot Program: the city of St. Louis, Hendry County, FL (Airglades), and Westchester County, NY. Much of the action took place in St. Louis.

In spring 2018, with support from the mayor and a majority of the city council, **St. Louis** hired a team of advisors and consultants to assess the feasibility of a PPP lease of Lambert St. Louis International Airport. The team consists of financial advisor Moelis & Co., McKenna & Associates to identify qualified operators, and Grow Missouri, a business group that is funding these efforts. August saw the first meeting of the new Airport Advisory Working Group tasked with developing the process for seeking and evaluating bids under an 18-month timeline.[66] The city launched a series of public meetings in October, while opponents began calling for a public vote on whether or not to lease the airport. At year-end, the *St. Louis Post-Dispatch* reported that the city's financial advisor was finding strong interest from airport operators and investors.[67] In early 2019, opponents continued to call for a referendum on the issue.

Aviation observers expect that if Lambert Airport is leased under the federal program, it may serve as a model for other airport owners to consider doing likewise. Lambert handles nearly twice the annual passenger volume as San Juan International, the only U.S. airport currently operating under a long-term PPP lease. And it is seen as more "mainstream" than an airport in an overseas territory. Although it is a "large hub," its lease would no longer preclude other such large airports from being leased, thanks to the liberalization of the federal program.

Another slot is held by Hendry County, FL, for its general aviation airport, which has been renamed Airglades International Airport. The privatization plan calls for converting it into a large cargo hub, serving as a reliever airport to space-constrained Miami International, 100 miles to the south. Airglades International LLC in 2017 received a Finding of No Significant Impact (FONSI) decision from the FAA on the plan's environmental review. The company's final plan for financing the acquisition of the airport is due to be submitted to the FAA by Sept. 30, 2019.[68] The plan has the support of Hendry County's government, and the Florida DOT in 2018 agreed to fund up to $1 million of the cost of preliminary engineering and design of the company's planned Perishable Air Cargo Complex. Construction is expected to begin in 2019.[69]

The third slot is held by **Westchester County, NY**. The FAA approved its preliminary application in late 2016, based on a proposal by Oaktree Capital Management for a 40-year lease of the Westchester County Airport, along lines similar to the 2013 lease of San Juan International. After the county legislature objected to the lack of competitive bids, a consultant was hired in 2017, and a competition ensued, with Australia-based infrastructure investor Macquarie emerging as winning bidder. But with a change of county administrator at the start of 2018, the lease was put on hold, and the company's letter of credit expired in February 2018, making the future of the PPP lease uncertain.[70]

2.4.2 AIRPORT COMPONENT PPPS

Another trend became prominent in 2018: long-term design-build-finance-operate-maintain (DBFOM) PPP deals for specific facilities on an airport. *The New York Times* noted this trend in a recent article, reporting that, "As governments reduce spending on infrastructure, private companies are moving into airports big and small, paying for private terminals with new types of services and teaming up with local agencies to renovate existing terminals. The so-called public-private partnerships, or PPPs, have created new possibilities for airports, which have struggled for years to find the money to improve terminals and accommodate an increase in passengers and cargo."[71] Three major terminal projects and two transportation facility projects stood out in 2018.

Well along in construction was the replacement of the obsolete and undersized central terminal at New York's LaGuardia Airport. The airport's operator, the Port Authority of New York and New Jersey, selected a consortium of Vantage Airport Group, Skanska, and Meridiam as the winning bidder in 2015. The consortium is responsible for $2.5 billion of debt ($2.35 billion in tax-exempt bonds) and equity ($200 million), with the Port Authority paying about $1 billion for new parking structures and roadways and another $1.2 billion for a new entry hall added to the project by Gov. Andrew Cuomo. An initial portion of the new terminal opened in late 2018, and completion of the entire project is expected by 2022.

In 2018, the Port Authority authorized a series of projects to redesign and reconstruct most of the terminals at JFK International Airport. Since most of these terminals are long-term-leased to airlines or groups of airlines, separate agreements to finance and oversee construction have been or are being reached between the Port Authority, the airlines, consultants, and construction firms. Overall, the JFK revamp is expected to cost $13 billion.

The third major project is the redesign and expansion of the Great Hall airside terminal at Denver International Airport. Like the LaGuardia project, it is a 30-year DBFOM PPP. Financial close with Ferrovial Airports was reached in December 2017, with equity (from Ferrovial) and short-term construction bonds, which are to be replaced on completion by long-term private activity bonds. Construction began in 2018, with completion expected by 2024, after a two-year delay due to inadequate bearing strength of the concrete floor of the current terminal.[72] The project is relocating the TSA screening operation and expanding retail offerings. While the Great Hall is being revamped under the Ferrovial project, Denver International is using conventional financing to expand the capacity of its airside terminals.

Los Angeles World Airports has two DBFOM mega-projects under way at Los Angeles International Airport (LAX), both financed via availability payments. One is an Automated People Mover (APM) to transport passengers between the seven terminals and parking facilities, a rail transit station, and a consolidated rental car center. The other is the new consolidated rental car center (CONRAC) itself. The APM competition was won by a team led by ACS and Dragados, with a $1.95 billion price tag. Financial close took place in June 2018, and construction is under way in 2019.[73]

The $2 billion CONRAC concession was won by a team led by Fengate Asset Management and PCL Investments. Like the APM concession, its DBFOM revenue stream will be availability payments over the 28-year life of the agreement. Financial close was achieved in December 2018, and the project is also now under construction.[74] Johnson Controls will operate CONRAC, which will replace 20 individual rental car locations and their parking lots. The numerous company vans to and from the terminals will be replaced by the APM. (Similar arrangements with a single center linked by people mover to the terminals are in operation at Atlanta International and San Francisco International.)

Phoenix Sky Harbor Airport in 2018 issued a request for qualifications (RFQ) for two potential DBFOM projects: one is for a new parking structure to replace a large parking lot; the other is for an on-airport hotel and conference center.

On a smaller scale, private investment has provided the first-ever passenger terminal at Paine Field in Everett, north of Seattle, and also the site of a major Boeing assembly plant. Propeller Airports, which had twice tried to create a second commercial airport in metro Atlanta (but fell victim to lobbying by Delta Airlines and NIMBYs), succeeded in bringing a second commercial airport to metro Seattle. Propeller won both local and FAA approvals in 2017 and began construction of the two-gate terminal in early 2018. Final FAA approval to start scheduled airline service at the beginning of 2019 was delayed by the partial federal government shut-down, but service began by Alaska and United Airlines in February and March 2019, respectively. The new terminal, which was financed, built, and is being operated by Propeller under a 50-year lease, cost an estimated $40 million.[75] Approved capacity is 24 arrivals and departures per day, and was achieved by April 2019.[76] The project received an award from the National Council for Public-Private Partnerships in May 2019.

PART 3

AIR TRAFFIC CONTROL

3.1 AIR TRAFFIC CONTROL CORPORATIONS

Since New Zealand's pioneering 1987 decision to convert the air traffic portion of its transport agency to a self-supporting air navigation service provider (ANSP), about 60 other countries have done likewise. According to the International Civil Aviation Organization (ICAO), all but a handful of nations charge fees to aircraft operators flying in controlled airspace, and have done so in most cases since shortly after World War II. The only two modern western countries that had not done so by 1996 were Canada and the United States. In that year, Canada "corporatized" the air traffic control portion of Transport Canada, and authorized ICAO-compliant ATC user fees. That left only the United States still funding air traffic control out of a variety of aviation excise taxes, which bear no relation to the ATC services that aircraft receive.

Nearly all of today's self-supporting ANSPs share the following characteristics:[77]

- The ATC system is legally separated from the transportation agency and reorganized, generally under corporate law.
- Funding comes directly from the users of the airspace under that country's jurisdiction, generally via ICAO-compliant fees for en-route, terminal area, and overflights.
- In most cases, no government funding is involved, though some governments pay the ANSP to provide services in more remote areas.

- The revenue stream is bondable, to finance large-scale capital projects (similar to airport bond financing).
- The ANSP reports to a board of directors, not to a legislative body.
- Safety regulation is provided by a government agency, at arm's-length from the ANSP.

The most common form for ANSPs is a government corporation, in which the national government is the sole shareholder and appoints the board members. In Canada, the ANSP was chartered as a non-profit corporation, governed by a board consisting of aviation and business stakeholders (a kind of user co-op). Canada uses a similar structure for its main commercial airports. Two ANSPs are set up as public-private partnerships, in which the government holds about half the shares and the others are held by commercial interests: Italy's ENAV and the U.K.'s NATS. In 2001, the U.K. "privatized" NATS by allowing a consortium of U.K.-based airlines to purchase a 46% stake, with another 5% given to NATS employees. Years later, the airline group sold a large fraction of its shares to a U.K. pension fund. In 2016, Italy's government listed 49% of the shares in ENAV on the Milan stock exchange, and the company was valued at about $2 billion.

With ANSPs becoming self-supporting by the early 1990s, some of the early movers created an international trade association, the Civil Air Navigation Services Organization (CANSO). In this way, the ANSPs can be represented in international discussions on aviation policy, along with Airports Council International (ACI) and the International Air Transport Association (IATA). As of early 2019, CANSO had 92 full members (ATC providers) and 88 associate members (aerospace companies). About 60 of the full members are self-supporting ANSPs, including those of Australia, New Zealand, India, Thailand, South Africa, Canada, Austria, Germany, Denmark, Norway, Sweden, Spain, Portugal, and Switzerland. Governmental ANSPs include Cyprus, Luxembourg, Greece, the Maldives, and the FAA's Air Traffic Organization (which is part of safety regulator FAA).

There were two major ATC developments in 2018. First, Iridium launched a network of 66 satellites; each includes a device for reading the real-time GPS position of aircraft anywhere in the world and sending that information to subscribing ANSPs. The service is provided by a new company called Aireon, which developed the devices hosted on Iridium's satellites and operates the service for subscribing ANSPs. Traditional ATC uses radar to keep track of planes but can operate only over land where it is possible to build and maintain radars. There is no radar service over the oceans, over polar regions, or in very mountainous areas (including portions of the Rocky Mountains, the Andes, the Alps, and the

Himalayas). Aireon is therefore bringing radar-like position information to the 70% of the globe that never had it before. In fact, because the system's ADS-B devices report more frequently than radar, the position information is more precise than radar.

Aireon was created by Nav Canada and Iridium, with additional investment by several other self-supporting ANSPs: Enav, IAA, NATS, and Naviar. They were able to do this because they are run as businesses. As of the start of global service by Aireon in early 2019, 11 ANSPs (representing 28 countries) had subscribed,[78] with many more (including the FAA's Air Traffic Organization) planning to do likewise in the next year or so.

The second major development was the rapid spread of remote air traffic control towers. The basic idea was researched by the FAA in the 1990s: to use an array of cameras and other sensing devices at an airport, feeding displays in a control room on the ground rather than in an expensive tower. After demonstrating that the remote tower setup could work better than a conventional control tower (especially at night and in low-visibility weather), the FAA did nothing with the research findings.[79] But self-supporting ANSPs in Norway and Sweden worked with aerospace companies to take the idea further: locating the remote tower center many miles from the airport, and then showing that one such center could manage traffic at several distant airports. The first such center was certified to begin operations in Sweden in 2015. By the start of 2019, individual remote towers were operational in Germany, Hungary, Norway, Sweden, and the U.K,. and remote tower centers capable of serving multiple airports were operational in Germany, Norway, and Sweden.[80]

In the United States, the FAA has had no program to develop remote towers, but two projects funded by state governments and private industry are under way at the airports of Leesburg, VA and Loveland, CO.[81] In the 2018 FAA reauthorization bill, Congress authorized a small FAA remote towers program, but as of early 2019 no funding had been appropriated for this purpose.

3.2 U.S. AIR TRAFFIC CONTROL REFORM

Air traffic control corporatization was proposed during the Reagan, Clinton, and George W. Bush administrations, with the most progress being Vice President Al Gore's Reinventing Government proposal that led to an effort promoted by U.S. DOT Secretary Federico Peña. With the support of FAA Administrator David Hinson, the DOT introduced legislation to create a nonprofit U.S. Air Traffic Services Corporation (USATS) funded by ATC fees, but the bill did not even get a vote by the relevant House subcommittee. In the George W. Bush administration, FAA Administrator Marion Blakey made a major effort to replace aviation excise taxes with ATC user fees, but that did not result in legislation either.

In 2012 an ATC reform group was organized by the Business Roundtable to develop a business plan for a U.S. ANSP modeled after Nav Canada—a nonprofit corporation with an aviation stakeholder board. The proposal gained support from the airlines and the air traffic controllers' union after the federal government budget sequester in 2013. In 2014 it found a champion in Rep. Bill Shuster (R, PA), then-chairman of the House Transportation & Infrastructure Committee. It took several years for committee staff to draft a bill—largely along the lines proposed by the Business Roundtable. After hearings in 2015, it was approved on a party-line vote of that committee in 2016, but did not proceed further.

With a new Congress taking office in 2017, a revised bill was drafted, taking into account concerns raised by private pilots and entities in rural America. The revised bill was approved by the T&I Committee in June 2017, following a White House event featuring four former and current DOT Secretaries (all Republicans). The bill never made it to the House floor due to increased opposition from private pilots, rural interests, and government employee unions other than the air traffic controllers. A five-year FAA reauthorization bill was enacted in October 2018 lacking any ATC reform. And with the change to Democratic control of the House following the 2018 election, the prospects for ATC reform appear to be nil for that five-year period.[82]

PART 4

AIRPORT SECURITY

4.1 U.S. CONTRACT AIRPORT SCREENING

As of the end of 2018, some 22 U.S. airports had passenger and checked-baggage screening provided by private contractors, rather than TSA employees. This practice is allowed for all U.S. commercial airports where TSA operates, under a program authorized by Congress called TSA's Screening Partnership Program (SPP).

During the month-long partial shut-down of the federal government in December 2018/January 2019, a number of news articles noted that screeners at SPP airports (such as San Francisco International) were still getting paid, whereas TSA screeners were not.[83] The screening companies were willing to continue normal payrolls during the shut-down, confident of future reimbursement from TSA once the shut-down ended. An article distributed by Tribune News Service during the shut-down also noted the inherent conflict of interest in the current arrangement in which the TSA is both the regulator of airport security and the provider of most airport screening services. The *Washington Post* article also noted that Sen. Mike Lee (R, UT) planned to re-introduce, in 2019, his 2018 bill to streamline SPP.

Although only one airport (Atlantic City) joined SPP during 2018, one large hub seriously considered doing so: Orlando. At its Feb. 22, 2018 meeting, frustrated by very long checkpoint screening lines, the board of the Orlando International Airport Authority discussed replacing TSA screening with contract screening under SPP. But because several board members were opposed, they put off a decision for two months. By the time the April meeting took place, the opposition had mobilized. In addition to the TSA screeners' union, then-Sen. Bill Nelson (D, FL) and two Democratic House members from Florida had all voiced strong objection to the change. That led the board, on April 18th, to reject applying to SPP. Also in the interim, TSA had embarked on a crash program that included adding 75 more screeners and some new checkpoint equipment.[84]

Two respected aviation experts added new information to the debate on airport screening. In their new book, Mark Stewart and John Mueller compared the cost of screening in Australia and the United States.[85] They reported the average cost per passenger as $3.50 in Australia compared with $6.70 in the USA. They explained that screening in Australia is done by private contractors, as is also true in most of Europe. In an appendix in the book, they also cited the case of privatized Copenhagen Airport in Denmark, whose per-passenger cost is $3.20. At Copenhagen, the airport company employs and manages the screeners. As in all such non-governmental screening in Europe, arm's-length regulation is provided by the national government.

4.2 AIRPORT SCREENING REFORM IN CANADA

The Canadian Air Transport Security Authority (CATSA) was, like TSA, created in the aftermath of the Sept. 11, 2001 terrorist attacks. Unlike TSA, this did not represent a top-down federal takeover of airport screening. Rather, CATSA was designed as a new government agency that contracts with various screening companies to provide service at airports. Companies compete for those contracts, and the pay levels are permitted to reflect the different cost of living in different parts of Canada (something not true of TSA). CATSA is supported by a dedicated passenger security tax levied by the federal government, but only a portion of the revenues is allocated to CATSA. Over time, that has led to a budget squeeze on CATSA, leading to airline and passenger complaints about long lines and poor service. Hence, in spring 2018, Transport Canada announced that it was considering converting CATSA into a self-supporting nonprofit corporation, similar to the structure of Nav Canada, the air traffic control provider.[86] Subsequently, early in 2019, the Canadian government's 2019 budget proposal promised legislation to convert CATSA into a self-supporting nonprofit corporation.[87]

ABOUT THE AUTHOR

Robert W. Poole, Jr. is director of transportation policy and the Searle Freedom Trust Transportation Fellow at the 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 Investment Partnership 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.

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