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Subcommittee on Aviation
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Foreign Countries' Processes for Operating Air Transportation Systems

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Chairman LoBiondo and Members of the Subcommittee:

Thank you for inviting me to testify on the Federal Aviation Administration's (FAA) reform efforts. Over the past 2 decades, Congress has enacted legislation aimed at making FAA more efficient and cost effective while improving its delivery of air traffic services and expediting modernization projects. At the request of this Subcommittee, we are conducting an audit of FAA's efforts to implement these reforms and testified on our ongoing work last November.¹ The Subcommittee also asked us to look at how other nations operate, modernize, and finance their air navigation services and infrastructure and to compare these structures to FAA's.

My testimony today will focus on the four countries we examined—Canada, the United Kingdom, Germany, and France—and how they (1) organize and finance their air navigation systems and (2) plan for, develop, and implement new technologies. I will also highlight several factors that this Subcommittee may wish to take into account if it considers making changes to FAA's organizational and financing structures.

IN SUMMARY

The four countries we reviewed have separated their air traffic control functions from the safety oversight and regulatory functions. While safety and regulatory functions remain government-controlled, each nation has commercialized² its air traffic control function into an air navigation service provider (ANSP) using various organizational structures. The ANSPs are financially self-supporting and finance their operations primarily through user fees, but also have borrowing authority for modernization and infrastructure projects. The ANSPs also do not embark on large-modernization efforts or conduct extensive aviation research and development. Rather, they implement new technologies incrementally, using a variety of methods, such as purchasing commercial-off-the-shelf technologies. As Congress examines possible changes to FAA's organizational and financing structures, there are several differences between the U.S. aviation system and other countries' systems to consider, including the size and complexity of the U.S. system and differences in airport funding. Despite these differences, there are several lessons that can be learned from examining other nations' experiences in separating their aviation functions, including issues related to maintaining safety oversight and transitioning to the new organization.

¹ We testified before the House Transportation and Infrastructure Committee on our ongoing work on FAA's progress in achieving productivity efficiencies, cost savings, and improving delivery of modernization projects as a result of its reform efforts. See *Status of FAA's Efforts to Operate and Modernize the National Airspace System* (OIG Project ID CC-2015-001), Nov. 18, 2014. OIG reports are available on our Web site at <http://www.oig.dot.gov/>.

² According to the International Civil Aviation Organization, "commercialization" is the ability of an organization to operate like a commercial business. In discussions about air navigation services, the term is often used interchangeably with other terms, including restructuring, privatization, outsourcing, and corporatization.

BACKGROUND

Since 1958, FAA has overseen the safe operation of the busiest and most complex air traffic system in the world. FAA is responsible for overseeing all aspects of civil aviation in the United States, including operating the air traffic control system and regulating safety.

The Agency has gone through several reorganizations, most notably when President Clinton created the Air Traffic Organization (ATO), which began operations in 2004. While still part of FAA and reporting to the FAA Administrator, ATO is led by a Chief Operating Officer who is responsible for overseeing the day-to-day operation of the National Airspace System, maintaining equipment and facilities, and implementing the Next Generation Air Transportation System (NextGen) and other new technologies. ATO is separate from the Agency's safety, regulatory, and enforcement groups.

FAA is funded by two revenue sources: excise taxes paid by users of the National Airspace System through the Airport and Airway Trust Fund, and the General Fund. FAA's \$16 billion annual budget, which is approved by Congress, consists of four accounts:

- **Operations:** Funds most of the Agency's day-to-day activities, including safety oversight and air traffic control functions.
- **Facilities & Equipment:** Funds NextGen initiatives and other modernization and infrastructure improvement activities.
- **Airport Improvement Program:** Funds grants to airports to pay for runway construction and other related projects.
- **Research, Engineering, and Development:** Funds NextGen and other research areas.

FOREIGN NATIONS' AIR TRANSPORTATION SYSTEMS HAVE COMMON OPERATIONAL AND FINANCING CHARACTERISTICS

The four countries we examined have separated their air traffic control functions from their safety oversight and regulatory functions, and commercialized their ANSPs using a range of organizational structures. The ANSPs are financially self-sustaining and finance their operations through user fees. Also, they pay for infrastructure and modernization projects by issuing long-term bonds and other debt instruments.

Other Nations Separated Their Operational and Oversight Functions

When separating their air traffic control function from safety oversight and regulatory functions, the four countries we reviewed used a range of organizational structures. These structures include a private, not-for-profit, non-share corporation in Canada; a for-profit, public-private partnership in the United Kingdom; a government-owned limited liability

company in Germany; and a government agency in France.³ (See table 1 below for characteristics of these organizations.)

Table 1. Characteristics of Air Navigation Service Providers

	United States	Canada	United Kingdom	Germany	France
ANSP	ATO	Nav Canada	National Air Traffic Services Ltd. (NATS)	Deutsche Flugsicherung GmbH (DFS)	Direction des Services de la Navigation Aérienne (DSNA)
Type of Ownership	Government Function	Private Non-Share Not-For-Profit Corp.	Public/Private Partnership	Government-Owned Corp.	Government Function
Began Operations	2004	1996	1996 ⁴	1993	2005
Safety Regulator	FAA	Transport Canada	EASA & Civil Aviation Authority (CAA)	EASA & Federal Ministry of Transport and Digital Infrastructure (BMVI)	EASA & Civil Aviation Authority (DGAC)
Financing Structure	Excise Taxes & Appropriations	Air Navigation Charges & Borrowing Authority	Air Navigation Charges & Borrowing Authority	Air Navigation Charges & Borrowing Authority	Air Navigation Charges, Borrowing Authority & Passenger/Freight Tax

Source: OIG analysis

According to officials we spoke to, these countries commercialized their air traffic control functions to address issues such as rising national deficits, operational and cost inefficiencies, the governments' inability to modernize their air transportation systems, and stagnant wage growth for government employees.

While operations have been commercialized, the safety oversight and regulatory functions remain under the control of the respective governments and are separate from the ANSPs.⁵ In Europe, the European Aviation Safety Administration (EASA) regulates and oversees all aspects of aviation safety, and European governments must ensure that operators in their respective countries comply with EASA regulations.

Foreign ANSPs Are Financially Self-Sustaining

All of the ANSPs we examined are financially self-sustaining and do not receive funding from their governments. Further, while Nav Canada, National Air Traffic Services, Ltd. (NATS), and Deutsche Flugsicherung GmbH (DFS) have financial autonomy and are free

³ For a more information regarding each ANSP see attachment 1.

⁴ NATS was originally organized as a government-owned company but transitioned to a public-private partnership in 2001.

⁵ Under guidelines from the International Civil Aviation Organization, it is the responsibility of individual countries to ensure the safety of their aviation systems.

to operate and make financial decisions separate from their governments, Direction des Services de la Navigation Aérienne (DSNA) is subject to spending policies set by the French government, similar to FAA.

Each of the four countries finances its ANSP primarily through user fees. Users are charged fees for services such as navigation and surveillance activities in high-altitude and terminal environments, communications, and aeronautical and meteorological information. The rates charged by the ANSPs are based on the cost of providing services to users, capital projects, interest on debt instruments, and other costs. Normally, general aviation users in these countries pay user fees for flying in en-route and terminal airspace. However, small general aviation aircraft that do not fly in controlled airspace either do not pay fees or, in the case of Canada, pay a small annual fee for using the system. In addition to user fees, France charges a tax on passengers and freight and mail that leave the country on commercial flights.

The ANSPs in Canada, Germany, and the United Kingdom also earned revenue from developing and selling aviation technology developed in-house, such as air traffic management systems. However, these sales make up only a small percentage of the ANSPs' annual revenue.

The ANSPs also have the ability to finance their infrastructure and modernization efforts by issuing long-term bonds and other debt instruments, which are backed by the revenues earned by the ANSPs. While the ANSPs in Canada, Germany, and the United Kingdom use capital markets to sell their instruments, the French government issues separate debt instruments earmarked for specific DSNA projects.

MODERNIZATION EFFORTS IN OTHER COUNTRIES ARE SMALLER IN SIZE, AND THE COUNTRIES USE DIFFERENT METHODS TO DEVELOP AND IMPLEMENT NEW TECHNOLOGIES

The four foreign ANSPs we reviewed do not embark on large, comprehensive modernization efforts such as NextGen transformational programs or conduct extensive aviation research and development. Rather, they deploy new technologies incrementally and try to install technology that meets their operational needs.⁶ For example, Nav Canada used a phased-in approach in developing and introducing a new system known as Controller/Pilot Data Link Communications (CPDLC).⁷ According to officials we interviewed, these four ANSPs determine specific needs and identify systems to meet those operational demands; prioritize their needs; assess operational requirements;

⁶ As we have noted in previous reports, FAA has adopted a segmented approach to its major acquisitions, including its NextGen transformational programs. In contrast to the more incremental approach taken by the foreign ANSPs we reviewed, FAA's approach often mixes production and developmental efforts, and projects are more ambitious and span much longer timeframes with unclear end states. For additional details on FAA's segmented approach see our report on "Status of Transformational Programs and Risks to Achieving NextGen Goals" (OIG Report No. AV-2012-094), April 23, 2012.

⁷ CPDLC is used to supplement voice communication between pilots and controllers and provides benefits such as automating routine tasks and improving safety by reducing workload and communication errors.

develop cost estimates; and obtain user input and/or board of directors' approval for projects. For example, Nav Canada's Board of Directors approves Nav Canada's annual modernization budget and individual procurements in excess of \$7.5 million.

In lieu of developing large and multi-year modernization systems and software, three of the four ANSPs modify commercial-off-the-shelf products to meet their operational needs. For example, Nav Canada internally develops automation and other software-intensive systems mostly by tailoring commercial products to fit their operation. The company rarely uses contractors for this work; rather, most of the development is done by in-house staff with Nav Canada engineers directly designing and implementing systems. In addition, all four ANSPs form joint ventures and other partnerships with private companies, such as Nav Canada forming a joint venture with a company to develop a global, satellite-based Automatic Dependent Surveillance Broadcast (ADS-B) surveillance system, initially for use in the oceanic airspace.

Three of the four foreign ANSPs we examined have incorporated new technologies and procedures into the day-to-day operations of their respective systems. This includes technologies such as CPLDC, which controllers in Canada and the United Kingdom use for high-altitude operations, and using systems that incorporate electronic flight strips and other automation capabilities to streamline operations and decrease controller workload.












In addition, the United Kingdom, Germany, and France have joined other European countries in a large-scale effort to modernize and improve its air navigation system. Starting in 2004, the European Commission started the Single European Sky (SES) project to restructure Europe's airspace in order to increase its capacity and overall efficiency. The associated modernization program—Single European Sky ATM Research, or SESAR—is similar to NextGen and is a public-private partnership intended to define and develop common aviation technologies for use across Europe.

ADDITIONAL FACTORS TO CONSIDER WHEN EXAMINING POSSIBLE CHANGES TO FAA'S ORGANIZATIONAL STRUCTURE

As Congress examines possible changes to FAA's organizational and financing structures, there are several differences between the U.S. aviation system and other countries to consider. These include:

System Size and Complexity: The United States has the largest and most complex air transportation system in the world. ATO controls more than 2.5 times the airspace of the United Kingdom—the largest airspace of the four ANSPs we examined. The United States also has more operations than all of the foreign ANSPs we examined, and has a larger general aviation community. To manage the U.S. airspace, FAA operates more air traffic facilities and employs more controllers than the foreign ANSPs. (See table 2.)

Table 2. Comparison of Air Navigation Service Providers

	ATO (United States)	NATS (United Kingdom)	NAV CANADA (Canada)	DSNA (France)	DFS (Germany)
Total Airspace	75,110,000 km ²	29,180,000 km ²	18,000,000 km ²	1,000,000 km ²	394,000 km ²
					
Annual IFR Movements (2011)	15,539,009	2,106,689 ^a	3,855,947	3,009,230	3,061,000
 = 1,000,000 IFR Movements					
Number of General Aviation Aircraft (2012)	209,034	19,939	35,540	32,410 ^b	21,546
Number of Operational Air Traffic Controllers (2012)	18,001	1,480	1,689	3,964	1,716
Number of Air Traffic Facilities	317	18	49	91	20

^a Data from 2010.

^b Data from 2011.

Source: OIG analysis

- Capital Budgets:** Given the differences in size and complexity, the capital budgets for ANSPs are significantly smaller than FAA’s capital budget. For example, FAA’s Facilities and Equipment annual budget is \$2.6 billion, with several projects expected to cost hundreds of millions of dollars to complete. Nav Canada’s capital budget is approximately \$120 million annually, and considers a large acquisition to be \$10 million.
- Airport Funding:** U.S. airports are funded through Federal programs, such as the Airport Improvement Program, and Passenger Facility Charges. However, as with the foreign ANSPs, airports in each of the four countries we examined are generally self-supporting, autonomous entities. In addition, the foreign ANSPs do not include airport development and maintenance costs in their user fee calculations.

- **Aviation Research and Development:** FAA conducts a wide range of aviation research in areas such as evaluating and testing NextGen concepts; conducting runway, fuel, and other safety analyses; and studying human factors in the air traffic control environment. However, none of the ANSPs we examined conduct the level of aviation research that FAA conducts or operates a technical development complex like FAA’s Technical Center in Atlantic City, NJ.

Regardless of these differences, other nations’ experiences in separating their aviation function—as well as studies we reviewed—have led to several lessons learned. These include:

- **Safety:** Studies we reviewed, including a recent report commissioned by FAA,⁸ indicate that separating air navigation and safety/regulatory functions has not impacted safety. However, the FAA-commissioned report noted that if a government is planning to separate its safety oversight organization from an ANSP, it needs to establish a clear division of roles between the safety organization and the ANSP, ensure that a sufficient safety and regulatory workforce is in place, and verify that mechanisms are in place to properly fund the safety organization.
- **Transition Issues:** Officials in the countries we visited noted that they had to resolve several transition issues to commercialize their air navigation functions, including determining which functions to transfer, the timing of the transition, and how the government would conduct safety oversight and work with the newly created entity. There were also transition issues for employees moving to the commercialized entity. For example, Nav Canada and its union officials noted that there were contentious labor-management relations for the first several years after the transition. The initially poor relationship between managers and staff was attributed to a lack of trust, employees adjusting to a new business culture, and rules that prevented salary increases for 3 years.
- **Financial Considerations:** Separating the air traffic function from FAA would require resolving several financial issues, including determining which assets would be transferred to the new air traffic entity, such as air traffic facilities and equipment, as well as the value of those assets and the air traffic system. Properly valuing the air traffic control system and the associated assets will be important. According to the Auditor General of Canada, Transport Canada did not properly estimate the value of its air navigation system before transferring over to Nav Canada. This resulted in the government receiving significantly less for the system than estimated by the Department’s financial advisors.⁹

⁸ *CAA International Structures*, MITRE Corporation, October 2014.

⁹ *Transport Canada – The Commercialization of the Air Navigation System*, Office of the Auditor General of Canada, October 1, 1997.

CONCLUSION

The unique organizational and financing systems implemented by the countries we visited were designed in part to address their individual systems and demonstrate that there are different ways to structure and operate a nation's air traffic control system. Should Congress, the Administration, and aviation stakeholders move forward to consider different approaches regarding the organization, structure, and financing of our nation's air traffic control system, there are several significant policy questions that would influence decisions, given the unique characteristics of the U.S. system. But above all, safety must continue to be the United States' number one priority in overseeing our National Airspace System. Regardless of FAA's organizational structure, a strong and fully funded safety and regulatory agency remains critical to keeping our nation's transportation system one of the safest in the world.

This concludes my prepared statement. I will be happy to answer any questions you or the other Members of the Committee may have.

ATTACHMENT 1. ADDITIONAL INFORMATION REGARDING FOREIGN AIR NAVIGATION SERVICE PROVIDERS (ANSP)

Canada: Nav Canada is a private, non-profit, non-share corporation whose sole mission is to facilitate the safe movement of aircraft efficiently and cost-effectively through Canada's air traffic system. Beginning operations in 1996, the company is overseen by a 15-member Board of Directors comprised of representatives from airlines, general aviation, unions, and government. Except for its position on the board, the Canadian government does not have a direct role in the day-to-day operations of the company or management of the civil air traffic system.

United Kingdom: The main ANSP, National Air Traffic Services (NATS), was created in 1994 as a government-owned company and was converted to a for-profit, public-private partnership in 2001. The company received a 30-year license from the government to provide en-route air traffic services, but must compete with other ANSPs to provide air traffic services at the nation's airports. While the government is the company's largest shareholder (49 percent), it only receives dividends and does not involve itself in the day-to-day operations of the company or the civil air traffic system.

Germany: Deutsche Flugsicherung GmbH (DFS) was split from direct government control in 1993 and is a government-owned limited liability company. DFS provides services at 4 radar control facilities and at 16 national airports, while German states are responsible for obtaining services at other airports. DFS is run by a Board of Directors that is split evenly between the Government and employees. In 2004, the German government attempted to reorganize DFS into a public-private company by selling 75 percent of its shares to private investors. However, because the German constitution requires the operation of the air traffic system be carried out by the State, the privatization process was stopped in 2006.

France: The Direction des Services de la Navigation Aérienne (DSNA) is a government agency within the Ministry of Ecology, Sustainable Development, and Energy. Originally part of a single government organization, functional separation occurred between DSNA and the country's safety oversight group in 2005 when the government established the service provider under a separate directorate.