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CHAPTER V

AIR NAVIGATION*

SYNOPSIS

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I. INTRODUCTION

In the last Chapter, we reviewed the safety requirements governing such issues as personnel licensing, aircraft airworthiness and certification, nationality, aircraft ownership and registration requirements, and air carrier operator certification. This Chapter addresses another important safety-related obligation – air navigation.

Air Navigation Services [ANSs] are manifestly important to the safety and efficiency of air transportation.[1] Safety and security of flight depend upon the proficiency of their provision. They also impact airline economics both in terms of the charges they impose upon users of the system, and the delay and circuitous routings (and time, labor- and fuel-consumption) they can impose on aircraft operations. It is for these reasons that the safety, security, reliability, efficiency and cost of ANS are of particular interest to governments, airlines, and ultimately, the traveling and shipping public.

Harvard economist John Kenneth Galbraith observed, "In all countries the economic system depends on and develops from the state financing of highways, airports, postal services and urban infrastructure of the most diverse and essential sort."[2] Traditionally, airports and air navigation services have been established and operated by governmental institutions, usually departments, funded by the national treasury and staffed by government civil servants.[3] Financing and procurement requirements were those of any governmental institution, and typically were characterized by elaborate bureaucratic personnel, funding, and procurement requirements. Typically also, air navigation services and their economic, safety and airspace regulation were vested in the same institution.[4] Revenue earned by these entities usually flowed back to the national treasury, and was sometimes used to fund other, non-aviation, projects or services.[5]

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[1] "Among the traditional functions of government, air traffic control (ATC) is provided for the purpose of preventing collisions between aircraft in the air and between aircraft and obstructions on the ground, as well as expediting and maintaining an orderly flow of air traffic. In addition to ATC, the effective management of air traffic requires associated services such as meteorology, search and rescue, and telecommunications, as well as the provision of aeronautical information such as charts." Ira Lewis, "Analysis of Alternative Institutional Arrangements for Reform of US Air Traffic Control" (2004) 7 Int'l Public Management J. 385 at 386 [hereinafter Lewis, 2004].

[2] Bev Desjarlais, "Doug Young's Defection Shows His True Colors" *Hill Times* (5 June 2001) at 16.

[3] Paul Dempsey, *Air Commerce & the Law* (Coast Aire, 2004).

[4] Civil Air Navigation Services Org. (CANSO), *Corporatisation of Air Navigation Services* (Aug. 1999), online: CANSO < http://www.canso.org/NR/rdonlyres/DE778478-6399-4941-B242-2BD343E98905/0/corporatisationreport.pdf#search='Corporatisation%20of%20Air%20Navigation%20Services'> (date accessed: 12 December 2005) [hereinafter *Corporatisation of Air Navigation Services*] at 9.

[5] *Ibid*. at 4.

II. CAPACITY & CONGESTION

In order to maintain adequate separation between aircraft so as to ensure safety, governments the world over coordinate their supervision of aircraft under uniform standards established by ICAO. Air traffic control [ATC] is typically divided into three areas: (1) area control; (2) approach control; and (3) aerodrome control. *Area control* is designed to ensure adequate separation of aircraft once an aircraft has left the airspace controlled by an airport and is en route to another airport. *Approach control* (or terminal radar control) gives approaching and departing aircraft radio instructions within the approach control area (the airspace extending like a staircase from the airport. Airport surveillance radar monitors location and altitude of aircraft under terminal radar control. *Aerodrome control* consists of clearance given to an aircraft landing at or taking off from an airport in a control zone. This is performed from the air traffic control tower located at the airport.[6] Roderick van Damm of Eurocontrol summarized the principal components of ATC:

> *Air Traffic Management [ATM]* is a system consisting of a ground part and an air part, both of which are needed to ensure the safe and efficient movement of aircraft during all phases of operation. The airborne part of ATM consists of the functional capability which interacts with the ground part to attain the general objectives of ATM. The ground part of ATM comprises the functions of Air Traffic Services [ATS], Airspace Management [ASM] and Air Traffic Flow Management [ATFM]. Air Traffic Services are the primary components of ATM.
>
> *Air Traffic Service [ATS]* consists of flight information services, alerting service, air traffic advisory service, Air Traffic Control service [area control service, approach control service or aerodrome control service].
>
> *Air Traffic Control [ATC]* consists of a service operated by the appropriate authority to promote the safe, orderly and expeditious flow of air traffic.[7]

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[6] Osaka Regional Civil Aviation Bureau, Kansai International Airport Office 18-19 (1998).
[7] Roderick van Damm, A European Legal Framework for Air Traffic Management (presentation before the McGill University Institute of Air & Space Law, Montreal, Canada, Jan. 11, 2006).

Airway and airport inefficiencies contribute to delay, congestion, fuel consumption, environmental pollution, and a thinner margin of safety. Air traffic control delays cost the airline industry billions of dollars annually. Four priorities have been identified by airline leaders -- hardware replacement, software improvement, acceleration of the national route program, and development of satellite (global positioning system) navigation.[8]

In the United States, much criticism has been levied at the FAA's slow pace of ATC in replacing automation equipment. In 1983, the FAA estimated the cost at $2.5 billion; by 1994, the cost was $7.6 billion, and the project was eight years behind schedule. Sixty-four projects, totaling $3.8 billion had been completed; 158 projects remained.[9]

Air traffic congestion also appears to be a growing problem in East Asia. Traffic growth has been attributed to four factors:

1. Off-shore investment by Japanese, Korean and Taiwanese companies, whereby the manufacturers of North Asia seek cheaper production locations in Southeast Asia; this has created an "axis shift" of trunk routes from Southeast Asia towards Europe, toward a north-south alignment, connecting the major cities of Pacific Asia;
2. The emergence of China as a major market and production location, particularly around Hong Kong and the Pearl River Basin, and Shanghai;
3. The rising levels of personal income in the region; and
4. The rapidly expanding global role of cities in the region, as global trade patterns make intercontinental air transport essential.[10]

As a consequence, a relatively narrow, 300 kilometer traffic corridor has been created, with Japan and Korea on the north, and Sumatra and Java on the south, reinforced with the great circle routings to Europe and North America. The growth of traffic on this narrowly circumscribed geographical corridor has major implications for the management of air space in the region.[11] As noted elsewhere:

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[8] Aviation Daily (Dec. 14, 1995), at 413.
[9] U.S. General Accounting Office, Federal Aviation Administration: Issues Related to FAA Reform (Aug. 2, 1995).
[10] Paul Stephen Dempsey & Kevin O'Connor, Air Traffic Congestion and Infrastructure Development in the Pacific Asia Region, in Asia Pacific Air Transport: Challenges and Policy Reforms 23, 24-28 (Institute of Southeast Asia Studies 1997).
[11] Paul Stephen Dempsey & Kevin O'Connor, Air Traffic Congestion and Infrastructure

> It is possible that air space management problems could be serious, as the approach paths to the facilities in the Pearl River Delta will overlap. The difficulty with improving air space management is that it calls for international cooperation and agreement. The European experience has shown that is difficult to achieve... . In short, although capacity additions and improvements are undoubtedly needed in several locations, the region will need to move quickly to more sophisticated regional approaches to air space management to keep up with the rate of growth of air traffic in the region.[12]

Air traffic management is usually within the province of the federal government, with standardization and coordination provided internationally by ICAO. Nonetheless, the safety and efficiency of air traffic flows is also of concern to airports. Airport planners, therefore, need to take account of airspace flows, proximity to other airports, height of offsite buildings within the approach corridors, and historical meteorological data.[13]

III. INTERNATIONAL REQUIREMENTS

Several provisions of the Convention on International Civil Aviation[14] (more commonly known as the Chicago Convention) address issues of air navigation.

Certain provisions address the right of States to restrict aircraft operations. Article 1 provides that each State enjoyes complete and exclusive sovereignty over the air space above its territory. Article 5 grants non-scheduled flights the right to make flights into or across the territory of a State , though for safety reasons, a State may prescribe routes for non-scheduled flights proceeding over inaccessible regions, or areas without air navigation facilities. However, under Article 6, no scheduled flights may operate over the territory of a State without its special permission or authorization. Article 8 prohibits pilotless flights without

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Development in the Pacific Asia Region, in Asia Pacific Air Transport: Challenges and Policy Reforms 23, 28 (Institute of Southeast Asia Studies 1997).

[12] Paul Stephen Dempsey & Kevin O'Connor, Air Traffic Congestion and Infrastructure Development in the Pacific Asia Region, in Asia Pacific Air Transport: Challenges and Policy Reforms 23, 34 (Institute of Southeast Asia Studies 1997).

[13] Federal Aviation Administration, Airport Master Plans 19 (1985).

[14] *Convention on International Civil Aviation*, 7 December 1944, 15 U.N.T.S. 295, ICAO Doc. 7300/6 [hereinafter *Chicago Convention*].

special permission. Article 68 allows each State to designate the international air routes and airports in its territory. Under Article 9, a State may establish no-fly "prohibited areas" for military or public safety reasons; a State may require that aircraft finding themselves in prohibited areas must promptly land at a nearby airport.

Article 3*bis* provides that a State may require a civil aircraft flying above its territory without permission to land, but it may not use weapons against it, nor may it jeopardize the lives of the persons aboard it, or the safety of the aircraft. Under Article 25, States must provide assistance to aircraft in distress. Article 26 requires a State in which an accident occurs involving death or serious injury to investigate the incident; the State of aircraft registry may appoint observers to the investigation.

Article 22 of the Chicago Convention sets forth the general obligation of a State to facilitate and expedite navigation by aircraft, and to prevent unnecessary delays. Under Article 28, each State undertakes, so far as it finds practicable, to provide air navigation services (i.e. to provide airports, radio and meterological services and other air navigation facilities within its territory) in accordance with the standards and recommended practices [SARPs] set forth in the Annexes to the Convention; communications, codes, marking, signals, operating procedures, aeronautical maps and charts all must be consistent with applicable SARPs.

Article 44 provides that ICAO shall "develop the principles and techniques of international air navigation" so as to promote safety in flight, and encourage the development of air navigation facilities. If the ICAO Council concludes that a State's air navigation facilities are deficient, under Article 68, it may consult with the State. If deficiencies persist, and the State agrees, Articles 70, 71 and 74 allows the Council to finance, or provide, air navigation services, or provide technical assistance.

Several provisions require nondiscrimination. Article 11 provides that air navigation rules shall be nondiscriminatory "without distinction as to nationality"; such local laws and regulations governing the operation and navigation of aircraft "shall be complied with by aircraft upon entering or departing from or while within the territory of that State." Article 12 requires that States ensure that aircraft in its territory or carrying its nationality shall "comply with the rules and regulations relating to the flight and maneuver there in force"; such domestic regulations shall be uniform, to the greatest possible extent, with SARPs; and navigation rules over the high seas shall be established by ICAO. Article 15 of the

Chicago Convention requires:

- uniform conditions shall apply to the use of air navigation facilities by aircraft of every contracting State;
- air navigation charges shall not be higher for scheduled foreign aircraft than national aircraft engaged in similar international operations;
- no charge may be imposed solely for the right of transit over, entry into, or exit from its territory;
- charges imposed shall be published and communicated to the ICAO Council; and
- if a contracting State so requests, the ICAO Council may review such charges and report and make recommendations thereon to the concerned State(s).

The third of these requirements occasionally has been misinterpreted to prohibit a State from levying charges on aircraft that fly over or through its territory; but that is not the intention of this prohibition. Indeed, States may recover their costs of providing air navigation services to such aircraft. However, a State should not impose charges *merely* for the privilege of flying through or into that State's air space.[15]

Annex 11 requires that Contracting States shall determine those portions of the airspace over their territories where air traffic services will be provided. However, the entity providing ANS can be the State or a "suitable agency."[16] Although ICAO encourages governments to explore the possibility of establishing financially autonomous entities to provide ANS – where it would be in the best interests of the providers and the users (i.e., the airlines) – SARPs have not been promulgated within an Annex to govern how this should best be accomplished. Instead, ICAO has published various documents providing general guidance on these issues. Hence, there is enormous latitude in whether, and how, governments should establish such autonomous authorities.

Several Annexes are relevant to air navigation:

- Annex 2 – Rules of the Air: An aircraft must be flown in accord-

[15] Int'l Civil Aviation Org., *Manual on Air Navigation Services Economics* (ICAO Doc. 9161/3 3rd ed. 1997) § 1.5. Charges reported to ICAO are published in its *Manual of Airport and Air Navigation Facility Tariffs* (ICAO Doc. 7100), which is updated annually.

[16] ICAO, *Chicago Convention*, *supra* note 43, Annex 11 n. 1. "[T]here is no institutional obstacle in the relevant international instruments which would prevent a State from delegating responsibility for ATS to a suitable corporatized agency, national or foreign." Schubert, 1997, *supra* note 7 at 236.

ance with the general rules of the air and either the visual flight rules (VFR) or the instrument flight rules (IFR).[17]

- Annex 3 - Meteorological Service for International Air Navigation: requires the provision of essential meteorological information to operators, flight crew members, air traffic services units, search and rescue units, airport management and others.

- Annex 4 – Aeronautical Charts: requires the preparation of three sets of charts for planning and visual navigation along different scales.

- Annex 5 - Units of Measurement to be Used in Air and Ground Operations: introduced the international system of units to be used in all air and ground operations.

- Annex 6 – Operations of Aircraft: addresses aircraft operations, performance, communications and navigation equipment, maintenance, flight documents, the responsibilities of flight personnel, and the security of the aircraft.

- Annex 10 – Aeronautical Telecommunications: addresses (1) radio navigation aids; (2) communications procedures; (3) communications systems; (4) surveillance radar and collision avoidance systems; and (5) aeronautical frequency radio utilization.

- Annex 11 – Air Traffic Services: requires the establishment of flight information centres and air traffic control units, and division of the world's airspace into a series of contiguous flight information regions (FIRs) within which air traffic services are provided.

- Annex 15 – Aeronautical Informational Services: defines how an aeronautical information service (AIS) shall receive and originate, collate or assemble, edit, format, publish, store and distribute specific types of aeronautical information and data.

Additionally, best practices for air navigation have been identified in various Procedures for Air Navigation Services [PANS].[18]

[17] Most commercial aircraft are flown under IFR. VFR flights are permitted if a flight crew is able to remain clear of clouds by a distance of at least 1,500 meters horizontally and 300 meters vertically and to maintain a forward visibility of at least 8 kilometers. An aircraft may not be flown under VFR at night or above 6,100 meters except by special permission.
[18] PANS are operating practices too detailed for SARPs; they amplify the basic principles contained in the corresponding SARPs.

IV. NAVIGATIONAL AIDS

Airports must be designed to integrate with the air traffic control system, to provide navigational aids for approaching aircraft, and to control taxiing aircraft and vehicles moving abut the airport. Enhanced navigation technology can improve the safety and efficiency of takeoffs and landings. For example, upgrading ground equipment enabled Paris to join Dallas and Denver as cities where three simultaneous parallel aircraft approaches are possible.[19] At St. Louis Lambert International Airport, installation of a $9 million precision runway monitor allows high-speed high-resolution monitoring of incoming aircraft to enhance safety and capacity at the airport's parallel runways, only 1,300 feet apart.[20]

An airport's instrument landing system [ILS] allows air travel to proceed safely irrespective of poor visibility. The ILS consists essentially of a localizer beacon and glide path transmitter at the outer and middle marker beacon. The localizer beacon informs pilots of the appropriate direction for landings through a glide path. The glide path transmitter informs the pilot of the appropriate descent.[21] Table 7.2 reveals the potential location of several of these systems vis-à-vis the approach glide path and runway.

Approach lighting at the ends of the runways will require advance planning and purchase of land for installation and clearance of obstacles in the approach area. Pre-planning also includes installing sufficient duct capacity in the runways and taxiways during initial construction. Adequate duct capacity will enable runway lights to be upgraded to Category III technology without tearing up the runways.[22] Table 5.1 reveals the ICAO categorization of instrument landing systems.

Table 5.1 - INTERNATIONAL CIVIL AVIATION ORGANIZATION INSTRUMENT LANDING SYSTEM CATEGORIES			
Category	*Decision Height*	*Runway Visual Range*	*Remarks*
I	60m (200 ft)	800m (2600 ft)	
II	30m (100 ft)	400m (1200 ft)	

[19] Aeroports de Paris, Charles de Gaulle Airport: Europe's Foremost Transport Hub 20 (1997).
[20] Ken Leiser, Lambert Unveils High-Speed Radar System, St. Louis Post-Dispatch, Nov. 20, 1998, at C1.
[21] Munich Airport, Flight Operation 9 (1996).
[22] International Civil Aviation Organization, Airport Planning Manual I-69 (2d ed. 1987).

IIIA	0m	200m (700 ft)	Visual observation required for operation on the runway or taxiway
IIIB	0m	50m (150 ft)	Visual observation required for operation n the runway
IIIC	0m	0m	No operations depend on visual observation

Among the navigation aids a major airport is likely to have, and their acronyms, are the following:

1. Instrument landing system [ILS]/ microwave landing system [MLS];
2. VHF omnidirectional radio ranges [VOR] or non-directional radio beacon [NDB], which works as an intercept point at which the aircraft should intercept the ILS course; when used in conjunction with an ILS, the NDB is called a compass locator [CL];
3. Distance measuring equipment facilities [DME] (generally collocated with VOR or ILS or MLS); terminal DME provides approaching aircraft with information as to the distance to the touchdown point; guide slope [GS] gives approaching aircraft information regarding their angle of descent;
4. Collated tactical air navigation systems and VOR [VORTAC];
5. LLZ localizer, which provides approaching aircraft with guidance information to the centerline of the runway;
6. Middle marker [MM] identifies a point 900 meters from the end of the runway; an inner market [IM] identifies a point 400 meters from the end of the runway;
7. Far field monitor [FFM] checks the ILS as to accuracy; and
8. Radars -- approach, secondary and surveillance type.[23]

V. ORGANIZATIONAL STRUCTURE

The Chicago Convention and its Annexes in no way constrain *how* States should provide air navigation services. It is generally recognized that States are free to choose the organizational structure and legal form of their provision of air navigation services – the State shall designate the authority responsible for providing these services, the State itself or a

[23] International Civil Aviation Organization, Airport Planning Manual I-69 (2d ed. 1987); Osaka Regional Civil Aviation Bureau, Kansai International Airport Office 22-23 (1998).

suitable Agency.[24] According to ICAO, "There is no 'best option' for global application; the best option will vary from case to case."[25]

However, although the State may embrace a privatized or corporatized model in the provision of ANS, "arrangement through legislation or regulations should be made to ensure that the provisions of the Convention and other international obligations of the State are fully complied with by the operator of ... air navigation services."[26] Irrespective of the organizational form of the entity providing ANS, the State retains ultimate responsibility for safety and security, and compliance with the Chicago and related aviation treaties and conventions.[27] While operational functions may be delegated, the responsibility for complying with the Chicago Convention may not, and remain with the State exercising sovereignty over the airspace.[28]

ICAO recommended several of the following requirements for the ANS provider: (1) the organization should be subject to the State obligations under the Chicago Convention;[29] (2) its Charter should provide for appointment of a Board of Directors; (3) the organization should be self-financing, obtain funds from commercial markets, and attempt to achieve a financial return on investment; (4) it should apply commercial accounting standards and practices; and (5) it should be subject to normal business taxes.[30] A private sector organization providing ANS services also should be subject to safety and economic regulation by the relevant governmental regulatory institutions,[31] and that the government should continue to monitor the quality of services provided, and impose data reporting requirements.[32]

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24 ICAO *Chicago Convention*, *supra* note 43, Annex 11 § 2.1.3. Schubert, 1997, *supra* note 7 at 236.

25 Int'l Civil Aviation Org., *Study on Privatization in the Provision of Airports and Air Navigation Services* (ICAO Doc. ANSConf-WP/6 2000) at 12.

26 *Ibid*. at 6.

27 *Ibid*. at 12. See also ICAO Doc. ANSConf-WP/9 ¶ 3.7 (2000); Paul Dempsey, "Compliance & Enforcement in International Law: Achieving Global Uniformity in Aviation Safety" (2004) 30 North Carolina Journal of International Law and Commercial Regulation 1.

28 Schubert, 1997, *supra* note 7 at 236; Paul Dempsey, "Privatization of the Air: Government Liability for Privatized Air Traffic Services" (2003) XXVIII Ann. Air & Sp. L. 95.

29 "[W]here an autonomous body or entity is established . . . the State should stipulate as a condition for its approval of the new body or entity that it observe all relevant obligations of the state specified in the3 Convention on International Civil Aviation and its Annexes." Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 14.

30 Int'l Civil Aviation Org., *Manual on Air Navigation Services Economics* (ICAO Doc. 9161/3 3rd ed. 1997) § 2.17.

31 *Ibid*., § 2.18.

32 Int'l Civil Aviation Org., *Study on Privatization in the Provision of Airports and Air Navigation Services* (ICAO Doc. ANSConf-WP/6 2000) at 7-8.

At the national level, three basic organizational forms of ANS have been identified by ICAO:

- a government department;
- an autonomous public sector organization; or
- a private sector organization.[33]

Traditionally, ANS providers have been governmental departments, with the department head reporting directly to the executive level of government, with the staff consisting of civil servants, and with costs funded by the government from general taxation, user charges or a combination of the two.[34]

However, ICAO believes that "where airports and air navigation facilities have been operated by autonomous entities their overall financial situation and managerial efficiency have generally tended to improve."[35] Thus, autonomous ANS providers should be established "where this is in the best interest of providers and users ... ."[36] An autonomous public sector organization can take many forms. Typically, the government owns the organization, appointing a Board of Directors to oversee its operations. Typically also, the organization is self-financing and imposes user charges on users in order to provide sufficient capital to cover operating and capital expenditures. The staff is not likely to consist of civil servants.[37]

As of 1997, ICAO noted that there was no known example of a private sector organization, and that it might be a fully privatized, for-profit enterprise, operating like any capitalist entity. That was before the 2001 partial privatization of NATS in the United Kingdom, which is a for-profit ANS.[38]

Internationally, ICAO recognizes that a number of States have created regional international operating agencies to provide ANS within a defined geographic area (typically, route facilities and services), and that they have contributed to achieving greater economies of scale and im-

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[33] Int'l Civil Aviation Org., *Manual on Air Navigation Services Economics* (ICAO Doc. 9161/3 3rd ed. 1997) § 2.11.
[34] *Ibid*., § 2.12.
[35] Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 10.
[36] *Ibid*., § 11.
[37] Int'l Civil Aviation Org., *Manual on Air Navigation Services Economics* (ICAO Doc. 9161/3 3rd ed. 1997) §§ 2.14-2.15.
[38] Lewis, 2004, *supra* note 1 at 379.

proved efficiency at lower costs to providers and users.[39] Examples include ASECNA in Africa, COCESNA in Central America, and EUROCONTROL in Europe.[40]

A. REGULATORY OVERSIGHT

In establishing "autonomous public sector organizations" or "private sector organizations", States should bear in mind that the State is ultimately responsible for safety and security and, in light of the monopolistic nature of ANS, economic regulation of their operations.[41] ICAO has emphasized:

> [I]t is the State that in the final analysis is responsible for air navigation services and, therefore, in reality, autonomy cannot ever be complete. Any autonomous organization will ultimately be required to meet the objectives and obligations deferred by the government in its charter, including the requirement to comply with government established safety standards, have its service charges regulated, etc. Drawing up the Charter ... is a task of critical importance because it will determine the framework within which the autonomous authority will operate. In this context, it must be remembered that autonomous air navigation service providers are in fact monopolies and therefore must be adequately regulated and must be required to provide appropriate information and data pertaining to their operations to the regulatory authorities... .
>
> ICAO urges that States considering commercialization should ensure that the government retains a sufficient level of expertise to both regulate and oversee the performance of air navigation service providers, in terms of safety, economy and user satisfaction.[42]

Hence, the regulatory oversight function remains with States. According to ICAO, "the overriding responsibility of the State is to afford protection against monopolistic abuses which negatively impact on air-

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[39] *Corporatisation of Air Navigation Services, supra* note 5 at 5.
[40] Int'l Civil Aviation Org., *Manual on Air Navigation Services Economics* (ICAO Doc. 9161/3 3rd ed. 1997) §§ 2.24-2.26.
[41] Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 13.
[42] *Corporatisation of Air Navigation Services, supra* note 5 at 5-6.

craft operators, passengers and shippers alike and thereby may have a detrimental effect on the national economy as a whole."[43] Where regulatory bodies are established to regulate ANS, they must be provided with adequate authority to perform their mission:

> With growing private participation and privatization in the provision of airports and air navigation services, the responsibility of the State to monitor and also to take corrective action as a regulator has increased considerably, in the fields of safety, security and economics alike. Accordingly, the existing regulatory body within the State will need to be refocused and may need to [be] suitably strengthened, not only quantitatively but also qualitatively. The regulatory body should be backed by appropriate legislative framework and preferably be independent to avoid conflict of interests.[44]

A regulatory system to ensure these obligations were met would need to balance the needs of the State, the users, and the ANS provider.[45] Among the functions of the regulator would be to:

- prevent overcharging and other monopolistic practices;
- ensure transparency as well as the availability and presentation of all financial data required to determine [the] basis for charges;
- assess efficiency and efficacy in the operations of providers;
- review standards and quality of services providers; and
- monitor investments planned in relations to traffic forecast.[46]

In performing its role as economic regulator, the government should: (1) ensure nondiscrimination in the application of charges; (2) prohibit overcharging, anticompetitive practices, or abuse of a dominant position; (3) ensure transparency; (4) encourage efficiency; (5) establish and review standards, quality and level of ANS; (6) encourage invest-

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[43] ICAO Doc. ANSConf-WP/9 ¶ 3.7 (2000).

[44] Int'l Civil Aviation Org., *Study on Privatization in the Provision of Airports and Air Navigation Services* (ICAO Doc. ANSConf-WP/6 2000) at 10.

> Coupled with the monopolistic characteristics of airports and air navigation services, which insulate them to a certain extent from the corrective effects of market forces that govern where competition exists, more situations have emerged showing a need for a regulatory code and an independent overseeing body to ensure that the interests of users as well as the airport and/or air navigation service providers and of the national economy are promoted or at least protected and that international obligations are met. These are responsibilities which can only be assumed by the State itself.

ICAO Doc. ANSConf-WP/9 ¶ 3.1 (2000).

[45] *Ibid*. at 7.

[46] ICAO Doc. ANSConf-WP/9 ¶ 4.2 (2000).

ment necessary to satisfy future demand; and (7) ensure that the views of users are considered.[47]

B. FEES AND CHARGES

Whatever type of organization is designated to provide ANS, ICAO has established recommended principles to govern charges imposed on users of such services. ANS charges should be cost based, and should not include costs that are not properly allocable to ANS.[48] ICAO contemplates the establishment to an equitable cost recovery system under internationally accepted accounting standards comprised of:

- accounting of all ANS costs incurred on behalf of aeronautical users;
- allocating these costs among categories of users; and
- developing a pricing policy system.[49]

Given the monopolistic characteristics of ANS, ICAO emphasizes that "a number of safeguards would need to be implemented to protect users against overcharging and to ensure that obligations are met such as freedom of access, non-discrimination between categories of users and conformity with international agreements and obligations."[50] According to ICAO:

> Airports and air navigation services are in essence local monopolies on which the users – aircraft operators, passengers and shippers alike – are highly dependent... . If these services are privatized or private participation is permitted, it must be ensured that monopoly power is not misused. An unregulated private monopoly can be more harmful than a relatively inefficient public monopoly. Accordingly, regulations must provide for price controls or capping in regard to at least aeronautical charges.[51]

In establishing the cost basis of ANS charges, the full cost of providing ANS should be taken into account, including operational, management, administration, maintenance, and capital costs, including

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[47] Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 15.
[48] *Ibid*., § 36.
[49] *Ibid*., § 37.
[50] Int'l Civil Aviation Org., *Manual on Air Navigation Services Economics* (ICAO Doc. 9161/3 3rd ed. 1997) § 2.16.
[51] Int'l Civil Aviation Org., S*tudy on Privatization in the Provision of Airports and Air Navigation Services* (ICAO Doc. ANSConf-WP/6 2000) at 7.

depreciation.[52] It is conceded that ANS charges should be sufficient to cover all direct and indirect operating expenses, and provide a reasonable return on assets so as to contribute toward necessary capital improvements.[53]

ICAO recommends that the allocation of costs among aeronautical users be equitably imposed. Users should bear their full and fair costs.[54] But no users should be burdened with paying for costs not properly allocable to them under sound accounting principles.[55] In establishing an air navigation charges system, ICAO recommends that it contain several requirements, including that:

(1) it be simple, equitable, and suitable for general application;
(2) charges not discourage the use of facilities and services necessary for safety;
(3) charges be according to sound accounting principles;
(4) charges be non-discriminatory;
(5) any under-recovery of costs properly allocable to certain users not be borne by other users;
(6) charges take into account the cost of providing ANS and the effectiveness of the services provided, and also take account of the economic condition of users and that of the provider;
(7) there be no double-charging for services; and
(8) general aviation charges should be reasonable and related to the cost of facilities used.[56]

Charges imposed for route air navigation services ordinarily consist of a single fee based on distance flown and aircraft weight.[57] These factors are relatively easy to measure, bear a reasonable relationship to services provided, and usually eliminate discrimination against foreign aircraft.[58] Charges should be payable in the local currency of the State in which they are imposed.[59]

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[52] Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 38.
[53] *Ibid*., § 38(v).
[54] Int'l Civil Aviation Org., *Study on Privatization in the Provision of Airports and Air Navigation Services* (ICAO Doc. ANSConf-WP/6 2000) at 7.
[55] Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 40.
[56] *Ibid*., § 41.
[57] *Ibid*., §45.
[58] Lewis, 2004, *supra* note 1 at 387.
[59] Int'l Civil Aviation Org., *ICAO's Policies on Charges for Airports and Air Navigation Services* (ICAO Doc. 9082/7 7th ed. 2004) § 43.

Before changes in charges are made, ICAO emphasizes that it is important that the provider first consult with the users of ANS. Account should be taken of the financial condition of air carriers, providing a balance of interests of the ANS providers and users, particularly during periods of economic difficulty.[60] If agreement between the provider and user cannot be obtained, the user should have the right to appeal the charge to an independent body.[61] So as to ensure that new developments meet the needs of users and take into account their financial implications, consultations are also recommended before plans are finalized for providing new or expanded ANS.[62] Disputes should be resolved by a neutral body at the local level, with an emphasis of conciliation and mediation, but possibly including arbitration, or the establishment of an independent regulatory body to provide oversight of the autonomous ANS provider.[63]

VI. PRIVATIZATION AND CORPORATIZATION OF AIR NAVIGATION SERVICES

Relatively recently, governments have begun to "commercialize" "corporatize", or partially "privatize" their airports and ANS providers. These so-called "private" (usually governmentally-owned) corporations usually are managed as business enterprises, following market-based commercial practices.[64] In 1966, the British Airports Authority [BAA] became the first major public corporation established to manage airports. Initially, it was a government corporation; later, BAA became a government-owned company; about two decades after its formation, it was privatized, with the government assuming a minority ownership position.[65]

This gradual transitional model also appears to have fallen into favor in the provision of ANS, beginning in the modern era with New Zealand's corporatization in 1987,[66] though Switzerland formed a private body to provide ANS as early as 1921. Furthermore, as a general rule, when the provision of ANS is spun-off from core governmental institutions, the oversight responsibility for safety and economic regulation is retained within them.[67]

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[60] *Ibid*., § 20.
[61] *Ibid*., § 49.
[62] *Ibid*., § 50.
[63] *Ibid*., § 51.
[64] Francis Schubert, "The Corporatization of Air Traffic Control: Drifting between Private and Public Law" (1997) XXII (2) Ann. Air & Sp. L. 223 at 224 [hereinafter Schubert, 1997].
[65] Int'l Civil Aviation Org., *Study on Privatization in the Provision of Airports and Air Navigation Services* (ICAO Doc. ANSConf-WP/6 2000) at 2-3.
[66] "[I]t may be prudent for the States to proceed slowly and in stages." *Ibid*. at 9.
[67] Lewis, 2004, *supra* note 1, at 389.

The problems identified with having traditional government institutions provide ANS include:

- Governmental institutions have had difficulty in keeping pace with the capital needs of ANS to accommodate rapidly growing traffic demands and maintain high levels of safety in aviation;[68]
- Governmental institutions usually are restricted in their ability to borrow money in capital markets to finance infrastructure improvements.[69]
- Governmental institutions are subject to governmental procurement and decisional policies and practices, imposing bureaucratic efficiency impediments;[70] and
- Governmental institutions are subject to civil service labor costs and staffing levels undisciplined by market forces.[71]

Reasons advanced for the transfers of ANS from governmental departments to government corporations and non-governmental entities include:

- Typically, they are financially self-sufficient, weaned from government subsidies;[72]
- They are better able to raise capital in the market, and thereby meet growing capacity needs;[73]
- They are more efficient, and more capable of reducing costs for users, and subsidy requirements from governments;[74]
- They can have governance structures allowing users greater access and input on decisionmaking;[75] and
- They usually move to a more equitable user-charge approach to cost allocation.[76]

However, commercializing ANS providers may subject their governments to liability for their negligence, for the sovereign international

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[68] Int'l Civil Aviation Org., Conférence sur l'économie des aéroports et des services de navigation aérienne (Montréal, 19 – 28 June 2000) (ICAO Doc. ANSConf-WP/9 (2000)), online: ICAO < http://www.icao.int/icao/en/atb/ansconf2000/docs/wp09f.pdf#search ='ICAO%20Doc.%20ANSConfWP%2F9%20%282000%29'> (date accessed: 23 December 2005).

[69] *Corporatisation of Air Navigation Services, supra* note 5 at 8.

[70] Schubert, 1997, *supra* note 7 at 226.

[71] *Corporatisation of Air Navigation Services*, *supra* note 5 at 5.

[72] Schubert, 1997, *supra* note 7 at 231.

[73] *Corporatisation of Air Navigation Service*s, *supra* note 5 at 4.

[74] *Ibid*. at 5. See also, ICAO Doc. ANSConf-WP/9 (2000), *supra* note 11; Janie Treanor, "Privatization *v*. Corporatization of the Federal Aviation Administration: Revamping Air Traffic Control" (1998) 63 J. Air L. & Com. 633 [hereinafter Treanor, 1998].

[75] Schubert, 1997, *supra* note 7 at 228.

[76] *Ibid*. at 230.

legal obligations of a State over its airspace are nondelegable; State liability sometimes may be avoided where ANS providers are governmental institutions, particularly those which embrace the common law doctrine of sovereign immunity.[77] Similarly, once ANS services are performed by a non-governmental entity, they may be subject to various forms of taxation. Labor organizations also express concern about the loss of civil servant status and protection.[78] Concerns also have been raised by users about the potential for monopoly abuse by ANS providers in terms of higher fees and/or poorer service. For example, the airline industry's trade association, the International Air Transport Association [IATA], expressed these concerns:

> ANS commercialization may have a negative side, in particular when the principal objective is to maximize profits. No matter what organizational form an airport or ANS entity assumes through the process of commercialization, it remains by its nature a monopoly on which the users are completely dependent. There are a growing number of cases of abuse of this monopolistic situation by newly created commercial organizations, often with the complicity of the governments concerned.
>
> IATA's experience is that, in many cases, commercialization has resulted in significant increases in the airport and ANS cost base that are used to determine charges. In addition, the promised increases in efficiency and productivity have not always materialized.[79]

Some of these concerns may be ameliorated by government ownership and/or government economic and safety regulation of the ANS provider, and requirements for transparency and user consultation.[80] IATA urges that ANS charges be:

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[77] Paul Dempsey, "Privatization of the Air: Government Liability for Privatized Air Traffic Services" (2003) XXVIII Ann. Air & Sp. L. 95. On ANS liability more generally, see Francis Schubert, "Legal Barriers to a Safety Culture in Aviation" (2004) XXIX Ann. Air & Sp. L. 19.

[78] Marc Baumgartner, President of the International Federation of Air Traffic Controllers' Associations, argues that since the principal costs of ANS is personnel costs, the only way to reduce these costs are either by reducing the number of personnel, or increasing their productivity. He also notes that, "after an initial pay increase the negotiations for the collective bargaining agreement have become tougher than before." Marc Baumgartner, "Restructuring of Air Navigation Services" *Scope* (Oct. 2003) [hereinafter Baumgartner, 2003].

[79] ICAO Doc. ANSConf-WP/26 ¶¶ 2.2-2.3(2000).

[80] But it has been argued that governments have "failed in most of the cases to insure that the oversight (regulatory bodies) function assured a safe and financially viable translation of the objectives into reality." Baumgartner, 2003, *supra* note 21.

- Determined on the basis of transparent, fair and reasonable costs;
- In conformity with international agreements and obligations of the individual State;
- In line with ICAO's principles on user charges; and
- Subject to economic regulatory oversight, preferably through an independent, neutral body.[81]

ICAO refers to the non-governmental entities that governments create to operate ANS as "autonomous authorities." By autonomous, ICAO means that the entity should have greater freedom from government in conducting its financial affairs – that it should be self-financing, subject to business taxes, and earn a return on capital – but still regulated by government.[82] However, the ANS trade association, the Civil Air Navigation Services Organisation [CANSO], prefers the term "corporatized body." Both refer to an entity that exists outside the government civil service arena having limited commercial freedom to provide ANS. CANSO believes that the descriptive term "corporatized body" is preferable to "autonomous organization" in order to emphasize that autonomy is limited, and that States continue to ensure that ANS conforms to the requirements of the Chicago Convention and the Annexes promulgated thereunder.[83] IATA points out that the terms "privatization", or "corporatization", or "autonomization" can be substituted for the term "commercialization", and includes an array of organizational types, on a sliding scale of government ownership and control:

ANS Organizations	Degree of Commercialization
State Authority (CAA)	0%
Autonomous State Entity	|
State-owned Corporation (Crown corporation)	|
Concession/Lease (all or part of the facilities)	|
Partial Privatization (e.g. non-aeronautical)	|
Not-for-profit (stakeholder owned) Corporation	
Fully Privatized Company (publicly traded shares)	100%[84]

Perhaps "corporatized body" better describes this type of entity, though, this is a species of life with many sub-species. There is not one model of a corporatized ANS provider, but they have many similar characteristics. Some are State corporations, while others are limited-

[81] ICAO Doc. ANSConf-WP/26 ¶ 2.4 (2000).
[82] *Corporatisation of Air Navigation Services*, supra note 5 at 4.
[83] *Ibid*.
[84] ICAO Doc. ANSConf-WP/26 A-2 (2000).

liability corporations, or public companies, with varying degrees of governmental ownership and oversight.[85]

Typically, corporatized ANS providers are established by legislation promulgated by the national legislature or parliament, which defines their governance. According to Professor Francis Shubert:

> In principle, a state can delegate a specific function under its competence to an autonomous public entity or even to a private corporation, provided that (1) the relevant act is actually a function attributed to the State by domestic law; and (2) the State institutes proper supervision over the activities of the corporatized entity. Corporatization is a formal process which affects the basic structure of the providing agency while the nature of the services provided remains a function of public law even when delegated to a private entity.[86]

Corporatized ANS providers usually are run by a Board of Directors appointed by a government minister. They are usually subject to generally accepted accounting principles, subject to audit, and transparency requirements. For most such corporatized bodies, the government is the sole shareholder.[87] They are ordinarily established with a mandate to become financially self-sufficient.[88]

In 2000, ICAO surveyed governments in an attempt to evaluate how airport ANS were performing. It found that, in most States, ANS was performed directly by governmental institutions. In a relatively few but a growing number of States, ANS was being performed by "autonomous entities". In all but one of these States (i.e., Canada), ownership remained with the government. In most States where ANS has been delegated to a corporatized entity, the State continues to regulate, or has authority to approve, user charges, and safety.[89]

Of the States responding[90] to the ICAO survey:

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[85] Schubert, 1997, *supra* note 7 at 230.
[86] *Ibid*. at 235.
[87] *Corporatisation of Air Navigation Services*, *supra* note 5 at 7. See also ICAO Doc. ANSConf-WP/42 (2000).
[88] ICAO Doc. ANSConf-WP/9 (2000).
[89] Schubert, 1997, *supra* note 7 at 237; Sally Gethin, "Is Privatization the Answer?" *ATM* (Nov./Dec. 1994).
[90] Of ICAO's 188 member States, the largest number responding (75) constituted only 40% of its membership.

- 67% imposed cost-based navigation charges;
- 63% followed ICAO cost-recovery policies in setting charges;
- 57% of ANS providers designate charges subject to governmental approval, while 28% of governments set ANS charges directly:
- 45% applied a transparent accounting system;
- 45% required mandatory consultation with users in setting charges
- 42% had regulatory provisions restricting monopoly abuse.[91]

Table 5.1 summarizes the major characteristics of ten ANSPs, in terms of ownership, economic and safety regulation, and State guarantees for debt. At this writing, many nations are considering the commercialization, or privatization, of ANS. Proponents of privatization point to the experiences of Australia, Canada, and the United Kingdom as proof that privatization lowers costs. Critics of privatization point to these same foreign examples,[92] and the experience of privatized airports in the US,[93] as proof that, when the cost of increased liability is included, promised economic savings evaporate.[94]

Table 5.1 – Characteristics of ANS Providers

Country	*ANS Provider*	*Owner-ship*	*Economic Regula-tion*[95]	*Safety Regula-tion*	*Debt Guar-antee*
Austral-ia[96]	Air ser-vices Austral-ia	Govern-ment Corpora-tion	Commis-sion Over-sight	Separate agency	Yes – Fee to Gov-ernment for guar-

[91] ICAO Doc. ANSConf-WP/9 (2000).
[92] See National Air Traffic Controllers Association (NATCA), "Air Traffic Control Privatization", online: NATCA <http://<www.natca.org/legislationcenter/priv ATCcountries.msp> (date accessed: 2 September 2003).
[93] For example, on July 19, 1997, two general aviation aircraft collided in mid-air three miles south of Chicago's Meigs Field, killing all seven occupants. Plaintiffs alleged the crash was the result of the fact that there was only one inexperienced and inadequately trained controller in the tower at the time, a staffing level inadequate to traffic needs, no supervisor was present, and that the sole air traffic controller had been working for four hours without a break. It was also alleged that the FAA knew, or should have known, that the Meigs tower was understaffed by people inadequately trained to meet FAA safety requirements, and that the FAA's failure to exercise due care was the proximate cause of plaintiffs' deaths. Allegations of negligence causing death such as these raise issues of liability for the individual controllers, the private contractors and the federal government. *Alinsky* v. *United States*, 156 F. Supp. 2nd 908, 915 (N.D. Ill. 2001).
[94] "Foes of ATC Privatization Armed With New Ammunition", *Airline Financial News* (10 Mar. 2003); "Controllers Union Sees 'Folly' In Privatized ATC", *Airline Financial News* (17 June 2002).
[95] Excluding antitrust and competition regulation applicable to all industries.
[96] Corporatized in 1988.

					anty
Canada[97]	NAV CANADA	Not-for-profit private corporation	Legislated principles with appeals	Separate MOT	No
France[98]	Direction des services de la navigation aerienne	State Department	Approved by Transport	Internal but separate	Yes
Germany[99]	Deutsche Flugsicherung GmbH	Government Corporation	Approved by Transport	Internal but will be separate	No
Ireland[100]	Irish Aviation Authority	Government Corporation	Regulatory Commission for Terminal Fees only	Internal but separate	No
Netherlands[101]	Luchtverkeersleiding Nederland	Not-for-profit government corporation	Approved by Transport	Separate MOT	Discretionary
New Zealand[102]	Airways Corporation of New Zealand	Government Corporation	Self-regulation with appeal	Separate agency	No
South Africa	Air Traffic	Limited Liability	MOT Regulato-	Separate agency	No

[97] Corporatized in 1996.
[98] Consolidated in 2003.
[99] Established in 1993, and to be privatized in 2003.
[100] Corporatized in 1993-94.
[101] Corporatized in 1993.
[102] Corporatized in 1997.

	and Navigation Services, Ltd.	Public Company	ry committee		
Switzerland[103]	Skyguide	Not-for-profit government corporation	Approved by Transport	Separate agency	No
United Kingdom[104]	National Air Traffic Services, Ltd.	Public-private partnership	EC Regulator, price capping	Separate agency	No

Proponents of corporatization in the US insist that the ANS provider, the Federal Aviation Administration [FAA], has missed numerous Congressionally-imposed deadlines on the introduction of new technology,[105] and has aging equipment, sluggish procurement policies, budgetary restraints, and bureaucratic policies and procedures.[106] The FAA has been criticized more harshly in various quarters as having a culture that was "in a time warp," "resistant to change, defensive and turf-conscious," "secretive rather than open; self-interested rather than public spirited and highly resistant to change," "characterized by dysfunctional management," and "a self-perpetuating bureaucratic morass of inaction and self-protection."[107] By 2002, the FAA had lost its jurisdiction over aviation security, when it was transferred to the nascent US Department of Homeland Security.[108] In December 2003, President Bush signed the Century of Aviation Reauthorization Act which postponed further privatization, but only for one year.[109] The issue remains a lively one in the United States and in many other countries.

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[103] Incorporated in 2001; predecessor established in 1921.
[104] Public/private partnership established in 2001.
[105] Cletus Coughlin, Jeffrey Cohen & Sarosh Khan, "Aviation Security and Terrorism: A Review of the Economic Issues" (Sept./Oct. 2002) *Federal Reserve Bank of St. Louis Review* 13.
[106] Treanor, 1998, *supra* note 17 at 633.
[107] See Ronald Lofaro & Kevin Smith, "Rising Risk? Rising Safety? The Millennium of Air Travel" (1995) 25 Transp. L.J. 205 at 211-12, and sources cited therein.
[108] Paul Dempsey, "Aviation Security: The Role of Law in the War against Terrorism" (2003) 41 Columbia Journal of Transnational Law 649.
[109] "Capital Watch", *Seattle Times* (13 Dec. 2003) at A6. Paul Dempsey, "Privatization of the Air: Government Liability for Privatized Air Traffic Services" (2003) XXVIII Ann. Air & Sp. L. 95.

VII. CONCLUSIONS

In 2005, a team of researchers from the McGill University Institute of Air & Space Law evaluated the ANS providers in Australia, Canada, France, Germany, Ireland the Netherlands, New Zealand, South Africa, Switzerland, and the United Kingdom. Table 4.1 and the following discussion summarizes their findings.

A. GOVERNMENT OWNERSHIP AND CONTROL

The movement from State to "corporatized" and privatized ANS has been motivated by considerations of cost, efficiency, procurement, the growing needs of users for improved and updated infrastructure to address pressing capacity needs, and the desire of governments to move from tax-based to user-fee-based and private capital market-based finance. It is also part of a broader trend to substitute public/private partnership for government-provided services, so as to introduce market incentives and disciplines into the provision of traditional public services.

The French and Netherlands ANS providers are governmental institutions (the French[110] ANS provider is directly under the supervision of a government Minister; the Netherlands[111] ANS provider is an independent organization which is a separate legal person from the government). The shareholders of the "corporatized" Australian,[112] German,[113]

[110] In France, the Director General of Civil Aviation (DGAC) is the central governmental organization for regulating civil aviation in France. The DGAC falls under the Ministry for Town Planning, Housing and Transport. The DSNA is a national body that falls under the authority of the DGAC. Some support functions are provided to DSNA within DGAC by its General Secretariat (SG) while DSNA is mainly focused on operational and technical activities.

[111] Luchtverkeersleiding Nederland (LVNL), or Air Traffic Control the Netherlands, is an independent administrative body (Zelfstandig Bestuursorgaan, or ZBO), accountable to the Minister of Transport, Public Works and Water Management to whom it reports on matters of performance and policy. It is a legal person distinct from the government but is a public agency.

[112] Airservices Australia [AA] was established in 1995 as a "Commonwealth Authority" to provide air traffic services, aeronautical information services, aeronautical radio navigation services, aeronautical telecommunications services and aerodrome rescue and fire fighting services. As a Commonwealth Authority, AA is fully owned by the Government of Australia.

[113] In October 1992, the German Federal Government established – and on 1 January 1993 put into operation -- DFS Deutsche Flugsicherung GmbH (DFS) to assume responsibility for air navigation services by transferring all assets of the former Bundesanstalt für Flugsicherung (BFS) [a Federal agency under public law] to the DFS. DFS is a company organized under German private law that is a 100% state-owned company – i.e. the German Federal Government is the only shareholder and is represented by the Ministry of Transport, Building and Housing (MOT). Since 2004 – and to be implemented in 2006-2007 -- the German Ministry of Transport has been preparing for a partial privatization of DFS in the context of a Public-Private partnership. The functions of DFS include: air traffic control functions (not exercised by EUROCONTROL); the acceptance, processing and forwarding of flight plans; and, since 1 January 1995, the provision of regional military air traffic control.

Irish,[114] New Zealand,[115] and South African[116] ANS providers are governmental institutions (though the German ANS provider is moving toward a public/private partnership). The Swiss[117] ANS provider is nearly 100% governmentally owned. In the United Kingdom,[118] the ANS provider is a public/private partnership, of which the government owns 48.9% (the remainder owned by ATC employees, airports and airlines). The Canadian ANS provider is a fully private non-share (and non-profit) capital corporation - a company without owners – in other words, a stakeholder cooperative.[119]

The Ministries that now own the shares of these corporatized entities might in future sell or transfer these shares to private interests, as has occurred in Canada and the United Kingdom.[120] As they move to-

[114] The Irish Aviation Authority [IAA] was established as a "private company" in 1993 to perform a number of functions, including operating and managing air navigation services. Ireland also has established an "independent" Commission for Aviation Regulation [CAR] as a "body corporate" to regulate airport and aviation terminal service charges.

[115] The Airways Corporation of New Zealand (ACNZ) was established on 1 April 1987 under the State-owned Enterprises Policy that was being carried out by the Government of the day. It was incorporated as a company with shares under the Companies Act, and all the shares have since been fully held by the Government, acting through the Ministers for State Owned Enterprises and Finance. Initially, ACNZ was responsible for providing air navigation services and rescue fire services on a commercial basis, but the latter has since been transferred to airport authorities. Although ACNZ is fully owned by the Government, the State-owned Enterprises Act requires that it should be run as if it was privately owned.

[116] Air Traffic and Navigation Services Company Limited (ATNS) was established in 1993 as a limited liability company with shares under the South African Companies Act. Its shares are fully held by the Minister of Transport on behalf of the Government of South Africa, although they could be disposed of with the approval of Parliament. Apart from being the sole shareholder of ATNS, the Minister of Transport is also the Executive Authority of ATNS for purposes of ensuring compliance with public finance management laws. The Minister also has power to issue orders to ATNS regarding what it can do or not do.

[117] Skyguide (formerly Swisscontrol) is responsible for providing civil and military air traffic management (ATM) services for airspace over Switzerland and at and around Zurich, Geneva, Bern, and Lugano airports. Skyguide is a non-profit public limited company that is over 99.9% owned by the Swiss Federation. State ownership is exercised through the Federal Department of Environment, Transport, Energy and Communication (DETEC).

[118] In the UK, NATS Holdings owns 100% of the Shares of NATS. NATS itself controls 100% each of two operating companies/subsidiaries: (1) NATS En Route plc [NERL] [for en-route, oceanic and military services] that is subject to economic regulation by the CAA and (2) NATS Services Ltd [for terminal and commercial activities] does not hold a licence (and thus will not be able to provide en route services) is unregulated by the CAA.

[119] On November 1, 1996, Transport Canada , transferred ownership and control of Canada's civil air navigation services (ANS) network and facilities from direct control by a principal federal government department [Transport Canada] and other departments [such as Justice and Public Works] to a commercialized entity, NAV CANADA. NAV CANADA was established as the world's first fully private, non-share capital corporation on May 26, 1995 to acquire, own, manage, operate, maintain and develop the Canadian civil air navigation system. NAV CANADA became the world's first air navigation service (ANS) provider without majority government ownership or control.

[120] The United Kingdom's National Air Traffic Services Limited (NATS) went through a two-step process of commercialization. First, in 1996, NATS was changed from a full public sector entity that was part of the UK Civil Aviation Authority (CAA) into a corporation with 100% of the shares owned by the CAA. Second, in 2001, NATS became effectively partially privatized with the adoption of the Public-Private Partnership (PPP) model that involved 51%

ward private ownership, economic and safety regulatory oversight by government will likely become more critical.

No two ANS providers are precisely alike. Each has substantive duties mandated by law that are unique to it. For example, the Irish ANS not only operates and manages air navigation services, but also performs medical examinations of holders of airmen certificates, and regulates the airworthiness of aircraft. Initially, the New Zealand ANS was responsible for providing rescue and fire services, though this was subsequently transferred to the airport authorities. The Netherlands ANS must provide air traffic control training and produce aeronautical maps and publications. Hence, governments define the functions to be performed by ANS providers, and these functions may go beyond core air navigation services.

B. QUALIFICATIONS AND APPOINTMENT PROCESS

Consistent with ICAO's recommendations, most ANS providers reviewed are governed by a Board some or all of whose members are appointed by a government Minister.[121] The principal exception is

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of NATS Holdings shares being sold to the private sector [(1) the Airline Group holds a 41.9% stake (this is a consortium of seven UK airlines: British Airways, bmi British Midland, Virgin Atlantic, Britannia, Monarch, EasyJet and Airtours); (2) NATS staff holds 5%; (3) the UK airport operator, British Airports Authority (BAA plc) holds 4.2%] while the UK Government retained 49% ownership. NATS operates under a 30 year licence from the CAA.

[121] AA is run by a Board of Directors appointed by the Minister for Transport and Regional Services. The Board consists of nine members: a chairperson who is appointed on a full time basis, a deputy chairperson, the chief executive officer (who is not appointed by the Minister) and six other members some of whom may be employees of AA. Board members are required to act independently with care and diligence and to make judgments in good faith believing same to be in the best interests of AA.

In Ireland, the IAA's nine directors are appointed by the Minister of Transport; the directors appoint a Chief Executive for the company. Commissioners of the Irish Commission for Aviation Regulation (of which there may be up to three) also are appointed by the Minister of Transport. While serving as Commissioners, they may not hold any other office or employment for compensation. The Netherlands ANS Supervisory Board, composed of 6 members, is chaired by a retired Commander in Chief of the Royal Netherlands Air Force, and further consists of representatives from Transavia Airlines, RNlAF, Schiphol Group and the MTPWWM. KLM were represented on the board until recently, when a change to Dutch law barred it from having a representative sitting directly on the board. There is also a two person Executive Board (CEO and Vice-Chair) that controls a Management Board made up of heads of directorates.

In New Zealand, any number of directors, not being less than two or more than nine, may be appointed by the two shareholding ministers in consultation with the New Zealand Crown Company Monitoring Advisory Unit (CCMAU). Persons qualified to be appointed as directors are those who, in the opinion of the shareholding ministers, will assist ACNZ to achieve its principal objective. Directors are appointed for a maximum duration of three years and there are provisions dealing with situations of conflict of interest. The Board of the South African ATNS comprises executive and non-executive directors appointed by the Minister of Transport. By law, the majority of the directors must be non-executive directors, and the majority of the non-executive directors must be people who are not employed in the Public Service. Presently, the Board comprises 8 members, including the Managing

France,[122] which has no Board structure, but instead has a traditional government departmental structure.

The appointment approach may be divided into several models: (1) in some ANSs, the government has discretion to appoint all Board members (e.g., Australia, Ireland, New Zealand, and South Africa); (2) in others, the government minister is required to reserve seats for certain constituencies, such as users or labor (e.g., Germany[123] and Switzerland[124]); (3) in others, the government appoints most of the Board members, but certain seats are designated by constituent groups (e.g., the Netherlands); (4) in still others, the government appoints a minority of seats (Canada[125] and the United Kingdom[126]). In none of the examined

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Director of ATNS the only executive director appointed by other members of the Board in consultation with the Minister. There are no provisions dealing with the independence of the Board or the resolution of situations of conflict of interest of directors.

[122] In France, the DSNA is comprised of three main departments: Headquarters, Operations Department and Technical Department. The Head of each of these departments reports to the Director of DNSA, who in turn reports to the Director General of DGAC.

[123] In Germany, the corporate governance structure of the DFS can be understood as operating on three levels.

- *Shareholders:* The Federal Republic of Germany is the only [100%] *shareholder*, such that in law the task of providing air navigation services still remains with the State. The Ministry of Transport represents the German State in shareholder meetings.
- A *Supervisory Board* consists of 12 members: 6 elected employee/staff representatives and 6 representatives of the owner/employer. The Board's main functions are the execution of regulatory and functional control and the safeguarding of civil and military interests. The Supervisory Board must consent to any major investments and approve the annual business plan
- *Executive Board of Managing Directors* [including] the CEO and three other members of the Board are appointed and regulated by the DFS *Supervisory Board* and is accountable to it.

[124] In Switzerland, Skyguide's Board of Directors is comprised of a maximum of seven members, each of whom is elected by the General Assembly of Shareholders for a term of three years. Board members may be re-elected for a maximum of four terms in office and must retire at the age of 65. The majority of Board members must be Swiss nationals, and must be resident in Switzerland. Previously, half of the board seats were reserved for the government, but recent legislative changes reserve no seats for the government – or indeed for airlines or airports – and only provide explicitly for a representative of the military and a representative of employees. In practice, the 5 other members of the Board are drawn from unrelated private and public sector entities.

[125] NAV CANADA operates as a private non-profit entity and a "stakeholder cooperative" governed by three key bodies:

- *Voting Members* are the user groups (including the airlines, non-commercial aviation, unions and government) for whose distinct interests NAV CANADA was created.
- *Board of Directors* has 15 members: 10 directors represent the major ANS *stakeholders* including the Government of Canada, the commercial air carriers, general and business aviation, and NAV CANADA's employees with exclusions that prevent direct representation except by unanimous decision of the Board; 4 "unaffiliated" Directors with no ties to stakeholders; and the President and Chief Executive Officer appointed by the Board.
- *The Advisory Committee* -- named by a large number of "Associate Members" -- provides some representation of lesser and broader aviation interests.

Generally, Directors cannot be active employees, Directors or members of Government, the airlines, unions or Voting Members. More specifically, no one may be appointed to the

ANSs, is the government yet out of the picture. As ANS providers move toward increased privatization, the issue of government oversight will become more critical. Safety regulation has tended toward a direct separation of the regulatory and operational functions within governments. The ANS providers reviewed have identified three models of economic oversight: (1) traditional independent economic regulation (e.g., for terminal navigation services, Ireland, and for en route navigation, the UK); (2) specifying elaborate statutory criteria governing the ANS and providing for administrative or judicial appeals (e.g., Canada); or (3) establishing a "golden share" veto power in the government (e.g., UK).

In some ANS providers, users and constituents appear on the Board, either because they may nominate a representative to the appointing Minister, or because seats have been reserved for them legislatively. In the Netherlands, users and constituents may nominate candidates to the supervisory Board (which chooses the executive Board which, in turn, appoints a managing Board) to the appointing Minister. In Switzerland, a Board position is reserved for employees, and another for the military. In Canada and the UK, certain seats on the Board are reserved for identified stakeholders, who appoint their representatives. Germany's supervisory Board has half its seats reserved for employees; that Board appoints the executive Board.

Some ANS providers have included stakeholders on their governance Boards in order to enhance responsiveness to user needs. Others, with the experience of having stakeholders on their Boards (e.g., Switzerland and the Netherlands), have begun to reduce or eliminate stakeholder representation because they want an arms length relationship in determining long-term infrastructure needs vis-à-vis short-term user charges. These two ANS providers also have moved the regulators off their Boards to ensure the separation of regulatory and provider functions. Similarly, in New Zealand the Minister of Transport specifically

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Board who is an elected official or an employee of any level of public government in Canada (other than municipal). No one may be appointed who is an officer, director or employee of a significant ANS customer or supplier, and no one may be appointed who is a member of a NAV CANADA bargaining agent or of a Voting Member. Nevertheless, the just mentioned categories of excluded persons may still be appointed to the Board of Directors if the Board unanimously agrees that such an appointment will involve no conflict-of-interest.

[126] The United Kingdom's NATS 12-member Board consists of a non-executive Officer, Director International Affairs, Finance Director, and 9 non-executive Directors [including 3 Partnership Directors appointed by the UK Government shareholder; 4 directors including the IATA representative appointed by the Airline Group, and 2 directors appointed by the British Airport Authority (BAA)]. The Board's functions include: the approval of the company's strategic and operating plans and long term investment plan, major items of capital expenditure, oversight of safety, operational and financial performance, and the regular review of the effectiveness of the group's system of internal controls.

was excluded from being a shareholding Minister for these reasons. Hence, there appears to be a modest trend toward removing stakeholders and regulators from the ANS governing Board. But in contrast, the stakeholders are dominant by indirect representation on the ANS Board in the Canadian model and directly in the UK model – Germany might well move in that direction in the future.

On the one hand, though having stakeholders on the Board may make it more responsive to users, more efficient, and cost-effective, stakeholder representation on the ANS Board may accentuate its focus on the short-term and on fee reduction at the sacrifice of long-term infrastructure needs. On the other hand, in the absence of economic regulation, removing stakeholders from the Board may enhance the tendency of the ANS provider to engage in "gold plating"- spending money to upgrade facilities and employee wages and benefits in ways that are inconsistent with commercial realities.

C. ACCOUNTABILITY AND TRANSPARENCY REQUIREMENTS

Some ANS statutes explicitly prohibit conflicts-of-interest, requiring that a conflicted Board member respect disclosure and abstention from voting requirements.[127] Some statutes also allow the government to

[127] In Australia, the Board of AA is required to prepare a corporate plan and submit it to the Minister at least once each year. Within four months after the end of each financial year, the Board is also required to submit an annual report of the operations of AA, including financial statements for the year under review and the Auditor General's report on those statements. AA is subject to the Governance Arrangements for Airservices Australia, although it has not been designated as a Government Business Enterprise. Board members with material personal interests in any matter being considered by the Board are obliged to disclose the nature of their interests and thereafter to refrain from any deliberations on the matter except with the approval of the Board or the Minister.
NAV CANADA has formalized its disclosure procedures into a written policy stating it must operate in an open and transparent manner with full disclosure to all stakeholders. Every Annual Meeting of the Corporation is open to the public. The Annual Report of the Corporation must include the audited annual financial statements, the auditor's report on these, and an account of what the corporation did in the past year. Moreover, the following information, *inter alia,* is broadly disseminated by NAV CANADA: an annual information form providing a detailed three-year corporate record respecting NAV CANADA's business, operations, management and financial position; a summary of the company's business plan for the up-coming fiscal year; a prospectus describing the company's business and financial structure.

In France, DGAC continues to coordinate support functions across departments through its General Secretariat. Each year the parliament votes the French budget to which the Annex Budget for Civil Aviation (BAAC) is attached. As is true of any French Civil service administration, the DSNA is subject to random and frequent oversight from the French court of accounts "Cour des Comptes".

In Ireland, the IAA must keep all proper and usual accounts of monies received or expended by it, including a profit and loss statement, a cash flow statement, and a balance sheet, and such statements must be audited annually. The IAA must also prepare an Annual Report (a five-year "Business Development Plan") of its activities and those of its subsidiaries. IAA directors and staff must disclose any information in which they directly

remove a Board member from office for acts of impropriety. Other States have general ethical and good governance requirements in their corporation statutes.

Most ANS providers are required to conduct their business in the public, through annual reports, corporate plans, public meetings, informing users of their actions and giving them an opportunity to comment, and have their finances audited under generally acceptable commercial accounting standards.[128] In some instances, they have adopted international

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or indirectly interested involving any activities of the company or its subsidiaries. They must also refrain from participating in any meeting in which such matter is discussed, take no part in its deliberations, nor vote on any decision relating to the matter. Similar requirements are imposed on the members and staff of the Commission for Aviation Regulation. Prior to setting maximum airport charges, the Commission shall give notice to concerned persons, publish notice in a daily newspaper, and specify when representations may be made by interested parties or the public.

In the Netherlands, LVNL must comply with the Netherlands Corporate Governance code and the Code of Good Governance for Implementing Organizations developed specially for ZBOs. LVNL's administrative guidelines and user fee policy is based on the rules of conduct for the member states affiliated to Eurocontrol.

In New Zealand, one of ACNZ's major accountability requirements is the Statement of Corporate Intent (SCI) which is supposed to be delivered by the Board to the shareholding ministers at the beginning of each financial year. The SCI sets out the Board' corporate plans for ACNZ for the ensuing three years and, although it is reviewed by the shareholding ministers, it is not approved by them; thus remaining the directors own plan against which their performance is subsequently assessed. ACNZ is a reporting entity under the Financial Reporting Act. As such, it is obliged to prepare consolidated financial statements in accordance with standards established by the Accounting Standards Review Board. Due to the need to keep the regulator separate from ACNZ, the Minister for Transport has been deliberately excluded from being a shareholding minister.

In South Africa, the ATNS is required to submit a business plan covering five years at the beginning of each financial year to the shareholding minister. At the end of each financial year, ATNS is also obliged to submit an annual report including it's audited and approved financial statements to the shareholding minister, who, in turn, is also required to lay it before Parliament. As a public entity, the Public Finance Management Act is applicable to ATNS. As such, the Board is required to: keep full and proper records of the financial affairs of ATNS; prepare financial statements in accordance with generally accepted standards; and to have those financial statements audited and submitted to the Executive Authority, the National Treasury and the Auditor General.

[128] For example, Germany's DFS is significantly accountable to the Minister of Transport who is given the right to obtain any required information from the DFS and has access to all facilities and units of DFS. Moreover, the MOT exercises functional supervision of the DFS' operational services (including air traffic control services and flight information services). The MOT also has legal supervision of DFS respecting the execution of any future air navigation services. On a broader level, close consultation with users is maintained through a series of meetings throughout the year. [e.g., a bilateral consultation on cost and charges issues is held twice a year]. Moreover, DFS has an Advisory Board of business, customers and the media.

In Switzerland, financial control is the responsibility of the Controlling unit, which monitors observance of the four-year finance plan, the annual budget and the executive information system (a quarterly budget reassessment). Skyguide is also subject to regular TriNET audits of its air traffic management activities. TriNet is a trinational audit organization formed in 1999 among Swiss, Austrian and German air traffic control services to perform independent analyses of technical systems and operational procedures. In 2004, Skyguide adopted the International Financial Reporting Standards (IFRS). PricewaterhouseCoopers AG have been Skyguide's statutory auditors since 1996 and its group auditors since 2001. There is also a service level agreement with the military, which

accounting standards, as is recommended by ICAO.

Contemporary views of good government suggest that more transparency and user involvement is preferable to closed-door decisionmaking, except of course, where security issues mandate secrecy. To the extent ANS providers are free to enter into individualized contracts with users (as in Australia),[129] if these contracts are not available for public review, transparency – and indeed nondiscrimination – (two of the principles insisted upon by ICAO) potentially are jeopardized.[130]

D. RESTRICTIONS ON REVENUE SOURCES

To the extent that ANS services formerly were a burden on the national treasury, corporatization has allowed their financing to be user-fee based. It is expected that they will be financially self-sufficient.[131] ICAO urges governments to ensure that ANS providers be self-financed, obtain funds from commercial markets, and obtain a financial return on assets so as to contribute to necessary capital improvements. Some (e.g., Australia and New Zealand)[132] are allowed to make a profit, and to pay

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conducts audits of its own accounts.

Under the Transport Act 2000, the UK Government issued a licence to NERL to provide en route air traffic services in the UK. The Act gives the CAA the role of economic regulator of NERL through monitoring and enforcing the conditions in the licence and through modifications to the licence. Some aspects of the accountability and transparency required by NERL's licence, and monitored by the CAA, include that NERL is required not only to produce [and the CAA has approved] a code of practice setting out its methods and procedures for consulting users and for handling and responding to user complaints but also to submit to the CAA each year a Service and Investment Plan (SIP) and also to demonstrate the financial performance of those activities that are the subject of separate economic regulation. Moreover, the CAA has published procedures on how the direct users of NERL should make a complaint where a breach of a condition in NERL's air traffic services licence may have occurred. The CAA has also published a consultation document setting out its policies for monitoring and enforcing NERL's Licence. The CAA must approve key personnel in NATS (as with airlines) such as the Director of Safety.

[129] In Australia, AA has authority, subject to approval by the Minister, to set charges for the services and facilities it provides and penalties for their late payment. However, this power is not very significant since it does not apply to charges for services and facilities provided by AA under contract with its customers. AA contracts are nevertheless subject to review under the Trade Practices Act, which is Australia's framework competition act.

[130] However, it appears that prices in Australia, ANS fees are consistent across users following ICAO principles and are subject to discretionary review by the ACCC.

[131] In France, DSNA ATC activities are paid by user fees collected by EUROCONTROL. The non-ANS activities of the DGAC are covered by a passenger tax which also covers exempted flights.

The Irish Aviation Authority has authority to impose charges for the services it provides. Its Directors may borrow and raise money, and mortgage property, issue debentures, stock or other securities, though it may not invite the public to subscribe to any shares or debentures.

[132] In New Zealand, ACNZ has authority to impose charges on its customers for the services it provides. It is required to make a profit from its operations in order to pay dividends to the Government. There are no statutory restrictions regarding the sources from which ACNZ may raise its revenue; neither are there any restrictions on the types of

that profit to the shareholders (usually, the government). Others (e.g., the Netherlands)[133] require a governmental financial injection to cover exempt services not required to pay fees; the Netherlands ANS provider also is prohibited from building a reserve. The Canadian[134] and Swiss[135] ANS providers are explicitly prohibited from making a profit.

Most have been allowed to establish for-profit subsidiaries to expand their sources of revenue.[136] For example, in New Zealand and Germany,[137] consulting services provide a revenue stream; the Swiss ANS provides computer software through a subsidiary. Over time, we anticipate that ANS providers may establish subsidiaries to provide services in geographic regions not contiguous to their own, or airport terminal services outside their service territory. Competition between ANS providers for contracts may resolve some of the regulatory issues presented, yet it may create contractual, statutory or regulatory challenges of its own for determining how user fees are set to prohibit monopolistic abuse. The issues may differ between ANS services provided at airport terminal vis-à-vis en route and oceanic services, as has been recognized in the UK.[138]

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businesses it may engage in. In practice, ACNZ raises revenue through subsidiaries engaged in consultancy and management services and such other services that are not at the core of provision of air navigation services.

[133] In the Netherlands, LVNL is subject to standard revenue principles for ZBOs. Its principal source of revenues (96%) is fees. LVNL is not considered a corporate entity for the purposes of Value Added Tax (VAT) recovery. Thus, LVNL passes to its customers any VAT it pays for goods and services, which could be seen as a form of double taxation.

[134] NAV CANADA is authorized to establish its revenues by setting air navigation service charges [i.e. user fees] on airlines and aircraft operators sufficient to recover all the costs of providing its services. However, the ANS Act prohibits NAV CANADA from making a profit. All revenues stay within the ANS such that any excess earnings are reinvested in the company, kept as operating reserve, or used to reduce debt or user charges.

[135] Switzerland's Skyguide is a not-for-profit corporation. Thus, no dividends are paid to shareholders. Skyguide is obliged to provide some services that cannot be performed on a cost recovery basis (e.g. air navigation services at smaller airfields), or for which they are not compensated at all (e.g. air navigation services within German airspace). However, Skyguide now has flexibility to buildup reserves during good years to compensate for losses in bad years.

[136] In Australia, AA is allowed to raise revenue from contracts for consultancy and management services provided they fall within its statutory functions. AA may also participate in the formation of companies (subsidiaries) and partnerships.

[137] Today, Germany's DFS is financially autonomous through collecting user charges (EUROCONTROL is responsible for billing and collecting en-route charges for domestic and international air traffic; DFS bills and collects terminal charges for arrivals and departures). The military reimburses DFS for military-related costs. Furthermore, DFS not only receives no government subsidies but also must pay the German Federal government for all ANS-related costs. To expand revenue sources, DFS has expanded its non-core activities in the fields of consulting, data management, production of maps and charts (mainly for VFR flights), maintenance, simulations and training.

[138] In the UK, NATS is authorized to set air navigation service charges on airlines and aircraft operators (i.e. establish its revenues) sufficient not only to recover all the costs of providing its services (including debt service costs) but also to make a profit.

E. ACCESS TO CAPITAL MARKETS

Corporatization potentially allows the shares of the ANS to be sold to the public, though most governments have not yet taken the opportunity to do so. Corporatization also allows ANS providers to tap the private capital markets for their infrastructure needs, rather than burdening the national treasury.[139] In contrast, in Switzerland,[140] the ANS provider has issued new shares to the government to raise equity; but returning to the government for capital is an aberration from the general trend.

The issue of debt security is handled in a diverse fashion. Some ANS providers have the ability to issue government-guaranteed debt, or pledge their assets as security for debt; others explicitly do not. All appear to have the ability to secure debt with their revenue streams. For example, the Canadian[141] ANS is not allowed to secure debt by its assets or government guarantees; its debt is instead secured by its revenue stream. In Germany[142] and South Africa,[143] the government does not

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[139] In Australia, AA's initial capital was transferred to it from the capital of its predecessor, the CAA. It is a debt repayable to the Government of Australia. Apart from its initial capital, AA may borrow money from the Government of Australia out of funds appropriated by Parliament for the purpose. AA may also raise money by borrowing or otherwise from other sources, and it may give security over the whole or part of its assets for such loans. In addition, AA has power to enter into approved contracts for hedging purposes in order to protect itself against adverse currency variations in capital markets. In the Netherlands, LVNL has full access to financial debt markets to borrow and deposit funds. It has the equivalent of AAA-rating as a governmental organization. However it does not issue shares.

In the United Kingdom, the PPP model incorporated in NATS removed corporation debt from the public accounts, earned the UK Treasury a one-time cash injection from the sale proceeds and provided NATS with the ability to secure private financing in order to enable it to handle growing air traffic control demand in the UK. NERL had in 2001 an unusually high level of debt relative to equity such that this placed limits on the risks it could bear. However, the debt level is now much lower than it was originally.

[140] Switzerland's Skyguide has full access to capital markets subject to its bylaws and securities regulation. It can raise funds by issuing bonds or by increasing its share capital.

[141] Both NAV CANADA's $1.5 billion expenditure to acquire the air navigation system from Transport Canada and its ongoing capital requirements, have been financed with debt, that is less expensive than equity funding. NAV CANADA's debt is neither guaranteed by the Canadian Government nor secured by the assets of the corporation. However, NAV CANADA's debt is secured by (assigning to creditors) its revenue stream.

[142] Germany's DFS was created on an equity and debt basis [the latter is an interest-bearing loan owed to the Federal Republic of Germany]. Financing of infrastructure investment (based on a yearly budget and 3 – 5 year investment plans) is generally secured by using income from ANS charges. However, DFS also has a money and capital market programme allowing it to issue commercial paper and bonds in major currencies as needed. The German Federal Government does not guarantee DFS loans.

[143] The South African ATNS has limited access to capital markets. Its shares are primarily owned by the Government of South Africa and cannot be traded in any market unless with the approval of Parliament. However, ATNS has unrestricted power to borrow money from any source in order to achieve its objects or to perform its functions. There are no provisions regarding the use of ATNS' assets as security for loans; the Government does not provide sovereign guarantees for loans contracted by ATNS.

guarantee loans; they are also secured by the revenue stream. In France,[144] the government may issue treasury bonds guaranteed by the ANS assets. In Ireland,[145] the Minister for Finance can guarantee loans up to a certain level. In New Zealand,[146] the ANS provider can issue state enterprise equity bonds, deemed to be non-voting equity shares in the company.

F. SAFETY AND ECONOMIC REGULATION AUTHORITIES

The natural monopoly characteristics of ANS services have led many governments to ensure that ANS fees and charges are regulated by a separate governmental institution providing economic regulation. In fact, ICAO strongly recommends that States do so. But not all States have. Certain ANS providers have autonomy to set fees; while others have the ability to set fees subject to veto or regulatory review either prior or subsequent to their implementation. At the end of the spectrum at which government provides prior control of ANS fees lie Ireland,[147] the Netherlands,[148] South Africa and (for en route, oceanic and military charges), the United Kingdom.[149] In the Netherlands and Ireland, the ANS pro-

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[144] In France, ANS activity has had access to capital markets since 1985, although not to equity markets. Loans obtained from financial markets are part of the national debt.

[145] The Irish Minister for Finance holds all shares of the IAA, which paid its debt in full in 1994. Though the Minister may make loans to the IAA, no loans have been made to date. The IAA and its subsidiaries may borrow money from private sources for capital purposes (including working capital) in increments not to exceed £100 million at any one time. These loans may be guaranteed by the Minister for Finance up to £80 million, though this has not been done to date.

[146] In New Zealand, ACNZ is allowed, subject to Parliamentary approval by resolution, to issue state enterprise equity bonds to any persons at any time. These bonds are deemed to be ordinary shares, and the holders thereof, non-voting shareholders. These bonds are transferable and there are no restrictions on their being traded in capital markets.

[147] In Ireland, the IAA licenses air traffic control services and operators of air traffic service systems, including communications, navigational aid or other technologies to aircraft in flight or landing at an airport. The IAA licenses air traffic controllers. It also registers aircraft, and issues aircraft certificate of type approval, certifications of airworthiness, flight permits, noise certificates, transponder codes, aircraft maintenance and overhauls, and a variety of other aviation functions. The Irish Commission for Aviation Regulation regulates airport and aviation terminal service charges, and licenses air carriers.

[148] In 2001, the Netherlands' CAA-NL was split into the Aviation Division of the Inspectorate General of Transport, Public Works and Water Management (IVW) and the Directorate General of Civil Aviation (DGL). This allowed a clear separation of responsibilities for aviation policy making (DGL) and policy implementation (IVW). IVW can be regarded as the aviation safety regulator within the Netherlands. It is divided into two civil aviation agencies: an executive agency and an enforcement agency. The Supervisory Board of LVNL must approve all proposed tariffs for ANS, which are then placed before MTPWWM for final approval.

[149] The United Kingdom's CAA is a public corporation that was originally established by Parliament in 1972 as an independent specialist aviation regulator and provider of air traffic services. Today, it only retains its aviation regulator function [since NATS is the service provider] being independent of both the Department for Transport and political interference. Following the separation of NATS from the UK CAA in 2001, the CAA is now the UK's independent aviation regulator that as a single specialist body incorporates *all civil aviation*

vider proposes the fee to a Minister, who may approve it. In South Africa, a separate economic regulatory body must provide permission before prices can be set. In the UK, en route, oceanic and military ANS services are regulated, while terminal and commercial activities are not.

In several States, the fee becomes effective unless subsequently reversed. In New Zealand[150] and Switzerland,[151] the ANS provider sets the fee, though a government regulatory body can impose price controls. In France,[152] the ANS provider can set the fee, though the Minister may veto it. In Canada,[153] fees are governed by a comprehensive regime of statutory charging principles, and subject to subsequent appeal.

In Germany,[154] the ANS provider can set user fees at any level it feels is commercially viable, though its capital expenditures are monitored by the government. In Australia,[155] many fees appear to be con-

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regulatory functions -- economic regulation, safety regulation, airspace policy, and consumer protection. Only one of NATS' two operating companies/subsidiaries -- *NERL* [for en-route, oceanic and military services] -- is subject to active economic regulation and price-capping by the CAA. Moreover, the licence specifies price controls for oceanic charges.

[150] The safety aspects of New Zealand's ACNZ's operations as a service provider are regulated by the Civil Aviation Authority (CAA) under the Civil Aviation Act, 1990. This is carried out through certification and periodic auditing of ACNZ under Part 172 of the Civil Aviation Rules. For purposes of economic regulation, the Commerce Commission of New Zealand has been given authority to impose price controls on the services provided by ACNZ in the event of an abuse of monopoly power. The effect of this power is mainly deterrent as it has never been exerted.

[151] The Swiss Federal Office for Civil Aviation (FOCA) regulates the safety management of Skyguide. FOCA is part of the Department of Environment, Transport, Energy and Communication. There is now a strict separation between FOCA's safety-related activities and those dealing with aviation development. FOCA has been removed from the Skyguide Board. In principle, DETEC is the economic regulator for air navigation service provider. However, since 1996, Swisscontrol and later Skyguide have full financial autonomy. Skyguide can set rates for its services, subject however to ICAO and EUROCONTROL's rules related to route charges.

[152] In France, the Inspections and Safety Department (DCS) is responsible for ensuring compliance with safety and security policies developed by the Department for Strategic and Technical Affairs (DAST). This includes the supervision of air navigation services. DAST is now the member of the Eurocontrol Provisional Council rather than DSNA, and is the representative to ICAO. The Minister retains authority over fees and charges.

[153] The ANS Act grants NAV CANADA a mandate and (natural) monopoly to be the only party who may charge for key civil ANS. To protect consumers from market power abuses of a natural monopoly, a two-tiered approach was followed: first, in theory, NAV CANADA, as a non-profit user/stakeholder cooperative, has users of the cooperative's services that have a shared interest in low prices/costs and quality ANS that reduces the need for external regulation; second, the Canadian Government went one step further by also legislating a comprehensive set of charging principles as further protection for the users/stakeholders.

[154] In Germany, the MOT's economic regulatory oversight of DFS is limited to the approval of DFS's economic plan and major capital expenditures as well as legal supervision in the field of user charges. However, DFS – as a private-law company – is otherwise free to operate by following general commercial-law principles and charging whatever fees it wishes.

[155] With respect to terminal navigation services, en-route navigation services and aviation rescue and fire fighting services provided by AA to customers outside the framework of a contract, AA is required to notify the Australian Competition and Consumer Commission (ACCC) of any increases in service charges before putting them into effect. As noted above, this requirement does not apply to the bulk of AA's services, which are offered under contract.

sensually negotiated with the users, though Australia follows ICAO principles and applies charges equally to all users in the same class. In the UK, airport terminal charges are set by contract with the airport, rather than by regulation.

Depending upon geography, competition may serve as an adequate fee regulator. For example, if the Swiss ANS provider sets fees at too high a level, carriers may re-route aircraft around Swiss airspace, depending of course, upon the price of fuel, delay and other cost considerations.

Each of the States reviewed appear to aspire to achieving a goal of an external autonomous safety regulatory regime.[156] External monitoring and regulation of safety is provided in most of the reviewed States by a separate external governmental institution, usually the Ministry of Transport or Civil Aviation Authority, and/or its equivalent. But in France, the provision and regulation of ANS is performed by separate directorates of the transport ministry, which share some common departmental resources.

It is likely that more governments have not established economic regulatory agencies to provide oversight because of the high degree of government control over most "corporatized" ANS providers – govern-

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[156] As a service provider, AA is subject to certification and regulation by the Australian Civil Aviation Safety Authority (CASA) under a number of Civil Aviation Safety Regulations (CASRs). CASA sets safety standards and monitors compliance by AA. The operations of AA are also subject to review by the Australian Transport Safety Board, Australia's independent agency for transportation safety investigations.

Germany's DFS faces external safety regulation by the MOT and the Federal Office of Civil Aviation (LBA). The MOT is responsible for the legal and functional supervision of DFS in the field of the operational air navigation services. The LBA currently is responsible for ATC personnel licensing, approval of airspace changes, and approving training programmes. On the other hand, safety is managed internally in DFS that has a Safety Management System.

For the future, in conformity with ICAO and the Single European Sky [SES] initiative requirements, a separate safety regulator will be established to oversee DFS -- within the Civil Aviation Authority (LBA).

Safety regulation of ATNS is carried out by the South African Civil Aviation Authority under the Civil Aviation Authority Act. For purposes of economic regulation, ATNS is subject to the Economic Regulating Committee established under the Airports Company Act. The Committee is appointed solely by the Minister of Transport. Before ATNS can increase any of its existing service charges, it has to apply for and obtain "a permission" from the Committee to that effect. The Committee may issue the permission upon such terms calculated to restrain ATNS from abusing its monopoly power.

In the UK, while ANS provision is NATS responsibility, safety regulation is carried out from within the public sector by the CAA through its Safety Regulation Group (SRG). NERL is a holder of a CAA-issued licence to provide air traffic services and this licence is revocable if NATS breaches its absolute duty to provide a safe system. Furthermore, the CAA assures that air traffic controllers are only licensed when they have satisfied stringent CAA criteria and have passed CAA-conducted examinations; and, these personnel are subject to annual CAA administered competence and medical fitness tests. Procedures and equipment (affecting the safety of aircraft) used by air traffic controllers must be approved by the CAA.

ment Ministers appoint the Board members, and often review fees and charges. Because of the natural monopoly characteristics of ANS, as these institutions move toward privatization, however, governments may find it necessary to establish formal economic regulation mechanisms, impose price caps (as in the UK), or allow formal appeals (as in Canada).[157] Moreover, as they move toward greater privatization, a more elaborate process of consultation with users, transparency of decisionmaking, and the opportunity for appeals to an independent review agency may be required, as is recommended by ICAO.

G. PRICE AND SERVICE CONTROLS

ICAO encourages States to establish regulatory mechanisms to ensure non-discrimination in the application of charges, prohibition of over-charging, and achievement of efficiency; fees should be cost-based, and users should bear their full and fair costs; no user should be burdened with costs not fairly allocable to it; and the ANS provider should be subject to normal business taxes. Some statutes (e.g., Ireland)[158] require the ANS provider to abide by the provisions of the Chicago Convention, which explicitly prohibits discrimination against foreign and between the same type of aircraft.

The precision with which the statutes address the criteria governing fees and charges appears to vary with the discretion which the ANS provider has to set fees.[159] States with an *ex ante* fee and charge approval mechanism tend not to have elaborate criteria, while those having an *ex post* approval or appeal mechanism tend to have them.[160] For example,

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[157] Since the commercialization of air navigation services in Canada, NAV CANADA has become the owner and operator of the system [i.e. service provider] and Transport Canada [i.e. the Government] has largely been limited to being the independent, arm's length safety regulator. Thus, general safety regulations and standards [e.g. for air navigation facilities, equipment and personnel; licensing and monitoring air traffic control services, air traffic controllers, etc] for ANS are established and monitored by Transport Canada. However, NAV CANADA, as the *service provider,* has a duty to establish and regulate its own safety practices.

[158] The Irish Aviation Authority establishes its own charges for services, with the consent of the Transport Minister; it must ensure that its revenues are sufficient to cover its costs and charges, satisfy its capital needs, and its interest obligations. Different rates may be set for different classes of aircraft. The IAA also may charge such amounts "as it considers appropriate" for any other services provided by it. The Irish Commission for Aviation Regulation regulates maximum charges imposed by commercial airports having more than one million passengers annually.

[159] Germany's DFS uses a service fee-based system and is required to make an operating profit on which it pays taxes. The MOT decides how much of any remaining profit is retained by the state or deposited into DFS capital reserves.

[160] New Zealand's ACNZ has power to determine the prices/charges for the services it provides and users have a right of appeal to the Commerce Commission in situations of unjustifiable price hikes. In practice, although ACNZ is not statutorily required to do so, prices/charges for services have been set in cooperation with the users of the services. A

Ireland's ANS fees and charges (which must be approved by a government Minister before they become effective) should cover its costs and charges, satisfy its capital needs, and its interest obligations. At the other extreme, Canada[161] stands out as the one example of a nation that has promulgated elaborate statutory charging principles to govern fees and charges. Once imposed by the ANS provider, the fees may be challenged as failing to satisfy the statutory criteria.

Other nuances exist.[162] South Africa[163] cannot change its fees more than twice in a fiscal year. The Netherlands[164] ANS cannot build a reserve. Therefore, during periods of economic downturn, it cannot cushion the financial burden upon airlines, though ICAO asks that governments take into account "the financial condition of the carriers ... particularly during periods of economic difficulty." Most Australian fees are set by contract with users.[165] The UK ANS provider has been subjected to a "price cap" by the economic regulator, under which it may set rates and charges;[166] however, it pays penalties or receives bonuses dependent upon the delay it causes flights – the bonus system rewards performance to reduce delays. Such an approach is consistent with the ICAO principle that the efficiency and efficacy of the provider should be

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right of appeal to the New Zealand Ombudsman lies against administrative decisions made by ACNZ. Both the Ombudsmen Act and the Official Information Act are applicable to ACNZ. Decisions or recommendations made by the Ombudsman after investigating an appeal impose a public duty on ACNZ to act accordingly.

[161] NAV CANADA uses a service fee-based system developed in consultation with customers and approved by the stakeholder Board that seeks to fully cover the cost of services provided. As stated above, Canada has legislated an elaborate system of charging principles to govern fees.

[162] In France, user fees are approved by the Minister who will veto charge proposals if there are too many complaints. French case law is extensive on user charges and has confirmed that user fees for DSNA are not a tax.

[163] In issuing a permission to South African ATNS, the Committee has power to prescribe service standards in respect of any of the services provided by ATNS, and ATNS is obliged to abide by any such service standards. ATNS is statutorily prohibited from changing the level or modifying the structure of any of its charges more than twice within any financial year. ATNS is also restrained from closing off or substantially curtailing any of its services except with the approval of the Committee and the Shareholding Minister.

[164] In the Netherlands, the law prohibits the building up of reserves, and the government does make modest direct contributions to LVNL's budget. For example, after 9/11 the Dutch government provided € 31 million. LVNL's Aviation Act mandate stipulates the services it must offer.

[165] In Australia, apart form the requirement of notifying the ACCC of proposed increases in services charges before putting them into effect, AA is also required to give the Minister written notice before making a statutory determination of service charges and penalties for non-payment. The said notice must specify the basis for setting the service charge or penalty and the reasons for increasing the existing charges if that is the case. Again, these requirements do not apply to charges for services offered by AA under contract.

[166] In terms of price controls, the UK's CAA sets caps on the increases in the prices that NERL charges for its en route business (in terms of both Eurocontrol/and London approach and Oceanic services), subject to review every 5 years. According to the current Price Control system, NATS either pays penalties or receives bonuses dependent upon the level of delay it causes to flights. NATS' performance is measured by average delay per flight.

taken into account in the price structure.

In countries such as Switzerland[167] and the Netherlands, exempt services are problematic in terms of fulfilling the ICAO requirement of non-discriminatory and cost-based user charges, unless the government is willing to subsidize the costs of those exempt services from its general fund. Moreover, the Netherlands ANS provider cannot seek rebates on VAT, with the possibility of double taxation for the users, inconsistent with the ICAO requirement that ANS providers be subject to normal business taxes.

We note also that ICAO recommends that user fees be based solely on aircraft weight and distance flown. Undoubtedly, this simplified formula is designed to enhance transparency and reduce discrimination against foreign carriers. However, with increasing congestion of air space, peak period pricing would help flatten the demand curve to improve the utilization of scarce resources, and thereby improve safety and reduce infrastructure expense. Peak period pricing could be implemented in a transparent and revenue neutral manner, and should be considered by ANS providers.

H. APPEAL PROCESSES

ICAO recommends that the users be consulted before user charges are set, and that they be given the right to appeal an adverse decision to an independent body. Though not all ANS providers meet this requirement, all of the ANS providers studied are subject to some form of political, administrative or judicial review.[168] In most, appeals follow the traditional administrative law procedural process of governmental institutions.[169] In some, major ANS decisions are subject to review by a government Minister or regulatory agency. In Canada,[170] those dissatisfied with ANS deci-

[167] In Switzerland, DETEC is empowered to regulate prices. However, in practice it does so only on an ad hoc basis. DETEC tends to look at variations in charges over time, but does not explore in depth underlying reasons for any changes.

[168] Decisions of the Irish Commission for Aviation Regulation are subject to judicial review.

[169] In Australia, AA's administrative decisions are ultimately subject to appeal to the Administrative Appeals Tribunal. However, persons affected by the said decisions must have unsuccessfully applied to AA for a reconsideration of the decision. In France, DSNA and DGAC are subject to the general provisions of French administrative law. In the Netherlands, LVNL decisions are subject to standard appeal procedures available against government decisions. Specific grounds for appeal are set out in the governing legislation. However, there is no provision for appeal against LVNL of user fees, which are considered to be issued by the MTPWWM. Complaints based on South African ATNS' failure to comply with the provisions of the ATNS Act may be lodged with the Committee for investigation. The Committee may also, by itself, initiate investigations against ATNS if it has reasonable grounds to suspect that ATNS has failed to comply with the provisions of the Act.

[170] In Canada, if an ANS user believes that a charge does not meet one or more of the

sions can appeal to an independent, quasi-judicial tribunal. Switzerland[171] has a provision allowing arbitration of disputes.

established legislated charging principles, the right exists to appeal to the Canadian Transportation Agency ("CTA"), within a 30 day window from the charge coming into effect. Moreover, any changes to the level of service provided by NAV CANADA are subject to a Transport Canada safety review.

[171] In Switzerland, any dispute between Skyguide and its customers may be resolved by courts or arbitration.

I. LIABILITY

Where the government itself is the ANS provider directly, national legislation defines the extent to which claims may be brought. In some instances (e.g., Germany),[172] ANS provision is considered a federal responsibility, and therefore, liability actions must be instituted against the State. But to the extent that governments move ANS out of traditional governmental institutions into commercial models, these providers may lose the traditional "sovereign immunity" liability shield, and become subject to liability under the domestic legal regime governing torts/delicts, contacts and property.[173] It does not appear that governments have promulgated legislation promising to indemnify corporatized ANS providers for their liability. As a consequence, most ANS providers procure liability insurance, and some are statutorily so required.[174]

Moreover, since the provision of ANS is a non-delegable function of governments under the Chicago Convention, governments may also find themselves liable for failure to provide adequate safety oversight to the extent they have waived their sovereign immunity. In Canada,[175]

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[172] At the time the DFS was established, the German government and the DFS entered into a *Rahmenvereinbarung* (master/framework agreement) that, *inter alia,* defines the division of liabilities between both entities. This contract confirms that the German State alone – rather than DFS -- retains the ultimate responsibility for the proper operation of air navigation services and is liable to compensate third parties for damages resulting from the failure of ANS services and/or facilities, even when damages are caused by the DFS or its employees. Nevertheless, the German State retains a right of recourse action against DFS or its agents in the case of intentional damage or gross negligence. DFS is obliged to secure an insurance to cover costs that DFS may have to bear in the case of State liability.

[173] Paul Dempsey, "Privatization of the Air: Government Liability for Privatized Air Traffic Services" (2003) XXVIII Ann. Air & Sp. L. 95.

[174] For example, insurance coverage is covered by the French state through its general budgetary allocations for DNSA and DGAC. In the Netherlands, LVNL makes provision for insurance as part of its general costs. After 9/11, the Dutch government undertook to cover war risk insurance. Switzerland's Skyguide purchases private insurance.
Since the ANS functions have been delegated to an independent corporation – NATS -- the UK State only remains responsible and liable for damages caused by its own direct fault. In all other cases, in legal theory, the effective service provider (i.e. NATS) stands alone as responsible and liable such that the UK State has no legal obligation to step in and substitute for NATS in the case a successful claim would exceed the financial capacity of NATS. NATS is expected to insure itself against such liabilities. On the other hand, political reality and the common law principle that the State is the ultimate safeguard for public safety and national security, suggest that the State might substitute for NATS in the event of financial insolvency.

[175] NAV CANADA is a federally incorporated company that thereby assumes all the rights and responsibilities of such an entity in terms of suing and being sued. NAV CANADA is legally obliged to indemnify the Canadian Federal Government for liability "arising out of… the management, operation, maintenance and development of the ANS Services by NAV CANADA." Furthermore, NAV CANADA is obliged to "purchase, provide and continuously maintain… (commercially reasonable amounts of) insurance, … including aviation operations liability insurance." The aviation operations liability insurance shall provide coverage of not less than one billion dollars per occurrence and provide that the Federal Government is an additional insured.

the ANS provider is contractually obliged to indemnify the government, and to carry adequate insurance to cover its liability.

VIII. APPENDIX

A. FEDERATION OF TOUR OPERATORS v. HER MAJESTY'S TREASURY

United Kingdom
Queen's Bench Division (Administrative Court)

[2007] EWHC 2062 (Admin)

STANLEY BURNTON J:

On 6 December 2006, the Chancellor of the Exchequer announced ... the doubling of Air Passenger Duty ('APD' or 'the Duty') with effect ... only seven weeks later. Unlike airlines, tour operators, who sell package holidays, were largely precluded, by the Package Travel, Package Holidays and Package Tours Regulations 1992 ... from passing the increase on to those of their travelling customers who had already booked their holidays ... .

In these proceedings, the Claimants, the Federation of Tour Operators ('the FTO') ... and two representative tour operators... contend:
(a) that the imposition of the Duty is in breach of art 15 of the 1944 Chicago Convention on International Civil Aviation (known as the Chicago Convention), which has been incorporated into our municipal law by the EU legislation on the creation of a Single European Sky; ...

In order to understand the issues between the parties, it is necessary to understand the distinction, which is common ground, between a charge and a tax. In this context:

> 'charges are levies to defray the costs of providing facilities and services for civil aviation while taxes are levies to raise general national and local government revenues that are applied for non-aviation purposes.'

(From the third recital to the ICAO's Council Resolution on Taxation of International Air Transport ... .)

The English text of art 15 is as follows:

'AIRPORT AND SIMILAR CHARGES

> Every airport in a contracting State which is open to public use by its national aircraft shall likewise, subject to the provisions of Article 68, be open under uniform conditions to the aircraft of all the other contracting States. The like uniform conditions shall apply to the use, by aircraft of every contracting State, of all air navigation facilities, including radio and meteorological services, which may be provided for public use for the safety and expedition of air navigation.
>
> Any charges that may be imposed or permitted to be imposed by a contracting State for the use of such airports and air navigation facilities by the aircraft of any other contracting State shall not be higher:
>
> (a) As to aircraft not engaged in scheduled international air services, than those that would be paid by its national aircraft of the same class engaged in similar operations, and
>
> (b) As to aircraft engaged in scheduled international air service, than those that would be paid by its national aircraft engaged in similar international air services.
>
> All such charges shall be published and communicated to the International Civil Aviation Organization: provided that, upon representation by an interested contracting State, the charges imposed for the use of airports and other facilities shall be subject to review by the Council, which shall report and make recommendations thereon for the consideration of the State or States concerned. No fees, dues or other charges shall be imposed by any contracting State in respect solely of the right of transit over or entry into or exit from its territory of any aircraft of a contracting State or persons or property thereon.'

The issue between the parties concerns the last sentence of art 15... . The Claimants submit that the words 'fees, dues or other charges' include a tax, such as APD, and that most passengers who pay it do so only for the right of exit from the territory of the UK, since they are flying from a UK airport to one abroad. The Treasury submits that the words 'fees, dues or other charges' are restricted to charges, and do not include a tax, and therefore do not apply to APD. Secondly, the Treasury relies on the word 'solely': it submits that APD is payable in respect of passengers flying to destinations within the UK, and is therefore not payable

'solely' in respect of the right of transit over or entry into or exit from its territory. The Claimants put their submission as follows in their skeleton argument:

> '163 Since ... the majority number of UK departing flights are international and exit UK territory shortly after take off, APD operates as a levy on the right of exit from UK territory of the majority of passengers on board aircraft departing UK airports, ie a 'gateway' charge. It matters not that the 'trigger' for APD is the flight beginning from a UK airport. APD results in a charge 'solely' on the right of exit of air passengers from UK territory.
>
> 164 It would have been in the contemplation of the draftsmen and delegates that for aircraft and passengers on board to 'exit' a contracting State's territory, the flight would have to take off from an airport in that contracting State. It is not sensible to suggest that the signatories did not intend to prohibit all 'fees, dues or charges' which would inevitably be triggered during the process of flights exiting (or entering or transiting) UK territory.
>
> 165 A purposive construction would suggest that art 15 CC was intended to prohibit any 'gateway' charges of whatever nature and howsoever levied.'

In his reply, Mr Haddon-Cave QC put the argument differently. He submitted that 'solely' refers to aircraft, persons or property. Since APD is solely payable in respect of persons, its imposition contravenes art 15... .

By itself, the word 'dues' is apt to include taxes. However, it does not stand alone. It is in a provision headed 'Airport and similar charges', which indicates that it does not deal with taxes, and it is part of a composite phrase, 'fees, dues or other charges', which indicates that 'dues' are charges; and if so, taxes are not 'dues'. Furthermore, if it had been intended to include taxes in the prohibition, I think that that word would have been used, rather than the more ambiguous 'dues'. Dues may be charges, and may be taxes; but 'taxes' is clear and unambiguous.

More importantly, since it is not affected by possibly conflicting texts, I find the meaning of the words 'in respect solely of the right of transit over or entry into or exit from its territory of any aircraft of a contracting State or persons or property thereon' to be clear. A due imposed for something other than transit or entry or exit of an aircraft (or persons

or property on it) is not a due imposed solely in respect of the specified rights. This is consistent with the remainder of art 15. It is essentially an anti-discrimination provision (or most favoured State provision), precluding a State from favouring its national airline or airlines when imposing charges. A fee, due or other charge imposed in relation to the right to enter the territory of a State, or the right to leave it, or to transit over it, would discriminate in favour of a local or national airline as against the airlines of foreign States. A fee, due or charge that is payable on take-off, irrespective of destination, and including destinations within the territorial State, does not discriminate against foreign airlines, and is therefore not objectionable. It is correct that a passenger on a flight going to a foreign destination may feel that he is paying a tax because his plane is exiting from the territory of the imposing State; but the tax is not in fact payable 'solely' for the right to exit that territory, since it would be equally payable if his flight did not leave that territory.

On this basis, art 15 does not prohibit APD, whether or not taxes are within the scope of the last sentence.

I turn to consider subsequent State practice ... to see whether 'it establishes the agreement of the parties regarding its interpretation'.

The subsequent practice relied upon by the Treasury is principally:

(a) The imposition of APD by the UK Government in 1994.
(b) The lack of any protest or complaint to its doing so in the 13 years since it was first imposed.
(c) The fact that other states have imposed similar taxes without protest or complaint.
(d) The lack of any condemnation of any such tax by the ICAO.
(e) The fact that a large number of States support the imposition of the so-called Chirac tax, which, on the Claimants' case, would also infringe art 15... .

[From responses] by member States of the ICAO to the Council (of the ICAO) Resolution on Taxation of International Air Transport of 14 December 1993 ... second edition, 1994, ... one sees that:

(a) Australia had a departure tax until 31 December 1994, when it was replaced by a charge. It made the general comment cited below.
(b) Until 31 December 1997, Barbados had a travel tax of 20 per cent on airline tickets.
(c) Hong Kong had an Air Passenger Departure Tax payable by eve-

ry passenger unless exempted.

(d) Ecuador imposed a tax of ten per cent of their value on airline tickets.
(e) India imposed a Foreign Travel Tax on every passenger leaving India by flight.
(f) Pakistan declared that it was free to impose such taxes as it thought fit, without regard to ICAO policies (to which I refer below).
(g) Peru imposed a tax, quantified in Indirect Taxes on International Aviation at US$43 per passenger.

From the third edition (2000) of the State returns, one sees that:

(a) Austria had 'a 'Security Levy' to be paid by departing passengers which has the characteristics of a Federal Tax.'
(b) Ireland had a travel tax of Ir£5 on all passengers departing by both air and sea.
(c) Norway levies:

> 'a tax ... per passenger on the main routes of Southern Norway as well as on international scheduled and non-scheduled flights. The revenue from the tax accrues direct to the Norwegian Exchequer'.

On the other hand, a number of States imposed no taxes on international air transport. But what I find significant is not only the fact that a number of States imposed such taxes, but also the absence of any suggestion that their doing so constituted a breach of art 15. Pakistan was not the only State to proclaim that it was free to levy taxation as it thought fit. In its 1994 return, Australia stated:

> 'General Comment - While we understand that ICAO has the right to make recommendations and resolutions regarding international aviation taxation issues, we strongly oppose the creation of separate taxation regimes for particular groups, including international airlines, and would oppose any moves by ICAO to makes its taxation policy binding on Contracting States.
>
> Australia's policy remains that questions relating to the taxation of international airlines should be dealt with in the context of Australia's overall taxation policy. Australia will therefore continue to address these issues only in double taxation agreements and, less commonly, international airlines profits agreements.

> Extension of ICAO taxation policies to taxes levied at sub-national levels - Australia cannot agree to the provisions extending ICAO taxation policies to local tax authorities. Australian States and Territories have their own taxing powers that they legitimately possess. This is reflected in the fact that Australia's double taxation agreements and airline profit agreements do not cover State taxes.'

Furthermore, the resolution of the ICAO, which may be regarded as the guardian of the Chicago Convention, by which it was created, is inconsistent with the Claimants' interpretation of art 15. The ICAO's Policies on Taxation in the Field of International Air Transport, third edition 2000 (Doc 8632) state, in the Introduction:

> 'The Chicago Convention on International Civil Aviation of 1944 did not attempt to deal comprehensively with tax matters. The Convention simply provides (cf article 24 (a)) that fuel and lubricating oils on board an aircraft of a Contracting State on arrival in the territory of another Contracting State and retained on board on leaving the territory of that State shall be exempt from customs duty, inspection fees or similar national or local duties and charges. The same Article of the Chicago Convention also refers to the temporary admittance, free of duty, of aircraft on a flight to, from or across the territory of another Contracting State and the exemption from customs duty, etc, of spare parts, regular equipment and aircraft stores.'

Not only is art 15 not referred to; I read the second sentence as identifying the sole provision of the Convention that dealt with taxation.

The Council of the ICAO is its governing body; it is elected by the Assembly, which consists of all its member States, for a three-year term, and is composed of 36 States. The Council Resolution on Taxation of International Air Transport is in my judgment inconsistent with the Claimants' interpretation of art 15. Its recitals do not refer to art 15. The relevant recital on taxes on the use of international air transport is as follows:

> 'Whereas with respect to taxes on the sale and use of international air transport the imposition of taxes on the sale or use of international air transport tends to retard its further development by increasing its costs to the operator (as in the

case of taxes on gross receipts or turnover), to the shipper (as in the case of taxes on cargo air waybills) and to the traveller (as in the case of taxes on tickets), and moreover, subjects the traveller to considerable inconvenience (as in the case of head taxes, and embarkation and disembarkation taxes).'

The relevant part of the Council Resolution is paras 3, 4 and 5:

'3 With respect to taxes on the sale and use of international air transport: each Contracting State shall reduce to the fullest practicable extent and make plans to eliminate as soon as its economic conditions permit all forms of taxation on the sale or use of international transport by air, including taxes on gross receipts of operators and taxes levied directly on passengers or shippers;

4 Each Contracting State shall notify the Organization of the extent to which it currently levies taxes on international air transport and of the extent to which it is prepared to take action in accordance with the principles of this Resolution, and thereafter keep the Organization informed of any subsequent changes in its position vis-a-vis the resolution; and

5 The information thus received shall be published and transmitted to all Contracting States.'

As can be seen, there is no hint here that any such taxes have been imposed in breach of art 15, or that their abolition is required by it. The UK Government duly notified the ICAO of its imposition of APD; no complaint or challenge to its doing so has been forthcoming. The Commentary on the Resolution is no less inconsistent with the Claimants case. The Council's objection to taxes such as APD is explained at para 17:

'The same effect of an increase in the cost of air travel can be ascribed to other taxes, sometimes levied upon international air travellers at times of embarkation and disembarkation. In addition to raising the cost of travelling by air, these latter taxes, when collected at the last moment, have the added advantage of causing inconvenience to the traveller by requiring him or her, for example, to check in earlier for his or her embarkation, to obtain additional local currency, etc.'

In other words, the objection to such taxes is that they act as a de-

terrent to travel by air. Again, it is not suggested that they are unlawful under the Convention... .

For the above reasons, in my judgment art 15 did not prohibit the imposition of APD, or its increase... .

The Claimants have not established any of their grounds for challenging APD or its increase. The claim for judicial review will be dismissed.

B. CONVENTION ON INTERNATIONAL CIVIL AVIATION ANNEXES RELEVANT TO AIR NAVIGATION

(Adapted from summaries prepared by the International Civil Aviation Organization)

1. ANNEX 2: RULES OF THE AIR

Air travel must be safe and efficient; this requires, among other things, a set of internationally agreed rules of the air. The rules developed by ICAO - which consist of general rules, visual flight rules and instrument flight rules contained in Annex 2 - apply without exception over the high seas, and over national territories to the extent that they do not conflict with the rules of the State being overflown. The pilot-in-command of an aircraft is responsible for compliance with the rules of the air.

An aircraft must be flown in accordance with the general rules and either the visual flight rules (VFR) or the instrument flight rules (IFR). Flight in accordance with visual flight rules is permitted if a flight crew is able to remain clear of clouds by a distance of at least 1 500 m horizontally and at least 300 m (1 000 ft) vertically and to maintain a forward visibility of at least 8 km. For flights in some portions of the airspace and at low altitudes, and for helicopters, the requirements are less stringent. An aircraft cannot be flown under VFR at night or above 6 100 m (20 000 ft) except by special permission. Balloons are classified as aircraft, but unmanned free balloons can be flown only under specified conditions detailed in the Annex.

Instrument flight rules must be complied within weather conditions other than those mentioned above. A State may also require that they be applied in designated airspaces regardless of weather conditions,

or a pilot may choose to apply them even if the weather is good.

Most airliners fly under IFR at all times. Depending upon the type of airspace, these aircraft are provided with air traffic control service, air traffic advisory service or flight information service regardless of weather conditions. To fly under IFR, an aircraft must be equipped with suitable instruments and navigation equipment appropriate to the route to be flown. When operating under air traffic control the aircraft must maintain precisely the route and altitude that have been assigned to it and keep air traffic control informed about its position.

A flight plan must be filed with air traffic services units for all flights that will cross international borders, and for most other flights that are engaged in commercial operations. The flight plan provides information on the aircraft's identity and equipment, the point and time of departure, the route and altitude to be flown, the destination and estimated time of arrival, and the alternate airport to be used should landing at destination be impossible. The flight plan must also specify whether the flight will be carried out under visual or instrument flight rules.

Regardless of the type of flight plan, the pilots are responsible for avoiding collisions when in visual flight conditions, in accordance with the principle of see-and-avoid. However, flights operating under IFR are either kept separated by air traffic control units or provided with collision hazard information.

Right-of-way rules in the air are similar to those on the surface, but, as aircraft operate in three dimensions, some additional rules are required. When two aircraft are converging at approximately the same level, the aircraft on the right has the right of way except that aeroplanes must give way to airships, gliders and balloons, and to aircraft which are towing objects. An aircraft which is being overtaken has the right of way and the overtaking aircraft must remain clear by altering heading to the right. When two aircraft are approaching each other head on they must both alter heading to the right.

As interceptions of civil aircraft are, in all cases, potentially hazardous, the Council of ICAO has formulated special recommendations in Annex 2 which States are urged to implement through appropriate regulatory and administrative action. These special recommendations are contained in Attachment A to the Annex All these rules, when complied with by all concerned, help make for safe and efficient flight.

2. ANNEX 3: METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

Pilots need to be informed about meteorological conditions along the routes to be flown and at their destination aerodromes. The object of the meteorological service outlined in Annex 3 is to contribute to the safety, efficiency and regularity of air navigation. This is achieved by providing necessary meteorological information to operators, flight crew members, air traffic services units, search and rescue units, airport management and others concerned with aviation. Close liaison is essential between those supplying meteorological information and those using it. At international aerodromes the meteorological information is normally supplied to aeronautical users by a meteorological office. Suitable telecommunications facilities are made available by States to permit those aerodrome meteorological offices to supply information to air traffic services and search and rescue services. Telecommunications between the meteorological office and control towers or approach control offices should be such that the required points may normally be contacted within 15 seconds.

Aerodrome reports and forecasts are required by aeronautical users to carry out their functions. Aerodrome reports include surface wind, visibility, runway visual range, present weather, cloud, air and dew-point temperature and atmospheric pressure, and are issued either half-hourly or hourly. These reports are complemented by special reports whenever any parameter changes beyond pre-fixed limits of operational significance. Aerodrome forecasts include surface wind, visibility, weather, cloud and temperature, and are issued every three or six hours for a validity period of 9 to 24 hours. Aerodrome forecasts are kept under continuous review and amended by the meteorological office concerned, as necessary.

Landing forecasts are prepared for some international aerodromes to meet requirements of landing aircraft. They are appended to the aerodrome reports and have a validity of two hours. Landing forecasts contain expected conditions over the runway complex in regard to surface wind, visibility, weather and cloud.

To assist pilots with their flight planning, most States provide meteorological briefings which are increasingly carried out using automated systems. Briefings comprise details of en-route weather, upper winds and upper-air temperatures, often given in the form of meteorological charts, warnings related to hazardous phenomena en-route, and reports

and forecasts for the destination aerodrome and its alternates.

To provide aircraft in flight with information about significant changes in weather, meteorological watch offices are maintained. They prepare warnings of hazardous weather conditions, including thunderstorms, tropical cyclones, severe squall lines, heavy hail, severe turbulence, severe icing, mountain waves, sandstorms, dust storms and volcanic ash clouds. Moreover, these offices issue aerodrome warnings of meteorological conditions that could adversely affect aircraft or facilities on the ground: for example, warnings of expected snowstorms. They also issue warnings for wind shear for the climb-out and approach paths. Furthermore, aircraft in flight are required to report severe weather phenomena encountered en route. These reports are disseminated by the air traffic services units to all aircraft concerned.

On most international routes routine observations are made by aircraft of upper winds and temperatures. They are transmitted by aircraft in flight to provide observational data that can be used in the development of forecasts. These aircraft observations of winds and temperatures are being automated using the air-ground data link communications. As far as route forecasts are concerned, all flights require advance and accurate meteorological information so as to chart a course that will permit them to make use of the most favourable winds and conserve fuel. With rising fuel costs, this has become increasingly important. Therefore, ICAO has implemented the World Area Forecast System(WAFS). The purpose of this system is to provide States and aviation users with standardized and high-quality forecasts on upper-air temperature, humidity and winds and on significant weather. The WAFS is based on two world area forecast centres which use the most up-to-date computers and satellite telecommunications (ISCS and SADIS) to prepare and disseminate global forecasts in digital form directly to States and users.

During the past few years a number of incidents have occurred due to aircraft encounters with volcanic ash clouds following volcanic eruptions. In order to provide for the observation and reporting of volcanic ash clouds and the issuance of warnings to pilots and airlines, ICAO, with the assistance of other international organizations, has established an international airways volcano watch (IAVW). The corner stones of the IAVW are nine volcanic ash advisory centres which issue advisory information on volcanic ash globally, both to aviation users and meteorological offices concerned. Automated observing systems are becoming increasingly useful at aerodromes and currently are considered

to meet the aeronautical requirements as far as the observation of the surface wind, visibility, runway visual range and height of the cloud base, air and dew-point temperature and atmospheric pressure are concerned. In view of the improved performance of fully automated systems, they may now be used, without any human intervention, during non-operational hours of the aerodrome.

3. ANNEX 4: AERONAUTICAL CHARTS

The world of aviation, which by its very nature knows no geographical or political boundaries, requires maps that are unlike those used in ground transportation. For the safe performance of air operations it is essential that a current, comprehensive and authoritative source of navigation information be made available at all times, and aeronautical charts provide a convenient medium for supplying this information in a manageable, condensed and coordinated manner. It is often said that a picture is worth a thousand words, however, today's often complex aeronautical charts may be worth much more. Aeronautical charts not only provide the two dimensional information common in most maps, but also often portray three dimensional air traffic service systems. Almost all ICAO States produce aeronautical charts and most segments of aviation make reference to them for planning, air traffic control and navigation purposes. Without the global standardization of aeronautical charts it would be difficult for pilots and other chart users to effectively find and interpret important navigation information. The safe and efficient flow of air traffic is facilitated by aeronautical charts drawn to accepted ICAO Standards.

The Standards, Recommended Practices and explanatory notes contained in Annex 4 define the obligations of States to make available certain ICAO aeronautical chart types, and specify chart coverage, format, identification and content including standardized symbology and colour use. The goal is to satisfy the need for uniformity and consistency in the provision of aeronautical charts that contain appropriate information of a defined quality. When a published aeronautical chart contains "ICAO" in its title, this indicates that the chart producer has conformed to both general Annex 4 Standards and those pertaining to a particular ICAO chart type.

The ICAO Council first adopted the original Standards and Recommended Practices in 1948. Annex 4 has its origins in "Annex J - Aeronautical Maps and Charts" of the Draft Technical Annexes adopted by the International Civil Aviation Conference in Chicago in 1944. Since the

adoption of the first edition which provided specifications for seven ICAO chart types, there have been fifty-three amendments to update the Annex to accommodate the rapid advances in air navigation and cartographic technology. The ICAO series of aeronautical charts now consists of twenty-one types, each intended to serve specialized purposes. They range from detailed charts for individual aerodromes/heliports to small-scale charts for flight planning purposes and include electronic aeronautical charts for cockpit display.

There are three series of charts available for planning and visual navigation, each with a different scale. The *Aeronautical Navigation Chart — ICAO Small Scale* charts cover the largest area for a given amount of paper; they provide a general purpose chart series suitable for long-range flight planning. The World Aeronautical Chart — ICAO *1 : 1 000 000* charts provide complete world coverage with uniform presentation of data at a constant scale, and are used in the production of other charts. The Aeronautical Chart — ICAO 1:500 000 series supplies more detail and provides a suitable medium for pilot and navigation training. This series is most suitable for use by low-speed, short- or medium-range aircraft operating at low and intermediate altitudes.

The vast majority of scheduled flights take place along routes defined by radio and electronic navigation systems that make visual reference to the ground unnecessary. This type of navigation is conducted under instrument flight rules and the flight is required to comply with air traffic control services procedures. The Enroute Chart — ICAO portrays the air traffic service system, radio navigation aids and other aeronautical information essential to en-route navigation under instrument flight rules. It is designed for easy handling in the crowded space of an aircraft flight deck, and the presentation of information is such that it can easily be read in varying conditions of natural and artificial light. Where flights cross extensive oceanic and sparsely settled areas, the Plotting Chart — ICAO provides a means of maintaining a continuous flight record of aircraft position and is sometimes produced to complement the more complex enroute charts. As a flight approaches its destination, more detail is required about the area around the aerodrome of intended landing.

The Area Chart — ICAO provides pilots with information to facilitate the transition from en-route phase to final approach phase, as well as from take-off to en-route phases of the flight. The charts are designed to enable pilots to comply with departure and arrival procedures and holding pattern procedures, all of which are coordinated with the infor-

mation on the instrument approach charts. Frequently, air traffic services routes or position reporting requirements are different for arrivals and for departures and these cannot be shown with sufficient clarity on the area chart. Under these conditions a separate Standard Departure Chart — Instrument (SID) — ICAO and Standard Arrival Chart — *Instrument (STAR) — ICAO* are produced. The area chart may also be supplemented by a *Radar Minimum Altitude Chart — ICAO* which is designed to provide the information to enable flight crews to monitor and cross-check altitudes assigned while under radar control.

The Instrument Approach Chart — ICAO provides the pilot with a graphic presentation of instrument approach procedures, and missed approach procedures to be followed should the crew be unable to carry out a landing. This chart type contains a plan and profile view of the approach with full details of associated radio navigation aids and necessary aerodrome and topographical information. When a visual-type approach is flown, the pilot may refer to a Visual *Approach Chart – ICAO* which illustrates the basic aerodrome layout and surrounding features easily recognizable from the air. As well as providing orientation, these charts are designed to highlight potential dangers such as obstacles, high terrain and areas of hazardous airspace.

The Aerodrome/Heliport Chart — ICAO provides an illustration of the aerodrome or heliport which allows the pilot to recognize significant features, rapidly clear the runway or heliport touchdown area after landing and follow taxiing instructions. The charts show aerodrome/heliport movement areas, visual indicator locations, taxiing guidance aids, aerodrome/heliport lighting, hangars, terminal buildings and aircraft/heliport stands, various reference points required for the setting and checking of navigation systems and operational information such as pavement strengths and radio communication facility frequencies. At large aerodromes where all the aircraft taxiing and parking information cannot be clearly shown on the Aerodrome/Heliport Chart — ICAO, details are provided by the supplementary Aerodrome *Ground Movement Chart — ICAO and the Aircraft Parking/Docking Chart — ICAO.*

The heights of obstacles around airports are of critical importance to aircraft operations. Information about these are given in detail on the Aerodrome Obstacle Charts — ICAO, Types A, B, and C. These charts are intended to assist aircraft operators in making the complex take-off mass, distance and performance calculations required, including those covering emergency situations such as engine failure during takeoff. Aerodrome obstacle charts show the runways in plan and profile, take-

off flight path areas and the distances available for take-off run and accelerate-stop, taking obstacles into account; this data is provided for each runway which has significant obstacles in the take-off area. The detailed topographical information provided by some aerodrome obstacle charts includes coverage of areas as far as 45 km away from the aerodrome itself.

Recent developments associated with "glass cockpit technologies", the availability and exchange of electronic aeronautical information, and the increased implementation of navigation systems with high positional accuracies and continuous position fixing, have created an environment well suited to the rapid development of viable electronic charts for display in the cockpit. A fully developed electronic aeronautical chart display has the potential for functionality that extends well beyond paper charts and could offer significant benefits such as continuous plotting of the aircraft's position and customization of the chart display depending on the phase of flight and other operational considerations.
Annex 4, Chapter 20 Electronic Aeronautical Chart Display — ICAO provides basic requirements aimed at standardizing electronic aeronautical chart displays while not unduly limiting the development of this new cartographic technology.

Annex 4 provisions have evolved considerably from the seven original ICAO chart types adopted in 1948. To ensure that aeronautical charts meet the technological and other requirements of modern aviation operations, ICAO is constantly monitoring, improving and updating aeronautical chart specifications.

4. ANNEX 5: UNITS OF MEASUREMENT TO BE USED IN AIR AND GROUND OPERATIONS

The question of the units of measurement to be used in international civil aviation goes back as far as the origin of ICAO itself. At the International Civil Aviation Conference held at Chicago in 1944, the importance of a common system of measurements was realized and a resolution was adopted calling on States to make use of the metric system as the primary international standard.

A special committee was established to look into the question and as a result the First Assembly of ICAO in 1947 adopted a resolution (A1-35) recommending a system of units to be issued as an ICAO Standard as soon as possible. Stemming from this resolution, the first edition of Annex 5 was adopted in 1948. This contained an ICAO table of units based

essentially on the metric system, but it also contained four additional interim tables of units for use by those States unable to use the primary table. It was evident from the beginning that the achievement of standardization in units of measurement would not be easy, and Annex 5 was initially applicable only to those units used in communications between aircraft and ground stations.

Many attempts to improve the level of standardization were made in the following years and a number of amendments to Annex 5 were introduced. By 1961 the number of tables of units in the Annex had been reduced to two, which remained until Amendment 13 was adopted in March 1979. Amendment 13 extended considerably the scope of ICAO's role in standardizing units of measurements to cover all aspects of air and ground operations and not just air-ground communications. It also introduced the International System of Units, known as SI from the "Système International d'Unités", as the basic standardized system to be used in civil aviation.

In addition to the SI units the amendment recognized a number of non-SI units which may be used permanently in conjunction with SI units in aviation. These include the litre, the degree Celsius, the degree for measuring plane angle, etc. The amendment also recognized, as do the relevant ICAO Assembly Resolutions, that there are some non-SI units which have a special place in aviation and which will have to be retained, at least temporarily. These are the nautical mile and the knot, as well as the foot when it is used in the measurement of altitude, elevation or height only. Some practical problems arise in the termination of the use of these units and it has not yet been possible to fix a termination date.

Amendment 13 to Annex 5 represented a major step forward in the difficult process of standardizing units of measurement in international civil aviation. Although complete standardization is still some time away, the foundation has been laid for resolving a problem which has been recognized by ICAO since its inception. With this amendment a very large degree of standardization has been achieved between civil aviation and other scientific and engineering communities.

Amendments 14 and 15 to Annex 5 introduced a new definition of the metre, and references to temporary non-SI units were deleted.

5. ANNEX 6: OPERATION OF AIRCRAFT (PARTS I, II AND III)

The essence of Annex 6, simply put, is that the operation of aircraft engaged in international air transport must be as standardized as possible to ensure the highest levels of safety and efficiency.
In 1948 the Council first adopted Standards and Recommended Practices for the operation of aircraft engaged in international commercial air transport. They were based on recommendations of States attending the first session of the Operations Divisional Meeting held in 1946, and are the basis of Part I of Annex 6.

In order to keep pace with a new and vital industry, the original provisions have been and are being constantly reviewed. For instance, a second part to Annex 6, dealing exclusively with international general aviation, became applicable in September 1969. Similarly, a third part to Annex 6, dealing with all international helicopter operations, became applicable in November 1986. PartIII originally addressed only helicopter flight recorders, but an amendment completing the coverage of helicopter operations in the same comprehensive manner as aeroplane operations covered in Parts I and II was adopted for applicability in November 1990.

It would be impractical to provide one international set of operational rules and regulations for the wide variety of aircraft which exist today. Aircraft range from commercial airliners to the one-seat glider, all of which cross national boundaries into adjacent States.

In the course of a single operation, a long-range jet may fly over many international borders. Each aircraft has unique handling characteristics relative to its type and, under varying environmental conditions, may have specific operational limitations. The very international nature of commercial aviation, and of general aviation to a lesser degree, requires pilots and operators to conform to a wide variety of national rules and regulations.

The purpose of Annex 6 is to contribute to the safety of international air navigation by providing criteria for safe operating practices, and to contribute to the efficiency and regularity of international lair navigation by encouraging ICAO's Contracting States to facilitate the passage over their territories of commercial aircraft belonging to other countries that operate in conformity with these criteria.

ICAO Standards do not preclude the development of national standards which may be more stringent than those contained in the Annex. In all phases of aircraft operations, minimum standards are the most

acceptable compromise as they make commercial and general aviation viable without prejudicing safety. The Standards accepted by all Contracting States cover such areas as aircraft operations, performance, communications and navigation equipment, maintenance, flight documents, responsibilities of flight personnel and the security of the aircraft. The advent of the turbine engine and associated high performance aircraft designs necessitated a new approach to civil aircraft operation. Aircraft performance criteria, flight instruments, navigation equipment and many other operational aspects required new techniques, and they in turn created the need for international regulations to provide for safety and efficiency.

The introduction of high-speed, long- and short-range aircraft, for example, created problems associated with endurance at relatively low altitudes, where fuel consumption becomes a major factor. The fuel policies of many of the international civil aviation carriers are required to take into account the need for possible diversions to an alternate aerodrome when adverse weather is forecast at the intended destination.

Clearly defined International Standards and Recommended Practices exist in respect of operating minima based on the aircraft and the environmental factors found at each aerodrome. Subject to the State of the Operator's approval, the aircraft operator has to take into account the type of aeroplane or helicopter, the degree of sophistication of equipment carried on the aircraft, the characteristics of the approach and runway aids and the operating skill of the crew in carrying out procedures involved in operations in all weather conditions.

Another development has been the introduction of provisions (generally referred to as ETOPS) to ensure safe operations by twin-engined aeroplanes operating over extended ranges, often over water. This type of operation has arisen because of the attractive economics of the large twin-engined aeroplanes now available.

The human factor is an essential component for the safe and efficient conduct of aircraft operations. Annex 6 spells out the responsibilities of States in supervising their operators, particularly in respect of flight crew. The main provision requires the establishment of a method of supervising flight operations to ensure a continuing level of safety. It calls for the provision of an operations manual for each aircraft type, and places the onus on each operator to ensure that all operations personnel are properly instructed in their duties and responsibilities, and in the relationship of such duties to the airline operation as a whole.

The pilot-in-command has the final responsibility to make sure that flight preparation is complete and conforms to all requirements, and is required to certify flight preparation forms when satisfied that the aircraft is airworthy, and that other criteria are met in respect to instruments, maintenance, mass and load distribution (and the securing of the loads), and operating limitations of the aircraft.

Another important aspect covered in Annex 6is the requirement for operators to establish rules limiting the flight time and flight duty periods for flight crew members. The same Standard also calls for the operator to provide adequate rest periods so that fatigue occurring either on a flight, or successive flights over a period of time, does not endanger the safety of a flight. An alert flight crew must be capable of dealing not only with any technical emergencies but with other crew members and must react correctly and efficiently in case of an evacuation of the aircraft. Rules such as this must be included in the operations manual.

Critical to safe aircraft operations is the knowledge of the operating limits of each particular type of aircraft. The Annex sets out minimum performance operating limitations, with respect to aircraft in use today. These Standards take into account a significant number of factors which can affect the performance of a wide range of aircraft: mass of the aircraft, elevation, temperature, weather conditions and runway conditions, and include take-off and landing speeds under conditions which involve the failure of one or more power-units.

A detailed example is included in Attachment C to Annex 6, Part I, in which a level of performance has been calculated and found to apply over a wide range of aeroplane characteristics and atmospheric conditions.

ICAO is actively engaged in efforts to foresee the requirements of future operations such as the recent acceptance of a new set of procedures which revise the obstacle clearance requirements and instrument approach procedures for all categories of international civil commercial aviation.

Hijacking of civil aircraft has placed an additional burden on the pilot-in command. The various safety precautions that such acts necessitate, in addition to precautions of a purely technical nature, have been studied by ICAO and made to cover as many emergency situations as possible.

Part II of Annex 6 deals with aeroplanes ininternational general aviation. International commercial in transport operations and general aviation operations in helicopters is covered in Part III. Some international general aviation operations maybe performed by crews less experienced and less skilled than commercial civil aviation personnel. Equipment installed in some general aviation aircraft may not meet the same standard as in commercial in transport aircraft, and general aviation operations are subject to less rigorous standards and conducted with a greater degree of freedom than is found in commercial air transport operations.

Because of this, ICAO recognizes that international general aviation pilots and their passengers may not necessarily enjoy the same level of safety as the fare paying passenger in commercial air transport. PartII of the Annex, however, was designed specifically to ensure an acceptable level of safety to third parties (persons on the ground and persons inthe air in other aircraft). Thus, operations involving commercial and general aviation aircraft in a common environment are required to adhere to the minimum safety standards.

6. ANNEX 10: AERONAUTICAL TELECOMMUNICATIONS (VOLUMES I, II, III, IV AND V)

Three of the most complex and essential elements of international civil aviation are aeronautical communications, navigation and surveillance. These elements are covered by Annex 10 to the Convention.

Annex 10 is divided into five volumes:

Volume I — Radio Navigation Aids
Volume II — Communications Procedures including those with PANS status
Volume III — Communication Systems
Part 1 — Digital Data Communication Systems
Part 2 — Voice Communication Systems
Volume IV — Surveillance Radar and Collision Avoidance Systems
Volume V — Aeronautical Radio Frequency Spectrum Utilization

The five volumes of this Annex contain Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) and guidance material on aeronautical communication, naviga-

tion and surveillance systems.

Volume I of Annex 10 is a technical document which defines for international aircraft operations the systems necessary to provide radio navigation aids used by aircraft in all phases of flight. The SARPs and guidance material of this volume list essential parameter specifications for radio navigation aids such as the global navigation satellite system (GNSS), instrument landing system (ILS), microwave landing system (MLS), very high frequency (VHF) omnidirectional radio range (VOR), non-directional radio beacon (NDB) and distance measuring equipment (DME). The information contained in this volume includes aspects of power requirements, frequency, modulation, signal characteristics and monitoring needed to ensure that suitably equipped aircraft will be able to receive navigation signals in all parts of the world with the requisite degree of reliability.

Volumes II and III cover two general categories of voice and data communications that serve international civil aviation. They are the ground-ground communication between points on the ground and the air-ground communication between aircraft and points on the ground. The air-ground communication provides aircraft with all necessary information to conduct flights in safety, using both voice and data. An important element of the ground-ground communication is the aeronautical fixed telecommunications network (AFTN), a worldwide network organized to meet the specific requirements of international civil aviation. Within the AFTN category, all significant ground points, which include airports, air traffic control centres, meteorological offices and the like, are joined by appropriate links designed to serve aircraft throughout all phases of flight. Messages originated at any point on the network are routed as a matter of routine to all points required for the safe conduct of flight.

In Volume II of Annex 10, general, administrative and operational procedures pertaining to aeronautical fixed and mobile communications are presented.

Volume III of Annex 10 contains SARPs and guidance material for various air-ground and ground-ground voice and data communication systems, including aeronautical telecommunication network (ATN), aeronautical mobile-satellite service (AMSS), secondary surveillance radar (SSR) Mode S air-ground data link, very high frequency (VHF) air-ground digital link (VDL), aeronautical fixed telecommunication network (AFTN), aircraft addressing system, high frequency data link

(HFDL), aeronautical mobile service, selective calling system (SELCAL), aeronautical speech circuits and emergency locator transmitter (ELT).

Volume IV of Annex 10 contains SARPs and guidance material for secondary surveillance radar (SSR) and airborne collision avoidance systems (ACAS), including SARPs for SSR Mode A, Mode C and Mode S, and the technical characteristics of ACAS.

In Volume V of Annex 10, SARPs and guidance material on the utilization of aeronautical frequencies are defined. The International Telecommunication Union (ITU) has set up a framework in which the demands for radio spectrum from individual States are balanced with the interests of different radio service users to produce a planned radio environment incorporating interference-free, effective and efficient radio spectrum use. Volume V contains information on the assignment planning of individual aeronautical radio stations operating or planned to operate in different frequency bands.

7. ANNEX 11: AIR TRAFFIC SERVICES

Control of air traffic was almost unknown in1944. Today, air traffic control, flight information and alerting services, which together comprise air traffic services, rank high among the indispensable ground support facilities which ensure the safety and efficient operation of air traffic throughout the world. Annex 11 to the Chicago Convention defines air traffic services and specifies the world-wide Standards and Recommended Practices applicable in the provision of these services.

The world's airspace is divided into a series of contiguous flight information regions (FIRs) within which air traffic services are provided. In some cases, the flight in formation regions cover large oceanic areas with relatively low air traffic density, within which only flight information service and alerting service are provided. In other flight information regions, large portions of the airspace are controlled airspace within which air traffic control service is provided in addition to flight information and alerting services.

The prime objective of air traffic services, as defined in the Annex, is to prevent collisions between aircraft, whether taxiing on the manoeuvring area, taking off, landing, en route or in the holding pattern at the destination aerodrome. The Annex also deals with ways of expediting and maintaining an orderly flow of air traffic and of providing advice and information for the safe and efficient conduct of flights and alerting

service for aircraft in distress. To meet these objectives, ICAO provisions call for the establishment of flight information centres and air traffic control units.

All aircraft fly in accordance with either instrument flight rules (IFR) or visual flight rules (VFR). Under IFR, the aircraft fly from one radio aid to the next or by reference to self-contained airborne navigation equipment from which the pilot can determine the aircraft's position at all times. IFR flights are conducted through all but the severest of weather conditions, while aircraft flying under VFR must remain clear of cloud and operate in visibility conditions which will permit the pilot to see and avoid other aircraft.

Chapter 3 specifies the types of service to be provided to these flights - for example, IFR flights are provided with air traffic control service when operating in controlled airspace. When operating in uncontrolled airspace, flight information service, which includes known traffic information, is provided and the pilot is responsible for arranging the flight to avoid other traffic. Control service is normally not provided to VFR flights, unless in specific areas, in which case VFR flights are separated from IFR flights but no separation service is provided between VFR flights, unless specifically required by the ATC authority. However, not all aircraft are provided with air traffic services. If an aircraft is operating entirely outside of controlled airspace in an area where a flight plan is not required, the flight may not even be known to air traffic services.

Safety is the overriding concern of international civil aviation and air traffic management contributes substantially to safety in aviation. Annex 11 contains an important requirement for States to implement systematic and appropriate air traffic services (ATS) safety management programmes to ensure that safety is maintained in the provision of ATS within airspaces and at aerodromes. Safety management systems and programmes will serve as an important contribution toward ensuring safety in international civil aviation.

Air traffic control service consists of clearances and information issued by air traffic control units to achieve longitudinal, vertical or lateral separation between aircraft, in accordance with the provisions set out in Chapter 3 of the Annex. This chapter also deals with the contents of clearances, their coordination between ATC units and the coordination of transfer of responsibility for control as a flight progresses from the area of one control unit to another. An orderly transfer process

requires that an aircraft must be under the control of only one air traffic control unit at any one time.

Air traffic control units are sometimes faced with a traffic demand beyond the capacity of a particular location or area, as occurs at busy aerodromes during peak periods.

Annex 11 provides for ATC units to specify restrictions to the traffic flow, when required, for the purpose of avoiding excessive delays to aircraft in flight.

Annex11 also specifies the requirements for coordination between the civil air traffic control units and military authorities or other agencies responsible for activities that may affect flights of civil aircraft. Military units are provided with flight plan and other data concerning flights of civil aircraft to assist in establishing identification in the event that a civil aircraft approaches or enters a restricted area. Flight information service is provided to aircraft operating in controlled airspace and to others known to the air traffic services units. The information includes significant meteorological (SIGMET) information, changes in the serviceability of navigation aids and in the condition of aerodromes and associated facilities and any other information likely to affect safety. IFR flights receive; in addition, information on weather condition sat departure, destination and alternate aerodromes, collision hazards to aircraft operating outside of control areas and control zones and, for flight over water, available information on surface vessels. VFR flights also receive information on weather conditions which would make visual flight impractical. Annex 11 also contains specifications for operational flight information service (OFIS) broadcasts, including automated terminal information service (ATIS) broadcasts.

Chapter 5 of Annex 11 is concerned with the alerting service, which provides for the alerting of rescue coordination centres when an aircraft is believed or known to be in a state of emergency, when it fails to communicate or to arrive on time or when information is received that a forced landing has been made or is imminent. Alerting service is automatically provided to all aircraft receiving air traffic control service and, as far as is practicable, to all other aircraft whose pilots have filed a flight plan or are otherwise known to air traffic services. It is also provided to aircraft known or believed to be subject to unlawful interference. The effect of the alerting service is to set in motion all appropriate rescue and emergency organizations which can provide assistance when and where required.

Subsequent chapters of the Annex cover ATS requirements for air-ground communications and for communications between ATS Units and between those units and other essential offices. These chapters also specify the information required to be supplied to each type of air traffic services unit. Air-ground communications should permit direct, rapid and continuous static-free two-way radiotelephony communication, whenever practicable, while those between ATS units should permit exchange of printed messages and, in the case of air traffic control units, direct voice communications between controllers. Because of the importance of the information transmitted over air-ground radio channels and that received from other units and offices, Annex 11 recommends that such communications should be recorded.

An Appendix to the Annex spells out the principles governing the identification of air traffic services routes to allow both pilots and ATS to make unmistakable reference to any route without resorting to geographical references. Another Appendix specifies the requirements for designators for significant points marked by a radio aid as well as those not marked by a radio aid. Annex 11 also contains a series of attachments with guidance mate rial on a variety of subjects, from airspace organization to ATS requirements for air-ground channels to the establishment and naming of standard arrival and departure routes.

Contingency planning is an important responsibility of all States that provide air navigation services. An Attachment to Annex 11 contains concise guidance to assist States in providing for the safe and orderly flow of international air traffic in the event of disruptions of air traffic services and related supporting services and in preserving the availability of major world air routes in the event of disruptions.

The sky may be limitless but not for air traffic. As more aircraft fill the crowded air routes, air traffic control concepts, procedures, equipment and rules will continue to evolve as will the provisions of this Annex.

8. ANNEX 15: AERONAUTICAL INFORMATION SERVICES

One of the least known and most vital roles in support of international civil aviation is filled by the aeronautical information service (AIS). The object of the aeronautical information service is to ensure the flow of information necessary for the safety, regularity and efficiency of international air navigation.

Annex 15 defines how an aeronautical information service shall receive and/or originate, collate or assemble, edit, format, publish/store and distribute specified aeronautical information/data. The goal is to satisfy the need for uniformity and consistency in the provision of aeronautical information/data that is required for the operational use by international civil aviation.

The ICAO Council first adopted the original Standards and Recommended Practices in 1953. Annex 15 has its origins in Article 37 of the Chicago Convention. The first requirements for the Annex were developed by the ICAO Air Navigation Committee (now the Air Navigation Commission), following recommendations from regionalair navigation meetings, and were published by the authority of the Council as Procedures for International Notices to Airmen back in 1947.

"International notices to airmen" is a phrase which led to the birth of an early aeronautical acronym: NOTAM. In 1949, a special NOTAM meeting reviewed and proposed amendments to these procedures, which were later issued as *Procedures for Air Navigation Services that became applicable in 1951. A total of 33 amendments updated Annex 15* over the years to meet the rapid changes brought about by air travel and associated information technology. In recent years, Annex 15 amendments have reflected the increased need for the timely provision of quality aeronautical information/data and terrain data as they have become critical components of data-dependant on-board navigation systems. The Annex now contains many provisions aimed at preventing corrupt or erroneous aeronautical information/data which can potentially affect the safety of air navigation.

The operator of any type of aircraft, be it small private aircraft or large transport aircraft, must have available a variety of information concerning the air navigation facilities and services that may be expected to be used. For example, the operator must know the regulations concerning entry into and transit of the airspace of each State in which operations will be carried out, as well as what aerodromes, heliports, navigation aids, meteorological services, communication services and air traffic services are available and the procedures and regulations associated with them. The operator must also be informed, often on very short notice, of any change affecting the operation of these facilities and services and must know of any airspace restrictions or hazards likely to affect flights. While this information can nearly always be provided before take-off, it must, in some instances, be provided during flight.

The philosophy underlying Annex 15, which stems from Article 28 of the Convention on International Civil Aviation, is that each State is responsible for making available to civil aviation interests any and all information which is pertinent to and required for the operation of aircraft engaged in international civil aviation within its territory, as well as in areas outside its territory in which the State has air traffic control or other responsibilities.

The information handled by an AIS may vary widely in terms of the duration of its applicability. For example, information related to airports and its facilities may remain valid for many years while changes in the availability of those facilities (for instance, due to construction or repair) will only be valid for a relatively short period of time.

Information may be valid for as short a time as days or hours. The urgency attached to information may also vary, as well as the extent of its applicability in terms of the number of operators or types of operations affected. Information may be lengthy or concise or include graphics. Therefore, aeronautical information is handled differently depending on its urgency, operational significance, scope, volume and the length of time it will remain valid and relevant to users. Annex15specifies that aeronautical information be published as an integrated aeronautical information package. It is composed of the following elements: the *Aeronautical Information Publication (AIP), including amendment service, AIP supplements, NOTAM, pre-flight* information bulletins (PIB), aeronautical information circulars (AIC), checklists and lists of valid NOTAM. Each element is used to distribute specific types of aeronautical information.

Information concerning changes in facilities, services or procedures, in most cases, requires amendments to be made to airline operations manuals or other documents and databases produced by various aviation agencies. The organizations responsible for maintaining these publications usually work to a pre-arranged production programme. If aeronautical information were published indiscriminately with a variety of effective dates, it would be impossible to keep the manuals and other documents and databases up to date. Since many of the changes to facilities, services andprocedures can be anticipated, Annex 15 provides for the use of a regulated system, termed AIRAC (aeronautical information regulation and control), which requires significant changes to become effective and information to be distributed in accordance with a predetermined schedule of effective dates, unless operational considerations

make it impracticable.

Annex 15 also specifies that pre-flight information must be made available at each aerodrome/heliport normally used for international operations and sets the content of aeronautical information provided for pre-flight planning purposes as well as requirements for the provision of that information through automated aeronautical information systems. Additionally, there are requirements to ensure that important post-flight information provided by aircrews (for example, the presence of a bird hazard) are relayed to the AIS for distribution as the circumstances necessitate.

The need, role and importance of aeronautical information/data have changed significantly with the evolution of the Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) systems. The implementation of area navigation (RNAV), required navigation performance (RNP) and airborne computer-based navigation systems has brought about exacting requirements for the quality (accuracy, resolution and integrity) of aeronautical information/data and terrain data. The users' dependence on the quality of certain aeronautical information/data is evident from Annex 15, paragraph 3.2.8 a) which, when describing critical data, states: "There is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe". Since corrupt or erroneous aeronautical information/data can potentially affect the safety of air navigation because of the direct dependence upon it by both airborne and ground-based systems, it is imperative that each State ensure that users (aviation industry, air traffic services, etc.) receive timely and quality aeronautical information/data for the period of its intended use.

To achieve this, and to demonstrate to users the required information/data quality, Annex 15 provides that States must establish a quality system and put in place quality management procedures at all stages (receiving and/or originating, collating or assembling, editing, formatting, publishing, storing and distributing) of the aeronautical information/data process. The quality system must be documented and demonstrable for each function stage, ensuring that the organizational structure, procedures, processes and resources are in place in order to detect and remedy any information/data anomalies during the phases of production, maintenance and operational use. Explicit in such a quality management regime is the ability to trace all information/data from any point, back through the proceeding processes, to its origin.

Of all the activities in international civil aviation, the provision and sustaining of aeronautical information services may not rank among the most glamourous and indeed the complexity of AIS information supplying data-dependant on-board navigation systems may be transparent to the user, but without this service a pilot would be flying into the unknown.