



Commercial Air Navigation Services Aim to Combine Operational Efficiency With Safety

Based on data from five non-U.S. commercial air navigation service providers, the U.S. Government Accountability Office found that several safety indicators remained the same or improved, when compared with earlier periods of ownership/operation by national governments. Dependence on commercial revenue requires providers to anticipate and mitigate risks from economic downturns, however.

FSF Editorial Staff

Safety indicators for air traffic control (ATC) generally remained the same or improved after national governments discontinued their ownership/operation of five non-U.S. air navigation service providers (ANSPs), according to a study conducted from August 2004 to July 2005 by the U.S. Government Accountability Office (GAO).¹ At the same time, these commercial ANSPs² reduced costs by reducing administrative staff and/or consolidating ATC facilities, improving efficiency through new technologies and equipment, and increasing air traffic controllers' productivity while generating fewer delays or briefer delays for airlines.³

“In the past, governments worldwide owned, operated and regulated air navigation services, viewing air traffic control as a governmental function,” the GAO report said. “But as nations faced increasing financial strains, many governments decided to shift the responsibility to an independent ANSP that operates as a business. As of March 2005, 38 nations worldwide had commercialized their air navigation services, fundamentally shifting the operational and financial responsibility for providing these services from the national government to an independent commercialized authority. . . . In general, the responsibility for regulating the safety of the services is independent of the ANSP⁴ and is still considered a governmental function.”

The following ANSPs selected for the study were commercialized between 1987 and 2001, and generally provided ATC services



for en route operations (including oceanic operations), approach control and terminal/airport control:⁵

- Airservices Australia;
- Airways Corporation of New Zealand;
- Deutsche Flugsicherung (DFS), Germany;
- National Air Traffic Services (NATS), United Kingdom; and,
- Nav Canada.

The five ANSPs were selected for the study because of the following characteristics in common:

- Their primary missions were comparable;
- They were subject to external safety regulation by an independent authority;
- They operated as self-financing businesses that may obtain debt financing from private capital markets while requiring airspace users (e.g., airlines) and others to pay for services rather than receiving annual funding from the national government. They also commonly sold related services such as meteorological training and consulting in safety management and ANSP commercialization; and,

- Under various types of economic review or price-setting guidelines, they operated primarily as monopolies in their core business of providing ATC services.

The following examples of improvements in ATC-related safety indicators were cited by the report:

- “Data from DFS show a decrease in the number of aircraft-proximity incidents in Germany, from 23 in 1995 to eight in 2003, three of which were attributed to DFS;
- “In the United Kingdom, the number of the riskiest air-proximity incidents for NATS declined from nine in 2001 to two in 2003 and one in 2004;
- “Similarly, data from Airways [Corporation of New Zealand] ... indicate a downward trend in incidents involving loss of separation for the years following commercialization; [and,]
- “Nav Canada’s annual report for 2004 also cites a decrease in the rate of loss-of-separation incidents, from an average of 0.96 incidents per 100,000 [aircraft] movements for 1999–2000 to an average of 0.79 incidents for 2003–2004.”

GAO based some of its conclusions about performance of the selected ANSPs on interviews with safety specialists inside the ANSPs and outside the ANSPs.

“Stakeholders have told us they believe [that their] air navigation system is as safe as it was when the government provided air navigation services,” the report said. “According to some, the separation of operating [functions] and regulatory functions has strengthened safety regulation and diminished any potential conflict of interest between promoting the financial interests of aviation operators and protecting safety.”

Motivations to commercialize ANSPs have included increasing airspace congestion, the requirement to replace equipment and facilities that were becoming obsolete, and economic pressures on operating costs.

Other driving forces have been national economic problems that led to reforms of government enterprises much broader than civil aviation. The objective often was to address both the government’s mounting financial obligations and to provide an environment with fewer government constraints on strategic decisions and operational decisions, the report said.

“For instance, the New Zealand government established 14 state-owned enterprises in 1987, including air navigation services, rail services and postal services,” the report said. “The government also reformed electricity as a state-owned enterprise in 1994 and telecommunications in 2004. ... According to the International Civil Aviation Organization (ICAO), a commercialized ANSP,

whether wholly or partly owned by the government or fully privatized, should function as an autonomous body and, compared with a government organization, should have greater freedom from the government in conducting its financial affairs and developing infrastructure funding. In addition, it should be self-financing, subject to the usual business taxes and required to seek a return on capital.”

This vision for commercial ANSPs sometimes has contrasted sharply with the problems of traditional air navigation services.

“Many [air navigation services under government control] were underfunded, as evidenced by freezes on air traffic controllers’ wages and insufficient funds to replace aging technologies,” the report said. “Despite concerns about the possibility that commercialization could potentially compromise safety, data from all five [ANSPs studied] indicate that safety has not eroded. ... Additionally, stakeholders told [GAO researchers] that safety regulation improved when the regulator was separated organizationally from the ANSP. ... Because we selected these ANSPs to illustrate certain characteristics, our results cannot be generalized to all commercialized ANSPs.”

Safety management systems (SMS)⁶ required by ICAO *Annex 11 to the Convention on International Civil Aviation, Air Navigation*, influenced the safety performance of the selected ANSPs.

“For example, DFS and NATS apply [an SMS] in accordance with Eurocontrol safety requirements to all of their operational activities,” the report said. “[The SMS] forms the basis for risk assessment, safety assurance, safety control and safety monitoring through standards that comply with national and international obligations. DFS’s [SMS] was also certified by the German Ministry of Transport in 2004. Similarly, Airservices Australia employs [an SMS] that complies with national and international requirements. To promote safety, the [SMS] requires activities such as operational risk assessments, surveillance, audits and incident investigations.”

Under SMSs, the selected ANSPs typically have addressed the potential for greater fatigue among individual controllers — despite improved technology and system upgrades — in work environments where air traffic levels might increase significantly.

“Data are not available to assess this [fatigue] potential, but some ANSPs have taken steps to limit and monitor controllers’ workload,” the report said. “For example, the U.K. Civil Aviation Authority has regulated the hours of civil air traffic controllers, and its Safety Regulation Group must be notified of any breach by NATS or by controllers. In New Zealand, as air traffic has increased, some airspace sectors have been subdivided so that controllers are responsible for a smaller piece of airspace. DFS, in cooperation with its controllers’ association, has undertaken a comprehensive study of controllers’ stress and strain [fatigue], which has

led to internal regulations on the maximum working hours allowed at individual sectors, according to DFS.”

As an example of advanced ATC technology to improve safety and increase controller productivity, the report cited an Australian system that replaced conventional radar displays with computer displays to integrate data from sources such as ground-based surveillance radar and satellite-linked navigational equipment on aircraft, and that automatically updates the display of aircraft data — unlike handwritten flight-progress strips.

Generally, the selected ANSPs did not reduce the staffing levels of air traffic controllers after commercialization, but they typically compressed their management layers or eliminated some administrative employees, the report said. Several examples of consolidating ATC facilities were cited among methods of reducing costs and, consequently, fees charged to air carriers.

“For example, Airways Corporation of New Zealand reported consolidating four radar centers into two over eight years and is planning to consolidate these two radar centers into a single center by 2006,” the report said. “DFS has also integrated operations and consolidated facilities, moving 17 approach units from airports and integrating them into four air traffic control centers.”

Another influence on the safety performance of the selected ANSPs was transparency — that is, providing independently audited financial statements and other performance data to the public and, in some cases, to aviation organizations outside the country.

“In addition, the United Kingdom and Germany report their data to Eurocontrol, whose Performance Review Commission collects data for benchmarking and publishes comparative studies of members’ performance,” the report said.

The process of ANSP commercialization may have unintended consequences for some regulatory authorities, the report said. For example, some regulatory authorities later had problems recruiting and retaining enough employees with “the required skills and expertise to ensure that the regulator can provide uninterrupted safety regulation.”

Based on the experience of the selected ANSPs, commercial ANSPs should be prepared to implement measures such as the following to mitigate the possible safety risks generated by periodic economic downturns in the air transport industry, the report said:

- Establishing a reserve fund;
- Reducing costs;
- Increasing fees for services;

- Borrowing funds; and/or,
- Restructuring/developing alternative revenue sources.

“After commercialization and before the [airline industry’s 2000–2003 economic] downturn ... Airservices Australia, DFS, NATS and Nav Canada had been able to cover their costs through user fees and borrowing,” the report said. “However, during the downturn, they had to take additional steps to address the revenue losses. Under its new regulatory structure, NATS now has a system in place to mitigate the effects of an industry downturn through automatic price increases that are triggered by reductions in air traffic.”

Before commercializing an ANSP, national governments also have to consider how ATC-related pricing schemes may affect safety indirectly by reducing/eliminating ATC services at some geographic locations.

“In the past and in some countries today, the ANSPs charged the same fee for air navigation services at every airport, regardless of its size or location,” the report said. “Under this arrangement, called network pricing, services at heavily used airports subsidize services at small or remote airports. However, two of [the selected] ANSPs, Airservices Australia and Airways Corporation of New Zealand, have adopted an alternative pricing scheme, called location-specific pricing, under which the fee for some service matches the cost of providing that service to a specific location. When [national] legislation calls for [airline] service to remote communities, an ANSP may ultimately be forced to take a financial loss if it is not able to fully recover its costs. Airservices Australia is seeking to control costs at some locations by deploying new lower-cost technologies to serve remote communities. For example, Airservices Australia is planning to install automatic dependent surveillance-broadcast⁷ ground stations, which will allow air traffic surveillance services over remote regions of Australia where no surveillance currently exists and where the introduction of radar would not be cost-effective.

“The conflict between an ANSP’s need to recover its costs and the inability of some users (e.g., regional air carriers) to pay the full costs of service to small or remote communities may mean that special measures are needed to protect service to such communities.”

Monopoly status or near-monopoly status of a commercial ANSP affects the ability of airlines to anticipate or to influence fee increases.

“With no alternative provider, [aircraft] operators cannot seek lower prices by changing routes and must pay whatever fees the ANSP charges,” the report said. “Since user fees constitute the ANSP’s primary source of revenue, [ICAO recognizes the need for] economic monitoring and regulation by an independent third party [that] can protect users and ensure a fair pricing process.”

The GAO study was designed to describe current characteristics and performance from available data but was limited in scope because some of the ANSPs' predecessor organizations did not collect or publicly report comparable data. Ideally, governments that are considering commercial ANSPs would develop baseline measures of safety, cost and efficiency to enable subsequent comparisons — including indicators of ATC safety, the report said. ♦

Notes

1. U.S. Government Accountability Office (GAO). *Air Traffic Control — Characteristics and Performance of Selected International Air Navigation Service Providers and Lessons Learned From Their Commercialization*. Report no. GAO-05-769. July 2005.
2. *Commercialization*, a term used by the International Civil Aviation Organization, was selected for the report on air navigation service providers (ANSPs) by GAO. Alternate terms for converting government-owned/operated aviation services to a business include *restructuring, privatization, outsourcing or corporatization*, GAO said.
3. Air traffic control (ATC) technology modernization and airspace redesign enabled “[U.K.] National Air Traffic Services, for example, to reduce its average delay per flight from 2.70 minutes in 2002 to 0.74 minutes in calendar year 2003, while handling almost 2.1 million flights,” the GAO report said.
4. External safety regulation of the selected ANSPs typically involves a separate authority that issues certificates or licenses to air traffic controllers and to technicians. “Under a performance-based approach to safety regulation, known as the relations-management approach, Transport Canada [for example] establishes the requirements in law and standards, and Nav Canada, as the operator, must demonstrate compliance by measuring and reporting on program results,” the GAO report said. “Transport Canada, among other things, conducts audits, adjudicates safety issues raised by stakeholders and licenses air traffic controllers. ... A performance-based organization is a discrete management unit with strong incentives to manage for results.”
5. All the ANSPs selected for the GAO study, except Deutsche Flugsicherung, provided oceanic air navigation services.
6. For purposes of the GAO report, a *safety management system* was defined as “a systematic and explicit approach defining the activities by which an air navigation service provider (ANSP) undertakes safety management to achieve acceptable or tolerable safety levels ... a system to ensure that the ANSP has identified, assessed and satisfactorily mitigated all safety risks, including establishing procedures for reporting and assessing safety occurrences in [ATC] and for assessing and mitigating risks.”
7. Automatic dependent surveillance–broadcast (ADS–B) is a technology that uses avionics to autonomously broadcast the identity, position, altitude, airspeed and other flight parameters of an aircraft. ADS–B receivers in ATC facilities and in other aircraft equipped with ADS–B then enable the use of these data for nonradar air traffic surveillance and collaborative decision making for collision avoidance and other purposes.

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