

Chapter 2

The Provision of Air Traffic Services

ICAO Assembly Resolution A37-15,¹ which was cited in the previous chapter, in Appendix W² recognizes that in accordance with Annex 11 to the Chicago Convention, ICAO member States are required to arrange for air traffic services to be provided in airspaces and at aerodromes for which it has been determined that such services would be required. The Resolution also notes that Annex 11 requires member States to ensure that safety management programmes are established and that cooperative efforts between such States could lead to more efficient air traffic management. Accordingly the Resolution resolves that in implementing air traffic services, States ensure that the services being provided meet established requirements for safety, regularity and efficiency of international civil aviation and, taking into account the need for cost effective introduction and operation of CNS/ATM systems, States give consideration to cooperative efforts for introducing more efficient airspace management, in particular, in the upper airspace. The Resolution in Appendix W also calls upon States to ensure that safety management programmes are introduced by the relevant air traffic services provider in all airspaces and at all aerodromes where air traffic services are provided.

2.1 The CNS/ATM System

The number of aircraft movements around the world is increasing consistently, in line with the sustained growth in passenger and cargo traffic, as well as business and general aviation. This is particularly true in densely-populated areas where congestion has become a major safety, operational and environmental concern.

The issue was addressed head on at the very successful Eleventh Air Navigation Conference (AN-Conf/11) held at ICAO in 2003. The Conference endorsed the Global Air Traffic Management Operational Concept, the first truly common vision formulated jointly by all stakeholders of the world aviation community for an

¹*Supra*, note 8 in Chap. 1.

²*Id.* II-23.

integrated and globally harmonized air traffic management (ATM) system, with a planning horizon up to and beyond the year 2025. In essence, it was thought of as an interoperable global ATM system that would apply to all users during all phases of flight and meet agreed levels of safety. . .provide for optimum economic operations. . .be environmentally sustainable and meet national security requirements. The Operational Concept outlines a total system performance framework to achieve defined requirements.

Since then, a number of initiatives and decisions have reaffirmed the role of ICAO as the key driving force in the implementation of harmonized air traffic management systems and performance-based efficiency improvements. For its part, the aviation community must respond accordingly when designing, planning, implementing and operating the global air navigation system in order to respond to expectations linked to safety, efficiency, access and equity, capacity, global interoperability, cost-effectiveness, security and protection of the environment.

One of the major innovations was the approval by the ICAO Council in November 2006 of the revised Global Air Navigation Plan. Originally titled Global Air Navigation Plan for CNS/ATM Systems, the revised Plan is based on recommendations of AN/Conf/11 and two related industry roadmaps created subsequent to the Conference. In essence, it is part of an integrated set of tools and guidance material, which includes the Global ATM Operational Concept, ATM Systems Requirements and Performance-Based Transition Guidelines that will guide the implementation of CNS/ATM systems and usher in the global ATM system envisioned in the operational concept.

In the migration from a technology-driven to a performance-based air navigation system, the emphasis on results is directly related the growing reality of privatized air navigation services and the ensuing pressure for greater accountability.

ICAO has integrated this work into its new Business Plan, which stresses the implementation of harmonized air traffic management systems and performance-based efficiency improvements, as well as increased functional integration between ICAO Headquarters and Regional Offices. Through innovative methods, the Global Plan will facilitate planning and implementation of important operational developments that have taken place in recent years, particularly with regards to aircraft capabilities. It will also ensure that opportunities that have emerged as technologies have matured, as research and trials have been successfully concluded, and as procedures and specifications have been finalized, are fully exploited.

Associated guidance and interactive planning tools for States, regional planning groups and air navigation services providers will be used to establish performance objectives and implementation time lines. The Global Plan will thus become the baseline for measurable achievements as the global ATM system continues to evolve from systems-based to performance-based. States and regions will be able to select initiatives tailored to their particular needs in order to meet agreed-upon performance objectives.

ICAO is assisting States to enhance their knowledge and comprehension of technical, organizational, economic and safety issues related to the implementation of a performance-based air navigation system. There is recognition of the essential

role of the Organization in advancing work in the operational, technical, safety and economic areas, as well as securing global interoperability between major air navigation initiatives.

Another dimension of the role of ICAO will be to develop and promote minimum performance reporting requirements for ANS providers, develop a methodology for measuring performance expectations, and develop guidance material on facilitating collaborative decision-making. This will also entail accelerating work on performance-based navigation (PBN). PBN provides for more direct and precise flight paths, increased safety, reduced fuel burn, more efficient traffic flows and reduced ATC communications.

This includes the implementation of area navigation (RNAV) and required navigation performance (RNP) in accordance with the PBN concept, integration of the ICAO Global Air Navigation Plan in performance-based transition planning, collaboration on establishing performance indicators, use of ICAO-defined key performance areas for performance management, and application of the ICAO Global Aviation Safety Plan (GASP) as a basis for meeting safety performance objectives.

Ultimately, the successful implementation of a global air navigation system depends on cooperation among all members of the civil aviation community and involves greater integration of ICAO regional offices and headquarters. ICAO is committed to meeting the operational expectations of all stakeholders. The task ahead is nothing short of ensuring the viability of the future air navigation system and its continued contribution to global economic development in a safe, secure and efficient manner.

2.2 Principles of State Liability for Acts of Autonomous Air Traffic Services Providers

The word “autonomous” is used throughout this chapter to identify air navigation services which, although commercialized, have not moved out of the jurisdiction of government. An autonomous air navigation provider is a self financing body which has greater freedom from governmental control, particularly in the conduct of its financial affairs, infrastructure funding and income streams. It is also subject to business taxes and is usually geared to achieve a return on its investment. However, an autonomous air navigation service provider should remain in the regulatory control of government, based on the fundamental premise that a facility originally provided by the government of a State, such as air traffic management, does not completely detach itself from the purview of responsibility that the government continues to hold over it, even if it were to be privatized. As such, a government cannot completely abdicate its responsibility for the provision of air navigation services, particularly since international treaty requires that governments retain such responsibility.

The Chicago Convention which came into effect on 7 April 1947, contains certain provisions demarcating the responsibility of Contracting States of ICAO. Article 28 of the Convention obligates contracting States to provide in their territories airports, radio services, meteorological services and other air navigation facilities to facilitate international air navigation, in accordance with the standards and practices established from time to time pursuant to the Convention.³ This fundamental concept of State responsibility has to be viewed from the perspective of modern exigencies of the supply and demand curve of air traffic services where such services are currently being provided both regionally and on a flight information region (FIR) basis. The need for a shift of focus of the modern air navigational system is determined by two factors: the growing air traffic demand and the need for enhanced and more efficient air traffic services; and the transition into a seamless air traffic management system calculated to obviate inconsistencies caused by boundaries.⁴ The goals of a global seamless air traffic management system are: to provide greater flexibility and efficiency by accommodating user-preferred flight profiles; to improve existing levels of safety; to accommodate the full range of aircraft types and airborne capabilities; to improve the provision of information to users, including weather conditions, the traffic situation and the availability of facilities; to organize air space in accordance with air traffic management (ATM) provisions and procedures; to increase user involvement in ATM decision making, including air-ground computer dialogue for flight plan negotiation; to create, to the extent possible, a single continuum of airspace where boundaries are transparent to users; and to increase capacity to meet future traffic demand.⁵

2.3 The Provision of Air Navigation Services

Article 12 of the Chicago Convention unambiguously states that over the high seas, the rules in force shall be those under the Convention and each Contracting State undertakes to insure the prosecution of all persons violating the regulations applicable. This peremptory principle,⁶ of adherence by States and aircraft bearing their nationality to any Standards and Recommended Practices (SARPs) adopted in regard to the high seas, effectively precludes any possible reliance by States on Article 38 of the Convention which allows States to deviate from SARPs in general. In other words, Annex 2 on Rules of the Air, which contains provisions relating to the operation of aircraft over the high seas, is sacrosanct and inviolable. The first

³Chicago Convention, *supra*, note 1 in Chap. 1, Article 28a).

⁴Sudharshan (2003) at 2.

⁵*Global Air Navigation Plan for CNS/ATM Systems*, Second Edition: 2002, ICAO Doc 9750, AN/963, p. 1-4-3 at paragraph 4.12.

⁶Bin Cheng confirms that over the high seas there is absolutely no option for States to deviate from rules established under the Chicago Convention for the manoeuvre and operations of aircraft. See Cheng (1962) at 148.

legal issue that would emerge from this clear principle is the question of applicability of Annexes (other than Annex 2) to the high seas and whether their provisions, if directly related to the principles of manoeuvre and navigation of aircraft over the high seas, would be binding with no flexibility offered by Article 38 of the Convention. Kaiser offers the opinion:

Over the high seas, the rules of the air have binding effect under Article 12, of the Chicago Convention. It should be clarified that rules of the air have a broader meaning than Annex 2 and encompass the Standards and Recommended Practices of all other Annexes as far as their application makes sense over the high seas.⁷

Kaiser is of course referring mainly to Annexes 10 and 11 to the Chicago Convention relating to air traffic services and air traffic management, while at the same time drawing the example of Annex 16 (on environmental) protection being applicable in a future date if extended beyond noise and engine emissions to the high seas under Article 12 of the Chicago Convention.⁸ This argument, which would ascribe to the ICAO Council wider control over larger spans of the world's air space, would be acceptable only if provisions of other Annexes (other than those of Annex 2) would directly have a bearing on the manoeuvre and navigation of aircraft over the high seas, as exclusively provided for by Article 12 of the Chicago Convention.

The ICAO Council, in adopting Annex 2 in April 1948 and subsequently in November 1951 when Amendment 1 to the Annex was adopted, resolved that the Annex constitutes *rules* relating to the flight and manoeuvre of aircraft within the meaning of Article 12 of the Convention. Therefore, the Council explicitly recognized that the rules in the Annex applied to the manoeuvre and operation of aircraft without exception. Annex 2, in its Foreword, states that the Standards in the Annex, together with the Standards and Recommended Practices of Annex 11, govern the application of the Procedures for Air Navigation Services Rules of the Air and Air Traffic Services, and the Regional Supplementary Procedures. The Regional Supplementary Procedures are subsidiary procedures of regional applicability. It is clear that by this introduction, there is established a distinct disparity between Annex 2 and Annex 11 where the provisions of the former remain unquestionably mandatory, and the provisions of the latter remain subject to Article 38 of the Chicago Convention and capable of being deviated from. However, it is clear that the purpose of Annex 11 is to ensure that flying on international routes is carried out under uniform conditions designed to improve the safety and efficiency of air operation and, therefore, provisions relating to air traffic control services, flight information services, and alerting services of Annex 11 when linked to the

⁷Kaiser (1995) 447 at 455. Bin Cheng states that contracting States are expected to be able to exercise control over all that takes place within their territories, but outside their respective territories only over aircraft bearing their nationality. Bin Cheng, *supra*, note 6, at 110 in this chapter.

⁸*Ibid.*

provisions of Annex 2, have a coercive effect that may in certain circumstances, transcend the parameters set in Article 38 of the Convention.

The second issue in determining the legal status of rules of the air over the high seas in relation to sovereignty is the element of control exercised by a State over aircraft operations over the high seas. Article 2.1.2 of Annex 2 provides that a Contracting State may deem to have accepted (unless ICAO is otherwise advised) that it provides air traffic services through an appropriate ATS Authority as designated to be responsible for providing air traffic services over parts of the high seas. An appropriate ATS Authority is defined in the foreword of the Annex as the relevant authority designated by the State responsible for providing air traffic services in the air space concerned. A contracting party accepts an appropriate ATS authority pursuant to a regional air navigation agreement, which is an agreement approved by the Council of ICAO usually based on the outcome of the findings of Regional Air Navigation Meetings.

It is somewhat disconcerting that neither the legal status of the regional air navigation plan or agreement, nor its definition is clear. In November 1996, at the 38th meeting of the European Air Navigation Planning Group, it was recorded that an Air Navigation Plan consisted of an authoritative internationally agreed reference document, which corresponded to a contract between States covered by the Plan regarding air navigation facilities to be provided, to be approved by the ICAO Council in accordance with the provisions of the Chicago Convention.⁹ It was deemed that the Council, in any given instance, would be acting on behalf of all Contracting States, including those not covered by the Plan. There is a marked dichotomy in the terminology used, which refers to the Plan on the one hand as a contract between parties and on the other hand as a reference document. Buerghenthal offers a more coherent view, by saying that ICAO Annexes, Plans, SUPPS¹⁰ and Regional Air Navigation Plans constitute an integral body of aviation legislation comparable both in structure and content to comprehensive domestic air navigation codes.¹¹ Yet another view is that the Regional Air Navigation Plan, not involving the process of ratification, signature or adoption, is a technical and operational document.¹² Confusion is further confounded by the fact that there is no direct consequence for any State which does not perform its obligations under a Regional Air Navigation Plan.

⁹ICAO Doc. EANPG COG/2-WP/6, 12/03/1996 at 3.

¹⁰The ICAO Regional Supplementary Procedures (SUPPS) form the procedural part of the Air Navigation Plan developed by Regional Air Navigation (RAN) Meetings to meet those needs of specific areas which are not covered in the worldwide provisions. They complement the statement of requirements for facilities and services contained in the Air Navigation Plan publications. Procedures of worldwide applicability are included either in the Annexes to the Convention on International Civil Aviation as Standards or Recommended Practices, or in the Procedures for Air Navigation Services (PANS). See *ICAO Doc 7030*.

¹¹Buerghenthal (1969) at 121.

¹²Milde (2002) at 192.

The provision of air navigation services are mainly regulated by three Annexes to the Chicago Convention, namely Annex 2 (Rules of the Air), Annex 3 (Meteorological Service for International Air Navigation) and Annex 11 (Air Traffic Services).¹³ Of these, compliance with Annex 2 is mandatory¹⁴ and does not give the States the flexibility provided in Article 38 of the Chicago Convention to register differences from any provisions of the Annex.

With regard to navigation over the high seas, the United Nations Convention on the Law of the Sea *UNCLOS*, Article 39, lays down the duties of ships and aircraft involved in transit navigation to the effect that ships and aircraft, while exercising the right of transit passage, should: proceed without delay through or over the strait; refrain from any threat or use of force against the sovereignty, territorial integrity or political independence of States bordering the strait, or in any other manner in violation of the principles of international law embodied in the Charter of the United Nations; refrain from any activities other than those incident to their normal modes of continuous and expeditious transit unless rendered necessary by force majeure or by distress; and comply with the relevant provisions of the Convention. Article 39(3) explicitly states that aircraft in transit passage shall observe the Rules of the Air established by ICAO as they apply to civil aircraft and that state aircraft will normally comply with such safety measures and will at all times operate with due regard for the safety of navigation. The provision further states that at all times aircraft shall monitor the radio frequency assigned by the competent internationally designated air traffic control authority or the appropriate international distress radio frequency.

¹³Article 54 1) of the Chicago Convention stipulates as a mandatory function of the Council the act of adopting, in accordance with Chapter VI of the Convention, international standards and recommended practices (SARPs) and for convenience designate them as Annexes to the Convention. Article 37 of the Convention reflects the areas in which SARPs should be developed and Annexes formed. Article 38 obliges contracting States to notify ICAO of any differences between their own regulations and practices and those established by international standards or procedures. The notification of differences however, does not absolve States from their continuing obligation under Article 37 to collaborate in securing the highest practicable degree of uniformity in international regulations, standards, and procedures.

¹⁴In October 1945, the Rules of the Air and Air Traffic Control (RAC) Division at its first session made recommendations for Standards, Practices and Procedures for the Rules of the Air. These were reviewed by the then Air Navigation Committee and approved by the Council on 25 February 1946. They were published as *Recommendations for Standards, Practices and Procedures—Rules of the Air* in the first part of Doc 2010, published in February 1946. The RAC Division, at its second session in December 1946–January 1947, reviewed Doc 2010 and proposed Standards and Recommended Practices for the Rules of the Air. These were adopted by the Council as Standards and Recommended Practices relating to Rules of the Air on 15 April 1948, pursuant to Article 37 of the Chicago Convention and designated as Annex 2 to the Convention with the title *International Standards and Recommended Practices—Rules of the Air*. They became effective on 15 September 1948. On 27 November 1951, the Council adopted a complete new text of the Annex, which no longer contained Recommended Practices. The Standards of the amended Annex 2 (Amendment 1) became effective on 1 April 1952 and applicable on 1 September 1952.

Standard 2.1.1 of Annex 2 to the Chicago Convention provides that the rules of the air shall apply to aircraft bearing the nationality and registration marks of a Contracting State, wherever they may be, to the extent that they do not conflict with the rules published by the State having jurisdiction over the territory over-flown.¹⁵ The operation of an aircraft either in flight or on the movement area of an aerodrome is required to be in compliance with the general rules and, in addition, when in flight, either with: visual flight rules (VFR); or the instrument flight rules (IFR).¹⁶ Standard 2.3.1 further provides that the pilot-in-command of an aircraft shall, whether manipulating the controls or not, be responsible for the operation of the aircraft in accordance with the rules of the air, except that the pilot-in-command may depart from these rules in circumstances that render such departure absolutely necessary in the interests of safety.

2.4 Meteorological Information

Annex 3 to the Chicago Convention provides in Standard 2.1.1. that the objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation. This objective has to be achieved by supplying the following users: operators, flight crew members, air traffic services units, search and rescue services units, airport managements and others concerned with the conduct or development of international air navigation, with the meteorological information necessary for the performance of their respective functions.¹⁷

The Annex, in Standard 2.1.3 calls for each Contracting State to determine the meteorological service which it will provide to meet the needs of international air navigation. This determination should be made in accordance with the provisions of this Annex and with due regard to regional air navigation agreements; it should include the determination of the meteorological service to be provided for international air navigation over international waters and other areas which lie outside the territory of the State concerned. Furthermore, each contracting State is required to designate the authority, hereinafter referred to as the meteorological authority, to provide or to arrange for the provision of meteorological service for international

¹⁵The Council of the International Civil Aviation Organization resolved, in adopting Annex 2 in April 1948 and Amendment 1 to the said Annex in November 1951, that the Annex constitutes Rules relating to the flight and manoeuvre of aircraft within the meaning of Article 12 of the Convention. Over the high seas, therefore, these rules apply without exception.

¹⁶Information relevant to the services provided to aircraft operating in accordance with both visual flight rules and instrument flight rules in the seven ATS airspace classes is contained in 2.6.1 and 2.6.3 of Annex 11. A pilot may elect to fly in accordance with instrument flight rules in visual meteorological conditions or may be required to do so by the appropriate ATS authority.

¹⁷Standard 2.1.2.

air navigation on its behalf. Details of the meteorological authority so designated shall be included in the State aeronautical information publication.

State responsibility for the provision of meteorological information is provided for in Standard 2.1.4, where each Contracting State is required to ensure that the designated meteorological authority complies with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for international air navigation.¹⁸

It is also provided in the Annex that close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.¹⁹ Furthermore, States have responsibility to establish one or more aerodrome and/or other meteorological offices which shall be adequate for the provision of the meteorological service required to satisfy the needs of international air navigation.²⁰

The Annex provides that an aerodrome meteorological office shall carry out all or some of the functions as necessary to meet the needs of flight operations at the aerodrome in the preparation of: forecasts and other relevant information for flights with which it is concerned; the extent of its responsibilities to prepare forecasts shall be related to the local availability and use of en-route and aerodrome forecast material received from other offices; preparation of and obtaining forecasts of local meteorological conditions; maintaining a continuous survey of meteorological conditions over the aerodromes for which it is designated to prepare forecasts; providing briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel; supplying other meteorological information to aeronautical users; displaying the available meteorological information; exchanging meteorological information with other meteorological offices; and supplying information received on pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, to its associated air traffic services unit, aeronautical information service unit and meteorological watch office as agreed between the meteorological, aeronautical information service and ATS authorities concerned.

Chapter 5 of the Annex includes further responsibilities of States. Standard 5.1 provides that each Contracting State is required to arrange, according to the provisions of this chapter, for observations to be made by aircraft of its registry operating on international air routes and for the recording and reporting of these observations. Aircraft observations are required with regard to routine aircraft observations during en-route and climb-out phases of the flight; and special and other non-routine aircraft observations during any phase of the flight.

¹⁸Requirements concerning qualifications and training of meteorological personnel in aeronautical meteorology are given in WMO Publication No. 49, Technical Regulations, Volume I—General Meteorological Standards and Recommended Practices, Chapter B.4—*Education and Training*.

¹⁹Standard 2.2.1.

²⁰Standard 3.3.1.

2.5 Air Traffic Services

The provision of air traffic services²¹ is addressed in Annex 11 to the Chicago Convention which provides *in limine* that Contracting States shall determine, in accordance with the provisions of this Annex and for the territories over which they have jurisdiction, those portions of the airspace and those aerodromes where air traffic services will be provided. They shall thereafter arrange for such services to be established and provided in accordance with the provisions of this Annex, except that, by mutual agreement, a State may delegate to another State the responsibility for establishing and providing air traffic services in flight information regions, control areas or control zones extending over the territories of the former.²²

The Standards and Recommended Practices in Annex 11, together with the Standards in Annex 2, govern the application of the *Procedures for Air Navigation Services—Air Traffic Management*²³ and the *Regional Supplementary Procedures—Rules of the Air and Air Traffic Services*, contained in Doc 7030, Annex 11 pertains to the establishment of airspace, units and services necessary to promote a safe, orderly and expeditious flow of air traffic. A clear distinction is made between air traffic control service, flight information service and alerting service. Its purpose, together with Annex 2, is to ensure that flying on international air routes is carried out under uniform conditions designed to improve the safety and efficiency of air operation.

The Standards and Recommended Practices in Annex 11 apply in those parts of the airspace under the jurisdiction of a Contracting State wherein air traffic services are provided and also wherever a Contracting State accepts the responsibility of providing air traffic services over the high seas or in airspace of undetermined sovereignty. A Contracting State accepting such responsibility may apply the Standards and Recommended Practices in a manner consistent with that adopted for airspace under its jurisdiction.

²¹According to Paragraph 2.2 of the Annex, the objectives of the air traffic services shall be to: (a) prevent collisions between aircraft; (b) prevent collisions between aircraft on the manoeuvring area and obstructions on that area; (c) expedite and maintain an orderly flow of air traffic; (d) provide advice and information useful for the safe and efficient conduct of flights; (e) notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

²²Standard 2.1.1. It is also provided in the Annex that if one State delegates to another State the responsibility for the provision of air traffic services over its territory, it does so without derogation of its national sovereignty. Similarly, the providing State's responsibility is limited to technical and operational considerations and does not extend beyond those pertaining to the safety and expedition of aircraft using the concerned airspace. Furthermore, the providing State in providing air traffic services within the territory of the delegating State will do so in accordance with the requirements of the latter which is expected to establish such facilities and services for the use of the providing State as are jointly agreed to be necessary. It is further expected that the delegating State would not withdraw or modify such facilities and services without prior consultation with the providing State. Both the delegating and providing States may terminate the agreement between them at any time.

²³Doc 4444, PANS-ATM.

Standard 2.1.2 of the Annex stipulates that those portions of the airspace over the high seas or in airspace of undetermined sovereignty where air traffic services will be provided shall be determined on the basis of regional air navigation agreements. A Contracting State having accepted the responsibility to provide air traffic services in such portions of airspace shall thereafter arrange for the services to be established and provided in accordance with the provisions of the Annex.²⁴ The Annex goes on to say that when it has been determined that air traffic services will be provided, the States concerned shall designate the authority²⁵ responsible for providing such services.²⁶ Situations which arise in respect of the establishment and provision of air traffic services to either part or whole of an international flight are as follows:

Situation 1: A route, or portion of a route, contained within airspace under the sovereignty of a State establishing and providing its own air traffic services.

Situation 2: A route, or portion of a route, contained within airspace under the sovereignty of a State which has, by mutual agreement, delegated to another State, responsibility for the establishment and provision of air traffic services.

Situation 3: A portion of a route contained within airspace over the high seas or in airspace of undetermined sovereignty for which a State has accepted the responsibility for the establishment and provision of air traffic services.

For the purpose of the Annex, the State which designates the authority responsible for establishing and providing the air traffic services is:

in *Situation 1*: the State having sovereignty over the relevant portion of the airspace;

in *Situation 2*: the State to whom responsibility for the establishment and provision of air traffic services has been delegated;

in *Situation 3*: the State which has accepted the responsibility for the establishment and provision of air traffic services.

2.6 Liability of States

As the overall liability of the State to provide air navigation services has been clearly identified by international treaty and, as already discussed, there are various kinds of air service providers ranging from State instrumentalities to private service providers, the liability regime could be varied and contentious. Clearly,

²⁴The phrase “regional air navigation agreements” refers to the agreements approved by the Council of ICAO normally on the advice of Regional Air Navigation Meetings. The Council, when approving the Foreword to this Annex, indicated that a Contracting State accepting the responsibility for providing air traffic services over the high seas or in airspace of undetermined sovereignty may apply the Standards and Recommended Practices in a manner consistent with that adopted for airspace under its jurisdiction.

²⁵The authority responsible for establishing and providing the services may be a State or a suitable Agency.

²⁶Standard 2.1.3.

liability of the State can be bifurcated into two areas under administrative law where liability of the State, its agency or a private body can be detained within the territory of a State, and international law, the latter involving principles of State responsibility and the liability of a State for causing injury to another State or its subjects.

2.6.1 *Liability Under Administrative Law*

State liability under administrative law can in turn be divided into two limbs: liability for acts of instrumentalities of State; and liability for privatized service providers for whose acts, relating to the provision of air navigation services, the State would still bear responsibility. The traditional model of administrative responsibility and accountability of the administrative State is based on the premise that Parliament controlled the executive but was in turn controlled by the people. Added to this, the fundamental postulate lay in the overarching principle that the judiciary played its role in keeping instrumentalities and agencies of the State intact. Accountability of the State for its agencies' actions was twofold: one stemming from a statutory power given to that agency by the State; and the other arising from delegation of authority by the State to the agency concerned. In the latter instance, however, the legislature could intervene and share some control of the agency. This gave rise to the inexorable principle that administrative law and judgments of courts on such agencies could be involved only in the former instance, when the State had provided a statutory base for a private agency or entity. In the 1983 British case of *O'Reilly & Mackman*,²⁷ the House of Lords limited the circumstances in which a public law remedy, such as a declaratory judgment or injunction, could be brought outside of Section 31 of the *Supreme Court Act* of 1918, which prescribed instances of legal actions to be brought against the State for an act of its statutory agent. This is notwithstanding the fact that Section 21 of the *Crown Proceedings Act* 1949 allows the Court in civil proceedings to issue a declaratory order against the State, although there could be no injunction specific performance orders against a State. Furthermore, a later case established that although the claim for judicial review might be brought against the Crown, the Crown's involvement is merely nominal and the ultimate dispute would be between the claimant and the defendant.²⁸ It is with the 1990 decision in the *Factorframe Case*²⁹ where Lord Bridge stated that injunctive relief against the Crown or its officers was not possible.

²⁷[1983] 2. A.C. 237.

²⁸*R. (on the application of Ben-Abdelaziz and Kugwa) v. London Borough of Hackney and the Secretary of State for the Home Department* [2001] 1 W.L.R. 1485, para 29.

²⁹*R. v. Secretary of State ex parte Factorframe Ltd.* [1990] 2 A.C. 85.

In the instance of a privatized service provider, the situation calls for a discussion of the reasons for privatization leading to the legal nature of a privatized entity.³⁰ The reasons for privatization could well range from improvement of efficiency to reducing government involvement in industrial decision making. The corollaries to privatization are often the widening of share ownership; encouraging share ownership by employees; providing more flexibility to pay policies; and enhancement of economic freedom. There could be two types of privatized service providers: the first being large companies which were once instrumentalities of state, which, even after privatization, do not possess potential for undue competition in the market. These would easily transit to a position in which large companies had been private in the first place, and would not be subject to principles of public law. The second category of the privatized service provider is one which has market power and consequent potential for untrammelled competition. In such cases, the State may regulate the provider by bringing it under the administrative purview of a State agency. These privatized bodies may be vulnerable under public law through the agencies having administrative control over them.

One of the analogies in the United Kingdom of a privatization of a utility can be observed in the legislative initiative of 1984 with the adoption of the *Telecommunications Act* which brought about the privatization of a major public utility.³¹ The 1984 legislation privatized the public corporation *British Telecom* (BT) and abolished BT's monopoly in providing telecom services, thus opening the doors to competition. The Director General of Telecommunications, established by the Act, can grant licenses to operators of telecom systems. The Director General is also empowered to refer a matter to the *Monopolies and Mergers Commission*, particularly on issues related to public interest such as pricing. If this particular feature were to be applicable to a privatized air navigation service provider appointed under Statute, there would be the interesting consideration under public law whether that provider complied with Article 15 of the Chicago Convention³² on charges for services.

The operation of the administrative process in a State becomes somewhat complex when viewed in the context of competition policy where the State takes measures to curb the ill-effects on society of monopolies and cartels. An initial difficulty that arose was the nineteenth Century control of trade, which was aimed at

³⁰For a detailed discussion of the legal liability of States and of a privatized service provider see Abeyratne (2004) pp. 31–51.

³¹From 1912 until 1981 telecommunications are the responsibility of the Post Office. The 1981 legislation represented telecommunications from KP. Services and established British Telecom as a public corporation.

³²Article 15 provides that every airport in an ICAO contracting State which is open to public use by its national aircraft shall likewise be open under uniform conditions to aircraft of all 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 services. Article 15 also provides that charges applicable to a foreign carrier for the provision of the air navigation services shall not be higher than those imposed on a carrier bearing the service provider State's nationality.

promoting competition proved counter productive, resulting in controlling competition. This difficulty was compounded by the early twentieth Century State policy of reluctance to interfere with citizens striking bargains for their benefit.³³ However, after World War 1, some British Governmental measures introduced comprehensive control of market power.³⁴

British legislators can be proud of three legislative stages of unfair competition control. The first came in the form of the 1948 *Monopolies and Restrictive Practices (Inquiry and Control), Act* which devolved regulatory responsibility on an agency—the Monopolies and Restriction Practices Commission (MRPC)—a body outside the normal departmental framework. The second stage commenced with the 1956 *Restrictive Trade Practices Act* which addressed the competitive threat of cartels and the *Restrictive Practices Court* was established to adjudicate an anti competitive and privy issues. The third stage took on with the expansion of the *Monopolies Commission* which investigates monopolies issues. Merger irregularities were added to the jurisdiction of the Commission with the *Monopolies and Mergers Act* of 1968. The 1980 *Competition Act* which followed gave the Commission power to investigate particular anti competitive practices. The final stage of the evaluation demarcates choice of institutions to investigate and adjudicate on anti competitive practices. From an administrative perspective, the citizen has been known to challenge these State instrumentalities,³⁵ the most notable of which has been the challenge offered to the various governmental institutions created under Statute to define their extent of duty to give reasons for competition legislation.³⁶

A Government's approach to regulation of a public utility, whether public or privatized, is usually based on the public interest rationale where individual consumer choice will determine the demand and supply for goods and their pricing and quantity.³⁷ In the United Kingdom, these factors are intrinsically related to transparency, accountability, proportionality, consistency and targeting.³⁸

Quite apart from the connotation of Article 15 of the Chicago Convention, setting international obligation, a State in a common law jurisdiction would be questioned in its Courts for its responsibility over iniquitous charges for services provided. An early nineteenth Century decision established the fact that the sovereign could not impose an unfair charge on services provided.³⁹

With regard to tortious liability of air navigation service providers for acts negligently committed that cause damage to aircraft and passengers, the basic premise is that a public body acting *ultra vires* is as liable for an act committed

³³*Mogul SS. Co. Ltd. v. McGregor Gow* [1892] A.C. 25. See also *Sorrell v. Smith* [1925] A.C. 700.

³⁴Committee on Trusts Cmd. 9236 (1918).

³⁵See *R. v. Monopolies and Mergers Commission Exp. Elders 1XL Ltd.* [1987] 1. W.L.R. 1121. Also *R.V.M. & M. C Exp. Mathew Brown plc* [1987] 1 W.L.R. 1235.

³⁶*R. v. Secretary of State for Trade Industry Ex parte Lonrho plc* [1989] 1 W.L.R. 325.

³⁷Ogus (1994).

³⁸See Better Regulation Guide, UK Cabinet Office (1998).

³⁹*Corporation of Stanford v. Pawlett*, (1830) 1 C&J 57, at 400.

beyond its powers as is a private individual.⁴⁰ In the 1995 Case of *X (Minors) v. Bedfordshire CC*,⁴¹ Lord Browne Wilkinson envisioned that there would be three possible causes of action where a plaintiff might bring a cause of action against a public entity: a breach of statutory duty without the necessity to prove carelessness; a common law breach of duty of care resulting from a breach of a statutory duty or a performance of a duty; and misfeasance in a public office. His Lordship ruled out any liability for carelessness in the performance of a duty imposed by statute.

In terms of compensation for torts of negligence, liability can be imposed on several counts: illegality or actions which are *ultra vires per se*; actions of ordinary negligence; a serious breach of duty; international wrong doing; and a lawfully caused governmental loss. Compensation for these torts could be either on an *ex gratia* basis or in the nature of restitutory relief.⁴² Illegality or an act *ultra vires* is the label given to fault in many civil law jurisdictions including France. Common law jurisdictions, such as the United Kingdom distinguished between illegality and fault, the latter being identified with negligence and the former being considered an act *ultra vires*.

Where a breach of statutory duty imposed on a State authority was an issue, the remedy in early times was predicated upon the premise that if a person responsible for the act in question had a statutory duty of care which was breached, an action lay at the suit of the aggrieved person.⁴³ In the early twentieth Century, Courts slightly adapted their fundamental approach to look at the intent of the statute on legislation particularly whether the law intended to create a cause of action for its breach. The overall judicial philosophy was that if there was room for awarding compensation under the principles of tort law, there would be no room for action under the statute itself.⁴⁴ Additionally, for there to be compensation for a breach of statutory duty, the Courts looked for a prescribed penalty within the Statute, together with a link between harm suffered and the risk which the statute intended to prevent.⁴⁵ A social interest statute enacted for the benefit of society at large would usually not give rise to a breach of duty action, unless negligence can be proved.⁴⁶ This principle was based on the fact that social legislation affects a class of persons and accommodation of an individual within that legislation was grounded on the discretion of the authority vested with power under the legislature concerned.⁴⁷

As the *Bedfordshire*⁴⁸ case illustrated, no action would lie for mere carelessness in the performance of a statutory duty unless there is a specific common law right of

⁴⁰*Entick v. Carrington* (1765) 19 St. Tr. 1029 at p. 1081.

⁴¹[1995] 2 A.C. 633 at 730.

⁴²Craig (2003) at 882.

⁴³*Sterling v. Turner* (1672) I. Ventris 200. *Rowning v. Goodchild* (1772) 2 W. Black 906, *Schinotti v. Bumstead* (1796) 6. T.R. 646, *Barry v. Arnaud*, (1839) 10 Ad. & E. 646, *Pickering v. James* (1873) L.R. 8 C.P. 489.

⁴⁴*Phillips v. Britannia Hygienic Laundry Co. Ltd.* [1923] 2 K. B. 832.

⁴⁵*Cutler v. Wandsworth Stadium Ltd.* [1949] AC 398. See Also *Groves v. Lord Winborne* [1898] 2. Q.B.402 and *Goris v. Scott* [1875] L.R. 9 ex. 125.

⁴⁶*Barrett v. Enfield LBC* [2001] 2.A.C. 550.

⁴⁷*O'Rourke v. Campden LBC* [1998] A.C. 158.

⁴⁸*Supra*, note 41 in this chapter.

action and that action is predicated upon a common law duty of care to be established by the plaintiff. Courts cannot impose their judgment on a discretion vested in an authority because such discretion is purely for the authority to exercise and decide upon. The discretion can only be impugned if the plaintiff shows manifest unreasonableness on the part of the authority vested with discretion, making the action fall outside the purview of the discretion.⁴⁹ In the 1990 case of *Caparo Industries plc v. Dickman*⁵⁰ the court set specific standards for determining whether a challenged decision fell outside a common law duty of care. They were: whether injury caused by the defendant was foreseeable; was there sufficient proximity between the parties; and whether the imposition of a duty of care on the authority was just, equitable and fair.⁵¹

In the 1996 case of *Stovin v. Wise*⁵² the Court established that, on the issue of breach of statutory authority, the consideration of a public duty to act under statute was not the only criterion. There was also the consideration as to whether the action in question breaches a private law duty to act which would ground a claim in damages.⁵³ An omission to exercise statutory power was actionable if the authority was proved to have been irrational in not exercising the power and that there was provision in the statute for the award of compensation if an action prescribed under statute was not taken. The reliance on policy explicit or implicit in a statute under question, that compensation would accrue to a plaintiff in the instance of a breach of statutory duty, was to be based on the fact that the purpose of the statute was to devolve responsibility on an authority whose actions within the statute would accomplish what members of a society could not accomplish by themselves.⁵⁴

With regard to negligence, in the early case of *Mercy Docks and Harbour Board Trustees v. Gibbs*, decided in 1866, the court of first instance held that a public body could be held liable in negligence when exercising a statutory power. Blackburn J. rejected the argument of the defendant that a remedy lay only within statutory bounds, a decision which was upheld later by the House of Lords.⁵⁵ The duty of care lay pursuant to a statutory power but was not prescribed both in terms of content and compensability within it. However, the scope of the statute and the persons it was meant to protect is important.⁵⁶ Enforcement of regulations and bylaws becomes an important criterion in the determination of negligence.

⁴⁹*Id* 736 A—737 A.

⁵⁰[1990] 2 A.C.605.

⁵¹*Id.* 611.

⁵²[1996] A.C. 923.

⁵³*Id.* 949–950.

⁵⁴This policy was enunciated by Lord Hoffman in *Stovin*, *supra*, note 11 in this chapter where His Lordship qualified the Australian Case *Sutherland Shire Council v. Heyman* (1985) C.L.R. 424 at 464 in which Mason J. established a doctrine of general reliance.

⁵⁵(1866) L.R.1. H.L.

⁵⁶Governors of the *Peabody Donation Fund v. Sir Lindsay Parkinson and Co. Ltd.* [1985] A.C. 210. Also, *Curran v. Northern Ireland Co-ownership Housing Association Ltd.* [1987] A.C.718.

In *Anns v. London Borough of Merton*,⁵⁷ decided in 1998, Lord Wilberforce held that negligence of the defendant Borough Council would ensue if he did not take reasonable care in securing compliance with bylaws and regulations.

Discretion and negligence are not mutually exclusive.⁵⁸ The operational criterion is whether, in the exercise of discretion, there was a breach of a duty of care. This liability and consequent consideration that grounds an action based on a break of a duty of care depends entirely on policy considerations whether it would be fair, just and reasonable to impose such a duty. Clearly on the basis of *Barret*⁵⁹ and *Phelps*⁶⁰ one could conclude that a duty of care is owed by an air navigation service provider (whether he is an agent of the government or a private body)⁶¹ to both the operators of the aircraft as well as those who use the operator's services in the given instance.

With regard to applicable law in the United States, the *Federal Tort Claims Act* of the United States⁶² although not creating any specific liability regime for the United States government, asserts that the US Government approves of its being treated as a legal person in terms of tortious liability, with no right to immunity.⁶³ In *Downs v. United States*⁶⁴ the Court held that the fundamental purpose of the Act was to relieve Congress of the burden of cases where the plaintiff was seeking redress for an act of an employee of the United States under a customary principle of US governmental liability that had to be invoked in every single instance. In the 1962 case of *Richards v. United States*,⁶⁵ the US Supreme Court held that the Act was designed to remove sovereign immunity from the United States from actions grounded in tort and to create specific exceptions where the Government might not be liable. One of such exceptions is that the US Government may not be held liable for the performance, or failure to perform a discretionary function. The rationale for this exception from liability is that in a discretionary function there is an element of

⁵⁷[1978] A.C. 728.

⁵⁸This is a principle applicable both in the United Kingdom and the United States. See *Johnson v. State of California*, 447 P. 2d. 352 (1968).

⁵⁹In *Barrett v. Enfield LBC*, [2001] 2. A.C. 550, the claim for breach of statutory duty per se was not pursued before the Court of Appeal or the House of Lords, in the case of a local authority sued for negligence in caring for a child.

⁶⁰In *Phelps v. Hillingdon LBC* [2001] 2 A.C. 619 at 652, the House of Lords held that duties cast on local authorities in the context of specific education needs were for the benefit of all children in a particular geographic location or area and therefore did not come under an action for breach of statutory duty in the case of a specific person.

⁶¹Street (1953) Chap. 2.

⁶²The *Federal Tort Claims Act* of 1946 waived government immunity for tortious liability.

⁶³The Act provides that the US District Courts shall have exclusive jurisdiction of civil actions or claims against the United States for pecuniary damages, accruing on or after 1 January 1945 for injury or loss of property, or personal injury or death caused by the negligent or wrongful act of the State or its employees if they are acting within the scope of their employment. The United States could also be liable as a private person to a claimant in accordance with the law of the place where the act or omission occurred. 28 U.S.C. 1345 (b).

⁶⁴(1975) CA 6 Tenn, 522 F2d 990.

⁶⁵(1962) 369 U.S. 17, 17 LED 2d 492.

choice or selection for which there is logical or ethical basis to hold the Government liable. In *Dalehite v. United States*⁶⁶ the Court held that discretion accorded to persons by the Government in laying out a plan of action would legitimately form an exception to the state liability principle. It is arguable that the *Dalehite* principle could be applied in an instance where the US Government gives the authority to a person to develop, apply and be accountable for a air navigation plan. However, 2 years after the decision, the case of *Indian Towing Co. Inc v. United States*⁶⁷ was handed down by the Supreme Court recognizing that the Government was liable for damage caused by the Coast Guard personnel in negligently failing to repair and make a lighthouse operative.

In 1985, the case of *Eastern Airlines v. Union Trust Co*⁶⁸ involved a mid air collision between two aircraft which were on final approach resulting in personal injury and property damage. The position of the US Government was that the air traffic controllers were exercising a discretionary function which exempted the government from liability under the Act⁶⁹. The Court, in rejecting the Government's position, concluded that the discretion was vested in the Federal Aviation Administration in handing over the tower to the air traffic controllers responsible for the negligent act and that the controllers had no discretion to be negligent in their duties. According to the reasoning of the Court, the controller and tower operator merely handled the operational details which were outside the purview of discretionary functions. Furthermore, the court distinguished between discretion at the operational level and the planning level and attributed to the Government responsibility at the planning level.

The interpretation of the Courts in the *Eastern Airlines* case has exposed the judicial decision making process to criticism on the ground that the air traffic controller does indeed exercise some form of discretion at various points in the exercise of his duties. For example, in an earlier case⁷⁰ in which the judgment was inconsistent with the *Eastern Airlines* judgment, it was held that the air traffic controller had a duty to warn the pilot of inclement weather which seriously jeopardized the safety of the aircraft. The rationale for the judgment was that, although the final decision regarding the course of the aircraft was within the pilot's discretion, the failure of the controller to warn was the proximate cause of the accident. The argument of the Government, that there was a discretion on the part of the controller in providing information to the aircraft crew, was rejected by the Court on the same basis as in *Dalehite*, *Indian Towing* and the earlier *Eastern Airlines* cases, in that the discretion was in handing over the operation of the tower to the operator and that neither the operator nor the controller had a discretion to provide services negligently.⁷¹ On this basis, the decision by the Government to

⁶⁶746 U.S. 15 (1953).

⁶⁷330 U.S. 61 (1955).

⁶⁸221 F.2d 62 (D.C. Cir 1985).

⁶⁹*Id.* 74–75.

⁷⁰*Ingham v. Eastern Airlines Inc.*, 373 F.2d 227 9 2nd Cir (1967).

⁷¹This reasoning has been questioned in other decisions in the United States. In *Stark v. United States F. Supp. (S.D. Cal 1967)*, the Court found that the air traffic controller had an obligation to determine

select the equipment for the landing systems is a planning activity and a discretionary one attributable to the Government. If equipment were to be chosen by the Government and the service provider used the equipment negligently in giving crucial instructions to the pilot, it is arguable that the Government may not be able to claim the benefit of the discretionary function exemption in exonerating itself from liability.⁷²

The question arises as to whether a breakdown of equipment would make the government strictly liable. An ICAO study,⁷³ conducted in 1984 stated that a breakdown of equipment should not exonerate the provider of the services (in the case of the United States the FAA which an instrumentality of State) because the provider would have a cause of action against the manufacturer. The Study, which was commissioned by the ICAO Council with a view to developing a Convention on air traffic controllers' liability, went on to say that:

Privileges and immunities whatever their nature and extent, should in no way be granted to air traffic control agencies whatever their status may be (private, public or multinational agencies) since they would defeat the purpose of a convention aiming at compensating victims of damage resulting from the negligence of air traffic control agencies; air traffic control agencies provide a public service and the responsibility involved carries with it obligations which cannot be eliminated by laws or otherwise; Furthermore, privileges and immunities in this field of activities might be considered in many countries to be contrary to the public order.⁷⁴

The Study recommended that claims against air traffic controllers must be supported by evidence of negligence on the part of the provider of the services or of failure of the equipment whether or not with the fault of the service provider. This is consistent with the United States jurisprudence that the pilot's negligence, if more serious than that of the controller, should be taken as the main cause of the damage even if the controller was negligent.⁷⁵

2.6.2 *Liability Under Public International Law*

The sovereign jurisdiction of a State does not extend beyond its territories. Therefore, a State cannot adjudicate against another State's acts in Courts of its own

whether the weather was good enough to allow a flight to go through. The responsibility of the State both at administrative law and public international law in certain circumstances of the provision of air navigation services, does not presuppose that there is no liability of the air traffic controller individually. There have been instances of the air traffic controller's individual liability, in common law jurisdictions (both jointly with the State concerned and severally) for negligence. See Crister S. Dahl, *Air traffic Control in Norway*, Unpublished LL.M thesis, McGill: Montreal, at 43.

⁷²*Miller v. United States*, 522 F.2d. 386 (6th Cir. 1975).

⁷³C-WP/7781, *Study on the Liability of Air traffic Control Agencies*, 1984, at 16.

⁷⁴*Id.* 15.

⁷⁵*Johnson v. United States* 187 F Supp. 489 E.D. Mich (1960).

jurisdiction, since the other State has sovereign immunity. The link between territorial jurisdiction and sovereign immunity is illustrated in a strong *cursas curiae*, commencing with an early nineteenth Century case where Marshall C.J. held in the United States Supreme Court that a State's sovereignty does not extend beyond its territories to encompass the jurisdiction of other States.⁷⁶

The principle of sovereign immunity recognized by Marshall CJ has been upheld through the centuries to follow. In the 2000 case of *Ex Parte Pinochet* (No. 3),⁷⁷ Lord Browne Wilkinson held that it is a fundamental principle of international law that one sovereign State does not adjudicate on the conduct of another sovereign State. The immunity extends both to civil and criminal liabilities.⁷⁸ The same year, Lord Millett held in the case of *Holland v. Lampon-Wolfe*⁷⁹ that State immunity is a corollary of customary international law and is based on the equality of sovereign States. It is not a legal principle that the United Kingdom [or any other State] places upon itself but inherits from the community of nations and its equality at international law.⁸⁰ A corollary to this basic theory is the Act of State which generally relates to the activities of the executive with regard to other States. The non justiciability of an Act of State applies both domestically and internationally to matters of State, such as those concerning security and territorial integrity are concerned.⁸¹

Sovereign immunity can be asserted as a justifiable exclusion to adjudication depending on the extent of control a State exercises over the issuant land. Thus, in the case of ships at foreign ports, the principle has veered from an extremity where the Court recognized the mere interest of a State in a ship which was operated privately for commercial purposes⁸² to rejecting a defective interest in a vessel which did not afford sovereign immunity to the State claiming its exclusion from a jurisdiction of a foreign Court.⁸³ The United States courts have insisted on adequate State control of a vessel.⁸⁴

In view of the many developments in the modern context where States have commercial interests beyond their boundaries, giving State enterprises an advantage over other national enterprises, many States recognize the practice of restrictive immunity of States in commercial issues.⁸⁵

The most compelling principle at public international law with regard to the liability of a State and with regard to the act of an air navigation service provider, is

⁷⁶*The Schooner Exchange v. McFaddon* 7 Cranch 116 (1812).

⁷⁷[2000] A.C. 147.

⁷⁸*Id.* 201.

⁷⁹[2000] 1.W.L.R. 1573.

⁸⁰*Id.* 1588.

⁸¹*Battes Gas and Oil Co. v. Hammer* (No. ?) [1982] A.C. 888.

⁸²*Porto Alexander* [1920] P. 30.

⁸³*Juan Ysmael v. Republic of Indonesia*, [1955] AC 72.

⁸⁴*The Navemor* 303US 68 (1938) and *Republic of Mexico v. Hoffman* 324US 30 (1945).

⁸⁵*See Abeyratne* (2005) p. 103 at 107.

the principle of State responsibility which is entrenched as a fundamental principle of international law, in particular, since the responsibility of a State in providing air navigation services to foreign as well as its own carriers is recognized by the Chicago Convention. Treaty obligation, as an integral part of State responsibility, was recognized in the 1990 *Rainbow Warrior* arbitration between France and New Zealand where the Court recognized that the law relating to treaties was relevant in determining one State's responsibility to another. The Court also recognized that at international law, there was no distinction between contractual and tortious liability and consequently State responsibility gave rise to reparation.

State responsibility is anchored on certain basic fundamental facts. Firstly, there should be international obligation between two States or more. Secondly, an act or omission by one State must violate that obligation which can be directly attributed or imputed to the State concerned. Thirdly, loss or damage must be incurred by the aggrieved State. These requirements fit well into the provision of air navigation services by one State to another which is recognized in Article 28 of the Chicago Convention. Therefore, the negligent act or omission of a service provider can be imputed to the State establishing or appointing such provider publicly or on a private basis. In the instance of an aircraft, whether national or foreign, carrying foreign nationals who are injured in an accident due to the negligent provision of air navigation would open a State to responsibility to make reparation to the claimants.⁸⁶ The objective responsibility theory suggests that a State's responsibility has to be one of strict liability, where good or bad faith is not a consideration, whereas the subjective responsibility test involves fault liability, involving negligence. In the 1926 *Neer* claim where an American superintendent of a Mexican mine was shot, the General Claims Commission hearing the claim of the United States applied the objective test and rejected the claim that Mexico was responsible for not pursuing the investigation diligently. Three years later, the French-Mexican Claims Commission, when considering the shooting of a French citizen by Mexican soldiers, applied the objective test and held the Mexican Republic responsible to make reparation to France.⁸⁷ The subjective approach involving an enquiry into negligence has been applied in the case of damage caused to one State by the rebels of another State as a result of a tax imposed by a third State where there was found to be no fault on the part of the third State.⁸⁸

In the famous *Corfu Channel* case, the International Court of Justice applied the subjective test and applied the fault theory. The Court was of the view that:

⁸⁶Charzow Factory Case PCIJ Series A No. 17, 1928, where the Court held that it is a principle of international law, and even a greater concept of international law, that any breach of an enjoyment involves an obligation to make reparation. See also the *Corfu Channel Case*, ICJ Reports at pp. 4, 26, *The Spanish Zone of Morocco Case*, 2 RIAA at p. 615 and *The Mayagna (Sumo) Indigenous Community of Awas Tingini v. Nicaragua*, *Inter American Court of Human rights*, Judgment of 31 August 2001 (Ser. C) No. 79, para 163.

⁸⁷*Caire Claim*, 5 RIAA, p.516 (1929).

⁸⁸*Home Missionary Society Claim*, 6 RIAA, p. 42 (1920).

It cannot be concluded from the mere fact of the control exercised by a State over its territory and waters that the State necessarily knew, or ought to have known, of any unlawful act perpetrated therein, nor yet that it necessarily knew, or should have known the authors. This fact, by itself and apart from other circumstances, neither involves *prima facie* responsibility nor shifts the burden of proof.⁸⁹

The Court, however, pointed out that exclusive control of its territory by a State had a bearing upon the methods of proof available to establish the involvement or knowledge of that State as to the events in question.

Apart from the direct attribution of responsibility to a State, particularly in instances where a State might be guilty of a breach of treaty provisions, or violate the territorial sovereignty of another State, there are instances where an act could be imputable to a State. Imputability depends upon the link that exists between the State and the legal person or persons actually responsible for the act in question. The legal possibility of imposing liability upon a State wherever an official could be linked to that State encourages a State to be more cautious of its responsibility in controlling those responsible for carrying out tasks for which the State could be ultimately held responsible. In the same context, the responsibility of placing mines was attributed to Albania in the *Corfu Channel* case since the court attributed to Albania the responsibility, since Albania was known to have knowledge of the placement of mines although it did not know who exactly carried out the act. It is arguable that, in view of the responsibility imposed upon a State by the Chicago Convention on the provision of air navigation services, the principles of immutability in State responsibility could be applied to an instance of an act or omission of a public or private official providing air navigation services.

The provisions of the Chicago Convention, which is an international treaty, are binding on contracting States to the Convention and therefore are principles of public international law. The International Court of Justice (ICJ), in the *North Sea Continental Shelf Case*,⁹⁰ held that legal principles that are incorporated in Treaties, such as the “common interest” principle, become customary international law by virtue of Article 38 of the 1969 *Vienna Convention on the Law of Treaties*.⁹¹ Article 38 recognizes that a rule set forth in a treaty would become binding upon a third State as a customary rule of international law if it is generally recognized by the States concerned as such, which in turn becomes a principle of customary international law, or *jus cogens*. Obligations arising from *jus cogens* are considered applicable *erga omnes* which would mean that States using space technology owe a duty of care to the world at large in the provision of such technology. The ICJ in the *Barcelona Traction Case* held:

[A]n essential distinction should be drawn between the obligations of a State towards the international community as a whole, and those arising *vis a vis* another State in the field of

⁸⁹The *Corfu Channel* Case, ICJ Reports, 1949, p. 4.

⁹⁰*I.C.J. Reports* 1970, at 32.

⁹¹*Vienna Convention on the Law of Treaties*, United Nations General Assembly Document A/CONF.39/27, 23 May 1969.

diplomatic protection. By their very nature, the former are the concerns of all States. In view of the importance of the rights involved, all States can be held to have a legal interest in their protection; they are obligations *erga omnes*.⁹²

The International Law Commission has observed of the ICJ decision:

[I]n the Courts view, there are in fact a number, albeit limited, of international obligations which, by reason of their importance to the international community as a whole, are- unlike others - obligations in respect of which all States have legal interest.⁹³

The views of the ICJ and the International Law Commission, which has supported the approach taken by the ICJ, give rise to two possible conclusions relating to *jus cogens* and its resultant obligations *erga omnes*:

- (a) Obligations *erga omnes* affect all States and thus cannot be made inapplicable to a State or group of States by an exclusive clause in a treaty or other document reflecting legal obligations without the consent of the international community as a whole;
- (b) Obligations *erga omnes* pre-empt other obligations which may be incompatible with them.

Some examples of obligations *erga omnes* cited by the ICJ are prohibition of acts of aggression, genocide, slavery and discrimination.⁹⁴ It is indeed worthy of note that all these obligations are derivatives of norms which are *jus cogens* at international law.

International responsibility relates both to breaches of treaty provisions and other breaches of legal duty. In the *Spanish Zone of Morocco Claims* case, Justice Huber observed:

[R]esponsibility is the necessary corollary of a right. All rights of an international character involve international responsibility. If the obligation in question is not met, responsibility entails the duty to make reparation.⁹⁵

It is also now recognized as a principle of international law that the breach of a duty involves an obligation to make reparation appropriately and adequately. This reparation is regarded as the indispensable complement of a failure to apply a convention and is applied as an inarticulate premise that need not be stated in the breached convention itself.⁹⁶ The ICJ affirmed this principle in 1949 in the *Corfu Channel Case*⁹⁷ by holding that Albania was responsible under international law to pay compensation to the United Kingdom for not warning that Albania had laid mines in Albanian waters which caused explosions, damaging ships belonging to the United Kingdom. Since the treaty law provisions of liability and the general

⁹²*Barcelona Traction, Light and Power Company Limited, I.C.J. Reports, 1974, 253 at 269–270.*

⁹³*Yearbook of International Law Commission 1976, Vol II, Part One at 29.*

⁹⁴*I.C.J. Reports, 1970 at 32.*

⁹⁵*1925 RIAA ii 615 at 641.*

⁹⁶*In Re. Chorzow Factory (Jurisdiction) Case, (1927) PCIJ, Ser. A, no. 9 at 21.*

⁹⁷*ICJ Reports (1949), 4 at 23.*

principles of international law as discussed complement each other in endorsing the liability of States to compensate for damage caused by space objects, there is no contention as to whether in the use of nuclear power sources in outer space, damage caused by the uses of space objects or use thereof would not go uncompensated. Furthermore, under the principles of international law, moral damages based on pain, suffering and humiliation, as well as on other considerations, are considered recoverable.⁹⁸

The sense of international responsibility that the United Nations ascribed to itself had reached a heady stage at this point, where the role of international law in international human conduct was perceived to be primary and above the authority of States. In its Report to the General Assembly, the International Law Commission recommended a draft provision which required:

Every State has the duty to conduct its relations with other States in accordance with international law and with the principle that the sovereignty of each State is subject to the supremacy of international law.⁹⁹

This principle, which forms a cornerstone of international conduct by States, provides the basis for strengthening international comity and regulating the conduct of States both internally—within their territories—and externally, towards other States. States are effectively precluded by this principle of pursuing their own interests untrammelled and with disregard to principles established by international law.

Principles of modern treaty law demand that an ICAO contracting State, which has placed its instrument of ratification to the Chicago Convention has consented to be bound by the provisions of that treaty. The word “contracting State” refers legally to a State which is bound by the treaty concerned, irrespective of whether the treaty is in force or not.¹⁰⁰ This goes to the root of international responsibility as already discussed and it is improbable at common law that a court would consider otherwise and disregard a State’s obligation in the provision of air navigation services, particularly in the context of governmental agencies and other instrumentalities of State. This however, does not completely exonerate the privatized service provider, who could be held liable at private law. Legally, as was discussed, neither the State nor the service provider can avoid liability on account of privatization. The State entails liability primarily at public international law and also at public law in general, and the provider incurs liability on a private basis in a private action that may be brought, under tort law principles or under contract law, as the case may be.

Paul Stephen Dempsey¹⁰¹ sums it up well, when he says that the issue has two critical considerations, one relating to legal issues and the other impacting public policy. Dempsey states correctly that the skies belong to the public and the

⁹⁸Christol (1991) at 231.

⁹⁹*Report of the International Law Commission to the General Assembly on the Work of the 1st Session, A/CN.4/13*, June 9 1949, at 21.

¹⁰⁰Aust (2000) at 75.

¹⁰¹See Dempsey (2003) 95 at 118–119.

sovereign is but the trustee in this regard. Under any circumstances, whether on fiscal profit making or political motivation, States cannot abdicate or pass on their responsibility and accountability of their traditional function and fiduciary responsibility. Besides, holding governments responsible will ensure proper quality control in the provision of air navigation services.

2.7 The Air Traffic Service Provider's Liability

States have to be mindful of the fact that their overall responsibility under the Chicago Convention in providing air navigation services extends to the air traffic controller, whose service is of a unique nature. The special feature in the provision of air traffic control is brought to bear by the nature of the service provided, be it in the relaying of information on meteorology or on traffic. Globally, air traffic control services offer information relayed by people by means of radio communication involving extremely short time periods and using a standard set of terminology in the English language, even in regions of the world where English is not the first language.¹⁰² ICAO endorses this view when it says:

The air traffic controller's job consists of complex tasks demanding a high degree of skill and active application of unique cognitive abilities such as spatial perception, information processing, reasoning and decision making. The controller must know where all the aircraft under his/her responsibility are, and determine how and when to take action to ensure that they remain separated from each other, while also seeing to their requests and needs for descent, climb, take off, departure etc.¹⁰³

In view of the arduous task performed by the air traffic controller, ICAO has stretched the responsibility of the State, from a fundamental statement of state responsibility reflected in Article 28 a) of the Chicago Convention, to a more detailed pronouncement in its guidelines, calling on States to make improvements to the air traffic management system through supporting software that could assist the controller with conflict prediction, detection, advisory and resolution.¹⁰⁴ ICAO's focus of concentration is on a unified strategy which establishes a mechanism integrating the efforts to increase transparency and disclosure of safety related information. Although the unified strategy extends to encompass all areas of safety of flight including airworthiness, it is incontrovertible that the overall philosophy of the strategy will apply to the provision of air navigation services as well. One of the most fundamental aims of ICAO, as enshrined in Article 44 a) of the Chicago

¹⁰²Miyagi (2005) at 143.

¹⁰³*Global Air navigation Plan for CNS/ATM Systems*, *supra*, note 10 in Chap. 2, at p. 1-4-7, paragraph 4.39.

¹⁰⁴*Id.* paragraph 4.40.

Convention, is to ensure the safe and orderly development of international civil aviation. To this end, and as part of its unified strategy, ICAO is suggesting the establishment of regional safety oversight organizations¹⁰⁵ along the lines of European Aviation Safety Agency (EASA) of Europe.

At the 35th Session of the ICAO Assembly, contracting States adopted Resolution A35-7,¹⁰⁶ which urges all contracting States to share with other contracting States critical safety information which may have an impact on the safety of international air navigation and to facilitate access to all relevant safety information. This resolving clause is based on the premise, explicitly recognized in the Resolution, that the improvement of the safety of international civil aviation on a worldwide basis requires the active collaboration of all stakeholders. By adopting Resolution A35-7, the 189 ICAO contracting States at that time arrogated to themselves increased responsibility for the safety of international civil aviation, irrespective of the nature of the provider of services that ensure such safety. This strategic approach of global safety oversight was further endorsed at the ICAO Conference on a Global Strategy for Aviation Safety convened of the Directors General of Civil Aviation from 20 to 22 March 2006 in Montreal, where all States consensually agreed that there should be an effective implementation of Safety Management Systems (SMS) in States, established according to a performance based approach in three steps: Firstly, where oversight authorities and operators and service providers agree on the safety performance to be expected from them while conducting their core business functions; secondly, that oversight authorities and service providers agree on the safety requirements necessary to achieve the safety performance agreed upon in the first step; and thirdly and finally, that oversight authorities verify achievement of the agreed safety performance or its lack thereof, and operators and service providers correct observed deviations.¹⁰⁷

All the above goes to demonstrate the heavy responsibility placed by States on themselves in undertaking that they and they alone will be accountable for the safety of aviation within their territories as well as cooperating on a global basis to implement a seamless air navigation system. Of course, any change in the provision of air traffic services, particularly with regard to the commercial nature of the service provider, will remain subservient to the fundamental concept of State sovereignty, which was endorsed by the Eleventh ICAO Air Navigation Conference held in Montreal from 22 September to 3 October 2003.¹⁰⁸

¹⁰⁵Dr. Assad Kotaite, *President of the International Civil Aviation Organization ICAO's Unified Strategy*, Airport 2005, 118 at 119.

¹⁰⁶*Assembly Resolutions in Force* (as of 8 October 2004), ICAO Doc 9848, at 1–60.

¹⁰⁷*Implementation of Safety Management Systems (SMS) in States*, Working paper submitted by the ICAO Secretariat, DGCA/06-WP/6, 9/01/06 at 1–2.

¹⁰⁸See Eleventh Air Navigation Conference report, *ICAO Doc 9828, AN-Conf/11*, Montreal: 20at para. 1.2.1.2, at p. 1–1, where it is recorded that the Conference agreed that the issue of sovereignty was paramount in the operation of global air traffic management, as interpreted through the Global ATM operational concept of sovereignty.

However, although the overall responsibility of the State to ensure the provision of air navigation services is immutable, there is no legal impediment to a State handing over the physical task of provision of services to a private entity while retaining its oversight role. Accordingly, in the present context, it is common to see a State largely in a supervisory role retaining its ownership of air space, drafting national legislation; determining governance over air navigation service providers; continuing to hold responsibility for certification and designation of service providers as well as setting regulations, while the service provider provides a public function in managing airspace with the broad spectrum of safety and efficiency. Within the overarching umbrella of State responsibility, there are various models of air navigation service providers. The first category is the original one which has not changed, where a State instrumentality continues to provide air navigation services. Examples of these are the Federal Aviation Administration¹⁰⁹ of the United States and the national authority of France (DSNA). The second category is the privatized or profit service provider such as NATS and third is the privatised service provider for non profit purposes such as NavCanada. There is a fourth category of a corporatized service provider for profit and those that come into this group are New Zealand Airways and Air Services Australia. A fifth category also exists, corporatized for non profit such as the air navigation service providers of Continental Europe. All these types of service providers, with the exception of the first category are autonomous, but remain undisputedly under the administrative supervision of their respective States.

In August 2006, a Swiss court indicted eight employees of the Swiss air traffic control authority, Skyguide, for their involvement in the plane crash which occurred in 2002 in Ueberlingen.. The Skyguide staff were charged with negligent manslaughter for their role in the air crash in which 71 people died when two jets collided over Swiss-controlled airspace in southern Germany. The defendants were accused of organizational shortcomings that led to a single air traffic controller being left in charge of the area where the crash occurred on July 1, 2002, and with providing insufficient information to him about technical work in progress that decisively affected the communications and radar systems.

In their May 2004 report, German investigators stated that Skyguide's main control tower radar had been switched off and the main telephone line was down. However, according to the public prosecutor, the trial is unlikely to take place this year. In a parallel development, a German court ruled on July 27 that Germany wrongly subcontracted its airspace control to Skyguide and was partly liable for the

¹⁰⁹The FAA has completed a Safety Management System Standard for aviation product and service providers. It outlines the key attributes of an SMS and establishes SMS requirements, and is calculated to be imposed by the FAAA on organization overseen by the FAA including aircraft operators, aircraft manufacturers and the FAA Air Traffic Organization (ATO) which is air navigation services provider of the United States. See *Safety Management System Concept*, Working Paper presented by the United States to the ICAO DGCA Conference of March 2006, DGCA/06-WP/12, 4/02/06 at 1.

air crash. The ruling was in response to a civil lawsuit filed by the Russian airline company that owned the passenger jet.

The exponential increase in air traffic movements over airspace has overburdened the air navigation system.¹¹⁰ The logical assumption would be that the need of the hour is to find alternate ways of optimal use of air space. This would require some discretion to be given to the pilot to find shortcuts in manoeuvring his aircraft in order to obviate airspace constraints. However, this flexibility is almost non-existence as the present air navigation system, particularly in terms of air traffic control, is based on the “positive control” concept which prescribes that pilots have to generally follow the instructions of the air traffic controller even if there is perfect visibility.¹¹¹ However, as will be discussed later, common law courts, particularly in the United States have not strictly adhered to this overarching concept.

In a world of congested airways, the additional problem of faulty communication between the players involved, particularly the air traffic controller and the technical crew of an aircraft in flight, does not help. NASA B 727 study has indicated that specific language variables are moderately to highly co-related with individual performance, individual error rates and individual communication ratings. During the course of their studies, NASA researchers analyzed causes of jet air transport accidents and incidents between 1968 and 1976 and came up with the conclusion that pilot error was more likely to reflect failures in team communication and coordination than deficiencies in technical proficiency. The percentage of accidents which resulted from faulty communications ranged between 70% and 80% of the total rate.¹¹² There is also the considered view that aeronautical language should be considered as a variable of interest in crew factors since language is a coping mechanism in that it cautions individuals to lessen and manage both causes and effects of stress.¹¹³ Analogically this should apply as well to the air traffic controller who, if well trained in the language of communication would not be exposed to stress at the work place.

There are no international rules governing the liability of the air traffic controller. However, there are various international guidelines that would give individual States both an impetus and direction to enact their own internal laws in this regard.

¹¹⁰The air navigation system comprises the aggregate of organizations, people, infrastructure, equipment, procedures, rules and information used to provide the airspace users with air navigation services including air traffic services. See Schubert (2001), 197–223 at 198.

¹¹¹In the earliest days of aviation, so few aircraft were in the skies that there was little need for ground-based control of aircraft. In Europe, though, aircraft were often flown in different countries, and it soon became apparent that some kind of standard rules were needed. In 1919, the International Commission for Air Navigation (ICAN) was created to develop “General Rules for Air Traffic.” Its rules and procedures were applied in most countries where aircraft operated.

¹¹²Resource Management on the Flight Deck: Proceedings of a NASA/Industry Workshop, G.E. Cooper, M.D. White, J.K. Lauber ed: 1980 (NASA CP-2120), Moffett Field, CA: NASA-Ames Research Center.

¹¹³Sexton and Helmreich (1999) 689–695 at 691.

The Chicago Convention¹¹⁴ contains certain provisions demarcating the responsibility of Contracting States of the International Civil Aviation Organization. Article 28 of the Convention obligates contracting States to provide in their territories airports, radio services, meteorological services and other air navigation facilities to facilitate international air navigation, in accordance with the standards and practices established from time to time pursuant to the Convention¹¹⁵ The “other air navigation facilities” referred to in article 28 of the Chicago Convention include Air Traffic Services, which is a combination of services provided to support the safe and expeditious flow of air traffic.¹¹⁶

ICAO has established Standards and Recommended Practices for licensing of air traffic controllers¹¹⁷ Part of this licensing process recognizes that there are prescribed ICAO language proficiency requirements¹¹⁸ based on a proficiency rating scale identifying Holistic Descriptors. These descriptors in turn require the air traffic controller, as a proficient speaker, to communicate effectively in voice only (telephone/radiotelephone) and in face to face situations; communicate on common, concrete and work related topics with accuracy and clarity; use appropriate communicative strategies to exchange messages and to recognize and resolve misunderstandings in a general and work related context; handle successfully and with relative ease the linguistic challenges presented by a complication or unexpected turn of events that occurs within the context of a routine work situation or communicative task with which the air traffic controller is otherwise familiar; and use a dialect or accent which is intelligible to the aeronautical community.¹¹⁹

“Air traffic service”¹²⁰ is a generic term meaning variously, flight information service, alerting service, air traffic advisory service, and air traffic control service. Air traffic control services comprise three services: *area control service*, which provides air traffic control services for controlled flights¹²¹; *approach control*

¹¹⁴*Supra*, note 1.

¹¹⁵Chicago Convention, *supra*, note 1 in Chap. 1, Article 28 a).

¹¹⁶ICAO has also put into place CNS/ATM (Communications, Navigation, Surveillance/Air Traffic Management) systems, through which communication between air and surface would achieve a new dimension—that of being relayed by aircraft to satellites in space, which would in turn relay messages to ground-control through a Ground Earth Station (GES). The advantages of this system are multifarious. Satellites would, under CNS/ATM systems permit communication not only by speech, but also by digital data link, which can bring significant advantages to the air traffic control system. See generally, Abeyratne (1994) pp. 156–186.

¹¹⁷Annex 1 to the Convention on International Civil Aviation (Personnel Licensing), Ninth Edition, July 2001, Chaps. 1, 1.2, Note 2b)

¹¹⁸*Id.* Appendix 1.

¹¹⁹*Id.* Appendix 1, paragraph 2.

¹²⁰For a detailed account of air traffic services, see Abeyratne (2006) 176–192 at 181–183.

¹²¹A controlled flight is any flight which is subject to an air traffic control clearance.

service, which provides air traffic control services for those parts of controlled flights associated with arrival and departure, and *aerodrome control service*, which relates to the provision of air traffic control services for aerodrome traffic.¹²² An alerting service is provided for all aircraft provided with air traffic control service and, to the extent practicable, to all other aircraft which file a flight plan or aircraft which are known to be in a particular portion of airspace and need such services.¹²³ This service is also provided to any aircraft known to be the subject of unlawful interference.¹²⁴

The provision of air traffic services¹²⁵ is addressed in Annex 11 to the Chicago Convention which provides *in limine* that Contracting States shall determine, in accordance with the provisions of this Annex and for the territories over which they have jurisdiction, those portions of the airspace and those aerodromes where air traffic services will be provided. They shall thereafter arrange for such services to be established and provided in accordance with the provisions of this Annex, except that, by mutual agreement, a State may delegate to another State the responsibility for establishing and providing air traffic services in flight information regions, control areas or control zones extending over the territories of the former.¹²⁶

As for the provision of meteorological services, Annex 3 to the Chicago Convention provides in Standard 2.1.1. that the objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation. This objective shall be achieved by providing operators, flight crew members, air traffic services units, search and rescue services units, airport managements and others concerned with the conduct or

¹²² Annex 11 to the Chicago Convention (Air Traffic Services), Thirteenth Edition, July 2001, Standard 2.3.1. The need for the provision of air traffic control services is determined by the types of air traffic involved; the density of air traffic; meteorological conditions; and such other factors as may be relevant. See Annex 11, id. Standard 2.4.1.

¹²³ Annex 11, Standard 5.1.1.

¹²⁴ *Ibid.*

¹²⁵ According to Paragraph 2.2 of the Annex, The objectives of the air traffic services shall be to: (a) prevent collisions between aircraft; (b) prevent collisions between aircraft on the manoeuvring area and obstructions on that area; (c) expedite and maintain an orderly flow of air traffic; (d) provide advice and information useful for the safe and efficient conduct of flights; (e) notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

¹²⁶ Standard 2.1.1. It is also provided in the Annex that if one State delegates to another State the responsibility for the provision of air traffic services over its territory, it does so without derogation of its national sovereignty. Similarly, the providing State's responsibility is limited to technical and operational considerations and does not extend beyond those pertaining to the safety and expedition of aircraft using the concerned airspace. Furthermore, the providing State in providing air traffic services within the territory of the delegating State will do so in accordance with the requirements of the latter which is expected to establish such facilities and services for the use of the providing State as are jointly agreed to be necessary. It is further expected that the delegating State would not withdraw or modify such facilities and services without prior consultation with the providing State. Both the delegating and providing States may terminate the agreement between them at any time.

development of international air navigation, with the meteorological information necessary for the performance of their respective functions.¹²⁷ Annex 11 to the Chicago Convention requires that air traffic services units shall be provided with up to date information on existing and forecast meteorological conditions as necessary for the performance of their respective functions.¹²⁸ The information must be provided in such a manner and form so as to require a minimum of interpretation on the part of air traffic services personnel and with a frequency that satisfies the requirements of the air traffic services units concerned.¹²⁹ It is also recommended that meteorological offices should be so situated as to facilitate personal consultation between meteorological personnel and personnel of units providing air traffic services.¹³⁰

Technical Standards and Recommended Practices for aeronautical telecommunications are contained in Annex 10 to the Chicago Convention (Aeronautical Telecommunications) which includes *inter alia*, general provisions for radio navigation aids, Global Navigation Satellite System (GNSS), specifications for Instrument Landing Systems (ILS) and other navigational aids. The basic principle underlying the use of these navigational aids is found in ICAO's Procedures for Air Navigation Services which requires States to ensure that the level of air traffic services and communications, navigation and surveillance, as well as air traffic procedures applicable to the airspace or aerodrome concerned, are appropriate services.¹³¹

Liability issues of an air traffic controller are intrinsically linked to the controller's relationship with the pilot with whom the former communicates. This relationship, between the controller and the pilot, has been called the "continuum of dependence".¹³² It has been generally recognized that the fundamental principle of liability is based on whether the pilot was flying under Visual Flight Rules (VFR) which gives the pilot absolute freedom to manoeuvre his aircraft, or Instrument Flight Rules (IFR) when visibility could be nil. In the former instance, the air traffic controller would not be generally held liable for a mid air collision as the pilot has full visibility. This is based on the pilot's responsibility to "see and be seen".¹³³

¹²⁷ Annex 3, in Standard 2.1.3 calls for each Contracting State to determine the meteorological service which it will provide to meet the needs of international air navigation. For a more detailed account of meteorological services, see Ruwantissa Abeyratne, *supra*, note 9 in Chap. 1, at 180–181.

¹²⁸ Annex 11, *supra*, note 10 in Chap. 1, Standard 7.1.1.1.

¹²⁹ *Ibid.*

¹³⁰ Annex 11 Recommendation 7.1.1.2.

¹³¹ Procedures for Air Navigation Services, Air Traffic Management, Doc. 4444 ATM/501, paragraph 2.1.1. These procedures and the *Regional Supplementary Procedures—Rules of the Air and Air Traffic Services*, contained in Doc 7030, admit of the establishment of airspace, units and services necessary to promote a safe, orderly and expeditious flow of air traffic. A clear distinction is made between air traffic control service, flight information service and alerting service. Its purpose, together with Annex 2, is to ensure that flying on international air routes is carried out under uniform conditions designed to improve the safety and efficiency of air operation.

¹³² See the Expanding Liability of Air Traffic Controllers, 39 *J.Air. L. and Com.* (1973) 599 at 622.

¹³³ *Air Services Inc. v. USA*, 18 CCH Avi 17,556-17564 (D. Miss.1983).

In the latter case, where the pilot was flying under IFR and had no visibility he would have been dependant on the communications of the air traffic controller.

One of the issues that arise in litigation pertaining to the liability of the air traffic controller is the weightage expected to given to the Air Traffic Control Procedures Manual and the extent to which the pilot is required to adhere to instructions therein. In the 1975 US case of *Baker v. United States*, the Court held that the manual cannot be considered as “the Bible” of air traffic control or a set of regulations having the force of law. Earlier, in a decision handed down by the Fifth Circuit Court, the court held that the air traffic controller’s duties are not hampered or limited within the narrow limits of the Manual.¹³⁴ This does not mean, however, that the air traffic controller has untrammelled discretion to override his controller’s manual. In the 1974 case of *Todd v. United States*,¹³⁵ the court held that the controller was negligent in allocating a cruise clearance height to the pilot which was lower than the altitude recommended in the Manual for mountainous terrain, particularly in an instance of adverse weather. The case of *Rudelson v. United States*,¹³⁶ decided in 1979 is quite significant, in that the court held an air traffic controller’s duties should not be circumscribed to tasks described in the FAA Manuals and that the controller has the discretion to go beyond the scope and content of the manual if the safety of passengers and crew was at stake.

There is no doubt that liability of the air traffic controller is an expanding concept and the continuum of dependence is no longer an absolute concept. Courts are showing a greater willingness to ascribe to the controller liability for negligent performance of duty, irrespective of whether such duty is incorporated or inscribed in the controller’s manual or not.

With the introduction in 1994 of the concept of free flight It became evident that eventually pilots might be able to use onboard instruments and electronics to maintain a safe distance between planes and to reduce their reliance on ground controllers. Full implementation of this concept would involve technology that made use of the Global Positioning System to help track the position of aircraft. In 1998, the Federal Aviation Administration of the US (FAA) and industry began applying some of the early capabilities developed by the Free Flight program.

Free flight is essentially a US practice which has spread to many parts of the world as a practical solution for the implementation of the ICAO CNS/ATM concept. It is a safe and efficient flight operating capability under IFR in which

¹³⁴*Hartz v. United States*, 387 F.2d. 870 at 873. A caveat must be added to this finding as it was an *obiter dictum*, since the controller’s failure to warn the pilot of wake turbulence was in contravention of the applicable aviation regulations of the United States.

¹³⁵384 F.Supp. 1284 at 1292.

¹³⁶602 F.2d. 1326 (9th Cir. 1979) There is also the more traditional view, enunciated by the First Circuit that the basic premise was that responsibility for ensuring the safety of passengers and crew in flight was defined in the *Air Traffic Control Procedures Manual*. See *Delta Airlines v. United States*, 561 F.2d. 381 at 389*.l*.

the operators have the freedom to select a path and speed and real time. Air traffic restrictions are only imposed to ensure separation to preclude exceeding airport capacity, to prevent unauthorized flights through special use air space and to ensure safety of flight. Restrictions are limited in extent and duration to correct the identified problem. Any activity which removes restriction represents a move toward the flight.¹³⁷ There is a “Free Routing system being developed in Europe which is similar to free flight except that the former will be subject to ATC clearance and the latter will not be”. Both systems could plan the routes and altitudes of such flights. In both instances, the air traffic controller can and must intervene if there is a potentially dangerous situation arising as a result of a free flight. Therefore The controller is not always exempt from liability merely because there is interaction between the controller and the pilot.

The liability of the air traffic controller in free flight situations where accidents have occurred has been subject to some discussion. One commentator is of the view that the respective responsibilities and liabilities of pilots and controllers for most accidents should not be altered by the free flight system, but that in air crash situations involving free flight where air traffic control is a factor, it is up to the courts to clarify the rules of liability to ensure safety under the new system.¹³⁸ Another states that the final authority of the pilot in command will prevail.¹³⁹

There is also the established principle that the negligence of the pilot would not necessarily exonerate the air traffic controller. In the 1987 case of *Rodriguez v. the United States*¹⁴⁰ the court as of the view that the notion that a pilot's negligence in performing his duties must, as a matter of law, free the air traffic controller from liability had already been rejected.¹⁴¹ The question arises as to whether both the pilot and the controller are liable if both of them are at fault. This principle of “shared liability” is common at tort law. However, the difficulty would be in apportioning damages between the pilot and the air traffic controller. Here the principle could be that the plaintiff's recovery is limited to the proportion of damages the defendant's negligence proximately caused.¹⁴² The Court went on to say in the *Rodriguez* case that although it was recognized that the pilot bears full authority for aircraft operation and is held to the highest degree of care, air traffic controllers could be held liable if negligence on the part of such person has a causal nexus or relationship to the occurrence of the accident.¹⁴³

The above notwithstanding, the fundamental principle that the aircraft commander has final authority over the flight still holds good. However, this principle is

¹³⁷*Report of the RTCA Board of Directors' Select Committee on Free Flight*, RTCA Inc: Washington DC, 1995 at 3.

¹³⁸Mc Chesney Goodman and Davis (1997) 656 at 670.

¹³⁹Francis Schubert, *supra*, at 218.

¹⁴⁰823 F.2d735 (3rd Cir 1987).

¹⁴¹*Id.* 745.

¹⁴²*Worthington v. United States* 221 F.2d. 62 (11th Cir. 1994) at 404.

¹⁴³*Supra*, note 140 in this chapter at 746.

conditional upon the fact that air traffic control clearances and directives are binding on flight crews, and pilots are required to comply.¹⁴⁴ If an air traffic control clearance is not satisfactory for a pilot, he may request and receive an amended clearance. There is a consistent *cursus curiae* that establishes the principle that air traffic control services do not substitute the pilot's substantive duties and that once a pilot has been given clearance he remains responsible for the movement of his aircraft.¹⁴⁵ In this respect, although the air traffic controller remains responsible and accountable for his instructions to the pilot, the pilot should not blindly follow such instructions, particularly if the pilot is not convinced that the instructions received should be followed without question.¹⁴⁶

Air traffic controllers cannot shift liability to the State on the basis of State responsibility to provide air traffic services, which is a responsibility recognized by the Chicago Convention. A case in point, was in *Eastern Airlines v. Union Trust Co.*¹⁴⁷ which established the rule that air traffic controllers had no discretion to be negligent in their work and that they could not shelter themselves behind the fact that they worked for an instrumentality of State in matters pertaining to their individual liability which clearly established liability criteria regarding the provision of air navigation services in the United States.

Communication is vital to the modern world. In this sense miscommunication in human interaction is a critical factor. A misrepresentation in the law of torts is actionable at negligence¹⁴⁸ and an aeronautical miscommunication, negligently delivered could be construed as gross negligence. The operative criterion would be that the aircrew would place reliance upon communications received from the air traffic control centre. In the 1997 case of *Hercules Management Ltd. v. Ernst & Young*¹⁴⁹ the court de-emphasized the language of special relationship and the importance of an assumption of responsibility and stressed the importance of the concept of foreseeable and reasonable reliance by the plaintiff.

¹⁴⁴ICAO Doc 4444, *supra*, note 24 in Chap. 1, Section 10.1.4.

¹⁴⁵In *Pan American v. Port Authority*, the court held that regardless of assistance provided from the ground, flight crew members have a continuing responsibility and duty to be aware of dangers which they can perceive with their own eyes. 787 F.Supp. 312 (E.D.N.Y.1992) at 318.

¹⁴⁶*Hartz v. United States* 249 F.Supp 119 (D. Ga. 1965) at 125. The controller's duty to warn does not relieve the pilot's primary responsibility for the safe operation of the aircraft, and the pilot has a continuing duty to be aware of the dangers discernible from the pilot's visual and instrument observations. See. *First of America-Bank Central v. U.S.*, 639 F. Supp. 446 (W.D. Mich. 1986) at 455.

¹⁴⁷221.F.2d.62 (D.C. Cir.) Revised 350 U.S. 907 (1955), modified 350 U.S. 962 (1956).

¹⁴⁸*Hedley Byrne & Co. v. Heller and Partners*, [1964] A.C. 465 (H.L.).

¹⁴⁹[1997] 2.S.C.R. 165.

2.8 Satellite Imagery

On 3 February 1998, a U.S. Marine EA-6B Prowler Jet conducting a low-altitude training mission near Cavalese, Italy, hit a cable supporting a gondola transportation system being operated across a wide valley. The impact of the jet on the cable severed it, immediately cutting off support for the gondola which plummeted to the ground nearly 600 feet. The accident killed 20 people.

The only manner in which a pre trial presentation could show the jury exactly what occurred during the accident was by recreating the incident. The Italian Government absolutely refused the defence attorneys, who had obtained a jet to recreate a flight path in the same valley, in order to recreate the incident. The only viable alternative available to the defence attorneys was to recreate the flight path with computer-based simulation, which was offered by a firm called Visual Forensics. Although such recreation through digital technology was possible using a helicopter-based global positioning system through a recording of a low speed flight through the valley followed by a digital recalibration of the film simulating the jet's air speed of 600 mph, by the time Visual Forensics were ready for the digital reconstruction, snow and ground conditions had been rendered significantly different from the photographic record of the accident scene.

Another debilitating factor was that no one was able to map out with precision the exact flight path during the critical last phase of the jet's approach. The jet's black box was not sophisticated enough to provide spatial coordinates to pinpoint the aircraft's precise altitude and trajectory.

The entire accident, to the most precise detail, could have been captured in earth photos taken from space platforms which now reveal precise and sharp spatial, temporal and spectral information about happenings on earth. This is accomplished by satellites circling the earth from 400 miles in space at 16,000 miles per hour and having the capacity to transmit data to the ground at high speed rates. Assisted by the global positioning system (GPS), these satellites are able to determine their orbital position in a precise and sharp way which permits them to position with high accuracy ground features for mapping and other applications within a few meters. Additionally, high-resolution space cameras which have the capability of multi-spectral (blue, green, red and near infra-red) imagery, have the capacity and ability to identify objects positioned on the ground which have hitherto been invisible to the human eye. This incredibly sophisticated technology makes detection and identification of objects as small as one meter now possible. The ultimate result could be that satellite imagery could not only be invaluable for agricultural, environmental, land use, hydrocarbon exploration and disaster assessment but it could also be an innovative evidentiary tool for litigators.

The Commercial availability and capability of production of higher resolution spaceborne imagery is now establishing space imagery as a compelling tool in litigation. Therefore, a legal community poised to enter the frontiers of space age technology will find in space imagery cogent and clear evidence analogous to DNA

evidence that is now being used in the forensic determination of bio medical identification.

Satellite imagery involves a process which uses cameras or sensor systems usually mounted on an orbiting satellite that capture light reflected from the earth's surface. The fundamental principle of this imagery process is that natural and man-made materials absorb and reflect varying quantities of light in different wavelengths and, through this absorption and reflection process, energy (light) enables satellite sensors to collect data by interacting with objects on the surface of the earth such as plants, soils and buildings in a way that makes possible the extraction of such data and information. Such information is absorbed by the camera/sensor system on the orbiting satellite and transmitted back to earth in a digital format and transformed or converted to images that are capable of being interpreted by sophisticated image processing software. This process makes satellite imagery ideally applicable to the requirement for detail pertaining to large area coverage such as regional cartography, environmental assessment, infrastructure planning and agricultural monitoring.¹⁵⁰

A significant development in recent satellite imagery through spatial information is the launching of the highest resolution commercial remote sensing satellite with an on-board digital camera having the capability of producing one-meter or better resolution at nadir to focus on the lowest point in the panchromatic, full spectrum mode and four-meter resolution imagery in the red, green, blue and near infra-red (NIR) bands. Such a one-meter resolution will enable the user to distinguish between objects which are one meter in size on the ground if they have distinguishable physical and visual characteristics. Easily detectable under this spatial recognition system are stripes in parking lots, swimming pools, cars, trucks, boats, tennis courts, landscape features, all within their surroundings and environs.

Satellite imagery is not restricted to photography. New sophisticated electronic sensors enable even more powerful imagery that mere photos—digital data that can be analysed, processed and interpreted on computers—computer analysis in digital format admits of possibilities for data to be used in multifarious ways using differences in spectral responses from ground features. The usefulness of this process is emphasized and highlighted when satellite imagery is used in conjunction with the geographic information system (GIS) and the global positioning system (GPS), which together can construct a complete model of an area.

The dynamic applications of a spatial satellite imaging system will be invaluable to attorneys, insurers and risk managers in acquiring data and information on natural and man-made disasters. The Chernobyl Nuclear Plant disaster and the Exxon Valdez oil spill in Alaska are two such incidents which were tracked and recorded for use by television and major newspaper media. The most significant area of contribution is in prediction or preparation where, a satellite just overhead of a disaster area can identify through its imagery an impending disaster or occurrence.

¹⁵⁰See KPMG. Marwick (1998) at p.5.

2.9 Space Law Applications

The essential activity which forms a basis for satellite imagery is remote sensing. Remote sensing is the use of satellite technology in obtaining pictures of a territory on earth. This activity is covered by the Outer Space Treaty of 1967¹⁵¹ which came into force on 10 October 1967. This treaty obliges signatory States to inform the United Nations Secretary General, the public and the international scientific community of the “nature, conduct, locations and results” of space activities.¹⁵² The Space Treaty also imposes international responsibility upon signatory States regarding private sector activities conducted within their territories resulting in activities in space by such private sector entities.¹⁵³ This, notwithstanding the collection of satellite images through remote sensing or other technology, is not prohibited under international law since no international treaty contains any specific provision precluding the satellite imaging of objects or places on earth. Moreover, there is no known definition of remote sensing which is essentially the science or art of obtaining information about an object, area or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area or phenomenon under investigation.¹⁵⁴

At the incipient stage of remote sensing applications, the deployment of remote sensing satellites were for military strategic purposes, remote sensing can now be used to further scientific and discovery objectives. Commercial pursuit of remote sensing for scientific and discovery objectives, called civil remote sensing, is usually conducted by agencies, organizations and individuals who exploit remote sensing systems and data to promote the general welfare and provide for the public good.¹⁵⁵ Commercial remote sensing may be impelled by the motive to make profit, either through procurement or sale of data obtained through sensing.¹⁵⁶

A legal regime applying a codification of customary legal principles calculated to bind nations and private enterprises through nations was set up in 1987 by the United Nations, when it adopted Resolution 41/65.¹⁵⁷ This resolution was a carefully thought out one, which took the United States and other nations involved 13 years to draft, beginning 1974. The remote sensing principles, as established by Resolution A41/65 admit of access and distribution of data and information generated by remote sensing systems. This activity has its genesis in the Outer Space

¹⁵¹Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, the Moon and other Celestial Bodies, 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T. 2410, T.I.A.S. No.6347, 6.I.L.M. 386 (entered into force on 10 October 1967).

¹⁵²*Id.* Article XI.

¹⁵³*Id.* Article VI.

¹⁵⁴See Lillesand and Kiefer (1979) at p. 1.

¹⁵⁵Johnson et al (1993) at p. 2.

¹⁵⁶*Id.* at p. 2 and 3.

¹⁵⁷United Nations Principles Relating to Remote Sensing of the Earth from Space, G.A. Res 41/65 (XLII), UN GOAR, 29 Sess. 95th Plen. Mtg., UN Doc A/RES/41/65 (1987) ann. at p. 2.

Treaty of 1967 which stipulates that the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit of and in the interest of all countries, on the basis of equality. Article IX of the Treaty embodies a principle of cooperation between nations and provides that the exploration and use of outer space shall be carried out by States parties in a spirit of cooperation and mutual assistance and with due regard to the corresponding interests of all other parties to the Treaty.

2.10 Outer Space Treaty Law

The legal and philosophical bases of space law form the antithesis of those applicable to air law in that space law is grounded on the principle that outer space is the common heritage of mankind and that no State or individual can therefore claim *rights in rem* to any portion of outer space. Air law, on the other hand, is firmly entrenched in the principle of sovereignty of States, so that a State may lay claims to rights over the airspace above its territory.¹⁵⁸ This essentially means that while the implementation of air law is heavily influenced by municipal law, space law is solely grounded on legal principles binding on the community of nations. Principles of public international law therefore play an exclusive part in the application of space law principles.

In terms of jurisprudence, space law represents the Idealist school which supports community interest over national interest, while air law represents the Realist school which advocates that national interests are pre-eminent considerations for all purposes. The Idealist school believes that individual interests should best be served by collective intercourse and is best illustrated by the view of Lauterpacht who was of the view:

a community may be said to be the body of a number of individuals more or less bound together through such common interests as to create a manifold intercourse between single individuals.¹⁵⁹

Legal principles relating to the international community necessarily emanate collectively from that community as a body of rules which require the consent of the community. An examination of the philosophy of space law therefore essentially requires an examination of the nature of public international law itself. This paper will discuss the philosophical basis of the common heritage principle of space law, through an evaluation of public international law and its relation to each other.

Space law is one of the most recent additions to international jurisprudence. That it pertains to one of the most highly technology intensive activities is an incontrovertible fact and was made evident with the successful launch of the Space Shuttle

¹⁵⁸See Abeyratne (1992) at pp. 135–144.

¹⁵⁹Lauterpacht (1955) at p. 11.

“Columbia” on 12 April 1981, where the world entered a new age of space exploitation, leaving behind the period of space exploration which seemingly started in 1957 with the launch of the Russian “Sputnik”. Understandably, the world was elated in 1981 with the phenomenon of the space shuttle to the extent that a space technologist at NASA predicted

I am convinced that by 1990 people will be going on the shuttle routinely - as an aircraft. . .¹⁶⁰

Of course, it has not happened quite that way yet. One must concede, however, that the expert’s prophecy was at least partially correct in that by 1990 we were actively involved with the concept of the aerospace plane, of which the space shuttle was a precursor.

The emergent philosophical problem posed by space law, in its offer to mankind of a new dimension of transportation law and property law, was succinctly subsumed by Professor Bockstiegel in 1983:

(Space law) . . . is the newest main field of international law . . . and it depends more than most other fields on probable and fast technical progress . . .¹⁶¹ It is obvious that the application of space technology will lead to the growing commercialization of space activities, since such service—at least in the long run—can only be maintained and expanded, if it is self financing . . .¹⁶²

The blending of high technology with a new forensic code of conduct on hitherto uncharted territory has brought to bear the need for the community of nations to formulate a sustainable legal theory that would ensure non-exploitation of space resources by individuals or States, while at the same time incorporating the element of responsibility and liability for individual and State conduct in outer space.

As mentioned earlier, the basic principle of space law is the “common interest” (or common heritage) principle which emerged as a result of the first specific Resolution on space law of the United Nations General Assembly in 1958.¹⁶³ The “common interest” principle has since been incorporated in subsequent multilateral treaties, particularly the *Outer Space Treaty* of 1967,¹⁶⁴ Article 1(1) which provides:

[T]he exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

This provision, which binds signatory States, is seemingly a departure from the traditional “national interest” approach of international air law and has represented

¹⁶⁰See *National Geographic*, March 1981, at p. 317.

¹⁶¹Böckstiegel (1983) at p. 305.

¹⁶²*Id.* At p. 314.

¹⁶³UNGA Resolution 1348 (XII), 13 December 1958.

¹⁶⁴*Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, opened for Signature at Moscow, London and Washington on 27 January 1967, 610 UNTS 205.

a moral obligation to some,¹⁶⁵ while to others the provision has represented a *jus cogens* or mandatory legal principle.¹⁶⁶

If it can be accepted that a principle of *jus cogens* creates obligations *erga omnes*, it becomes an undeniable fact that Article 1(1) of the *Outer Space Treaty* could be considered a peremptory norm or *jus cogens*, since it generates obligations towards the international community as a whole. Christol observes:

Article 1 Paragraph 1 of the Space Treaty, with its adoption of the common benefits and interests guarantee, can be supported (as an example of peremptory norms) because the provisions conform to moral law in the sense that all humankind is to benefit unconditionally, and because the terms are consistent with the spirit and the purposes identified in Article 1 Pars. 1 through 3 and Article 2 Pars 1 through 4 of the UN Charter, as well as with complimentary international agreements of lesser authority. To the extent that the terms are beneficial to individuals, the larger community, and States, and when the provisions are found on the fundamental moral principles contained in the foregoing paragraphs of Article 1 and 2 of the UN Charter, such basic principles qualify for the status of peremptory norms of general international law.¹⁶⁷

The effect of this observation is that the content and nature of Article 1(1) confirms that it is a *jus cogens*. There is seemingly no reason why the international community should not give such recognition to the “common interest” principle as enshrined in Article 1(1) which is aimed at the protection of the interests of the international community as a whole. *A fortiori*, on the same basis, Article IX of the *Outer Space Treaty* which requires that States should avoid harmful contamination and adverse change in the environment of the Earth which may result from the exploration of outer space would incontrovertibly be considered *jus cogens*.

Article VI of the *Outer Space Treaty* provides in part that State Parties to the Treaty shall bear international responsibility for national activities in outer space, whether such activities are carried out by governmental agencies or non-governmental agencies. This provision clearly introduces the notion of strict liability *erga omnes* to the application of the *jus cogens* principle relating to outer space activities of States and could be considered applicable in instances where States hold out to the international community as providers of technology achieved and used by them in outer space, which is used for purposes of air navigation. Article VI further requires that the activities of non-governmental entities in outer space shall require authorization and continuing supervision by the appropriate State Party to the Treaty, thus ensuring that the State whose nationality the entity bears would be vicariously answerable for the activities of that organization, thereby imputing liability to the State concerned.

Article VII makes a State Party internationally liable to another State Party for damage caused by a space object launched by that State.

¹⁶⁵Goedhuis (1976) 195 at 198–199. Also Cheng (1968), 532 at 578.

¹⁶⁶Markoff (1976) at 3. Also, Matte (1980) 1 119 at 147. R.S. Jakhu, *Developing Countries and the Fundamental Principles of International Space Law* (Girardot et al. ed.), 351. Christol (1983) at 1.

¹⁶⁷Christol, *supra*, note 98 in this chapter at 6.

The *Registration Convention* of 1974¹⁶⁸ in Article II(1) requires a launching State of a space object that is launched into earth orbit or beyond, to register such space object by means of an entry in an appropriate registry which it shall maintain and inform the Secretary General of the United Nations of the establishment of such a registry. This provision ensures that the international community is kept aware of which State is responsible for which space object and enables the United Nations to observe outer space activities of States. Article VI of the Convention makes it an obligation of all State Parties, including those that possess space monitoring and tracking facilities, to render assistance in identifying a space object which causes damage to other space objects or persons. Justice Manfred Lachs analyses these provisions of the *Registration Convention* to mean that the State of registry and the location of the space object would govern jurisdictional issues arising out of the legal status of space objects.¹⁶⁹ On the issue of joint launching of space objects, Justice Lachs observes:

No difficulties arise whenever a State launches its own object from its own territory; the same applies to objects owned or launched by non-governmental agencies registered in that State. However, in cases of joint launching, agreement between the parties is required as to which of them is to be deemed the State of Registry. A similar agreement is also necessary when a launching is carried out by an international organization.¹⁷⁰

The above provision ensures the identification of parties responsible for specific activities in outer space and thereby makes it easier to impose liability for environmental damage caused.

The *Outer Space Treaty*,¹⁷¹ while expostulating the fundamental principle in its Article 1 that the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, explicitly imposes in Article VII international liability and responsibility on each State Party to the Treaty, for damage caused to another State Party or to its populace (whether national or juridical) by the launch or procurement of launch of an object into outer space. In its preceding provisions the Treaty imposes international responsibility on States Parties for national activities conducted in outer space. The Treaty also requires its States Parties to be guided by the principle of co-operation and mutual assistance in the conduct of all their activities in outer space.¹⁷² This overall principle is further elucidated in the same provision:

¹⁶⁸*Convention on Registration of Objects Launched into Outer Space*, Adopted by the General Assembly of the United Nations, New York, 12 November 1974, 1023 UNTS 15.

¹⁶⁹Lachs (1972) at 70.

¹⁷⁰*Ibid.*

¹⁷¹*Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, opened for signature at Moscow, London and Washington, 27 January 1967. *Supra*, note 2 in Chap. 1.

¹⁷²*Id.* Article IX.

States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extra terrestrial matter.¹⁷³

The *Moon Agreement*¹⁷⁴ of 1979 provides that in the exploration and use of the moon, States Parties shall take measures *inter alia* to avoid harmfully affecting the environment of the earth through the introduction of extra terrestrial matter or otherwise.¹⁷⁵

The *Liability Convention*¹⁷⁶ contains a provision which lays down the legal remedy in instances of damage caused by Space objects. Article II provides:

A launching State shall be absolutely liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft in flight.¹⁷⁷

thereby imposing a regime of absolute liability on the State that launches space objects such as satellites, which provide technology and communication that is used for air navigational purposes. Although admittedly, both the *Outer Space Treaty* and the *Liability Convention* do not explicitly provide for damage caused by technology and communication provided by space objects, culpability arising from the “common interest” principle and liability provisions of the two conventions can be imputed to States under these Conventions.

Gorove states that in the field of international space law, two clearly connected terms have been used: liability and responsibility.¹⁷⁸ Although “responsibility” has not been cohesively interpreted in any legal treaty relating to outer space, “liability” occurs in the *Liability Convention* and is sufficiently clear therein. This, however, does not mean that State responsibility is not relevant to the obligations of States law as, in international relations, the invasion of a right or other legal interest of one subject of the law by another inevitably creates legal responsibility. Professor Brownlie observes:

[T]oday, one can regard responsibility as a general principle of international law, a concomitant of substantive rules and of the supposition that acts and omissions may be categorized as illegal by reference to the rules establishing rights and duties. Shortly, the law of responsibility is concerned with the incidence and consequence of illegal acts, and particularly the payment of compensation for loss caused.¹⁷⁹

¹⁷³*Ibid.*

¹⁷⁴Agreement Governing the Activities of States on the Moon and other Celestial Bodies, signed on 5 December 1979, UN Doc A/RES/34/68 of 5/12/1979.

¹⁷⁵*Id.* Article 7.

¹⁷⁶*Convention on International Liability for Damage Caused by Space Objects*, March 29 1972, 24 U.S.T 2389, T.I.A.S No. 7762.

¹⁷⁷Article II(a) defines damage as including loss of life, personal injury or other impairment of health; or loss or damage to property of States or of persons natural or juridical, or property of international governmental organizations.

¹⁷⁸Gorove (1983) at 373.

¹⁷⁹Brownlie (1990) at 433.

International responsibility relates both to breaches of treaty provisions and other breaches of legal duty. In the *Spanish Zone of Morocco Claims* case, Justice Huber observed:

[R]esponsibility is the necessary corollary of a right. All rights of an international character involve international responsibility. If the obligation in question is not met, responsibility entails the duty to make reparation.¹⁸⁰

There is also explicit recognition that principles of international law apply to space law. The General Assembly of the United Nations in 1961 adopted the view that international law, including the Charter of the United Nations, applies to outer space and celestial bodies.¹⁸¹ It is also now recognized as a principle of international law that the breach of a duty involves an obligation to make reparation appropriately and adequately. This reparation is regarded as the indispensable complement of a failure to apply a convention and is applied as an inarticulate premise that need not be stated in the breached convention itself.¹⁸² The ICJ affirmed this principle in 1949 in the *Corfu Channel Case*¹⁸³ by holding that Albania was responsible under international law to pay compensation to the United Kingdom for not warning that Albania had laid mines in Albanian waters which caused explosions, damaging ships belonging to the United Kingdom. Since the treaty law provisions of liability and the general principles of international law as discussed complement each other in endorsing the liability of States to compensate for damage caused by space objects, there is no contention as to whether in the use of nuclear power sources in outer space, damage caused by the uses of space objects or use thereof would not go uncompensated. The rationale for the award of compensation is explicitly included in Article XII of the *Liability Convention* which requires that the person aggrieved or injured should be restored (by the award of compensation to him) to the condition in which he would have been if the damage had not occurred. Furthermore, under the principles of international law, moral damages based on pain, suffering and humiliation, as well as on other considerations, are considered recoverable.¹⁸⁴

As discussed, both treaty law and general principles of international law on the subject of space law make the two elements of liability and responsibility a means to an end—that of awarding compensation to an aggrieved State or other subject under the law. Therefore, in view of the many legal issues that may arise, the primary purpose of a regulatory body which sets standards on State involvement in issues concerning the use of space technology would be to carefully consider the subtleties of responsibility and liability and explore their consequences on States

¹⁸⁰1925 RIAA ii 615 at 641.

¹⁸¹Resolution 1721 (XVI) adopted on 20 December 1961. See also Article 3 of the *Outer Space Treaty*.

¹⁸²*In Re. Chorzow Factory (Jurisdiction) Case, (1927) PCIJ, Ser. A, no. 9* at 21.

¹⁸³*ICJ Reports (1949)*, 4 at 23.

¹⁸⁴Christol (1991) at 231.

and others involved as they apply to the overall concept of the status of a State as a user of space technology which may cause harm or injury to the latter.

The most significant contribution of satellite images as evidence is through their detail and their availability in close proximity to an accident or other litigation causing event. Satellite images have been used in the United States from 1974. In *United States v. Reserve Mining*¹⁸⁵ satellite images were admitted into evidence to illustrate the dispersion of taconite tailings by a mining company. In 1988, the Courts, while rejecting the evidence of an expert witness that flooding had increased in a particular area, accepted satellite imagery on the same point as evidence.¹⁸⁶

There are two ways in which jurisdictions in the United States accept satellite images as evidence: as demonstrative evidence; and as scientific evidence. In the first instance, those images are largely recognized as evidence that would sum up or calculate voluminous evidence which cannot conveniently be examined in Court.¹⁸⁷ This judicial approach accommodates space imaging's CARTERRA product which generates maps, reports and three dimensional images from geographic information systems (GIS) and remote sensing tools. The CARTERRA product reduces complex, voluminous data into scientifically accurate and sharply illustrative charts. The principle of accepting illustrative charts as evidence that could be more illustrative and enlightening to a jury was recognized in 1965 in the case of *McDaniel v. U.S.*¹⁸⁸ In the 1984 case of *People v. McHugh*¹⁸⁹ graphic computer presentations were accepted by the Court as being a chart or diagram acceptable in evidence. The *McHugh* case was the first instance where a graphic computer presentation was admitted as evidence in a criminal trial and the Court recognized in this instance that computers are simply mechanical tools and when the outcome of a computer analysis is useful and clear it should be accepted, while any computer output which was confusing should be rejected.

Satellite images are also considered in some instances as scientific evidence when they corroborate or prove an opinion given by an expert or when they provide sufficient data for an expert to reasonably base an opinion or conclusion.¹⁹⁰ However, in the 1993 case of *Daubert v. Merrell Dow Pharm., Inc.*¹⁹¹ the trial

¹⁸⁵380 F. Supp. 11 (D-Minn. 1974).

¹⁸⁶*Gasser v. United States* 14 Cl.Ct.476 (1988).

¹⁸⁷Federal Regulation 1006 provides: "the contents or voluminous writings, recordings or photographs which cannot conveniently be examined by Court may be presented in the form of a chart, summary or calculation." See also Sharon H. Hodge, Satellite Data and Environmental Law; Technology Ripe for Litigation Application, 14 *Pace Env. L.Rev.*691 at 718 (1997).

¹⁸⁸343 F. 2d. 785 (5th Circ. 1965).

¹⁸⁹124 Misc. 2d. 559, at 560 also 476 N.Y.S. 2d. 721, at 722.

¹⁹⁰Federal Evidence Rule 702 provides that: "if scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise".

¹⁹¹509 U.S. 579 at 590.

Court emphasized that such evidence will be admitted with caution, where the Court would act as “gate keeper” and will ensure that evidence so submitted will be not only relevant but also reliable.¹⁹² The Court in the *Daubert* case added that the admissibility of remote sensing information must be examined within the context of the general requirements for admission of scientific evidence and expert opinion. A year later, the Tenth Circuit in *Robinson v. Missouri Pacific R.R.Co.*¹⁹³ interpreted the *Daubert* principle to be flexible, when it decided to admit a computer animation which demonstrated an expert’s opinion relating to the cause of a railroad accident. According to the Appellate Court in *Robinson*, any scientific evidence should have as its overarching objection the scientific validity of evidence presented and must establish the evidentiary reliability and relevance of the principles that underlie a proposed submission.

Opponents of the use of satellite imagery may argue that such imagery is not admissible on the ground and that they constitute hearsay evidence. This can be obviated by conjoining satellite imagery with an expert’s testimony since remote sensing data is transmitted to earth in digital format prior to being converted to an interpretable picture, requiring an individual to enter data to produce a recognizable satellite image. In *United States v. Elkins*¹⁹⁴ it was held that expert testimony may well include hearsay evidence if the basis of the testimony is relied upon to a reasonable degree by members of the expert’s profession.

In order to admit satellite imagery at a trial, litigators have to qualify an expert to introduce and explain such imagery; authenticate and prove the contents of data carried in the images; and establish that proper and accepted digital imagery processing techniques were employed. The last two criteria are stringently relied upon by the Courts which recognize that satellite imagery can be manipulated just as photographs, video tapes and computer simulations which generate visual evidence can.¹⁹⁵ In addition, the expert must also establish to Court that the computer used in processing the satellite images was functioning properly; the scientific analysis used was sufficiently accurate and comprehensive; and the data were relevant and reliable.

The satellite imagery submitted as evidence must also be authenticated, i.e., the person bringing forth the evidence must prove that it is what it purports to be.¹⁹⁶ Establishment of this fact is contingent upon the proper handling of data by the satellite data collection company and the transporter of the data and use of an approved scientific method by the expert who interprets the data.¹⁹⁷ Also, a litigator

¹⁹²See also, *Kumho Tire Co. v. Carmichael*, U.S., 119 S.ct.1167 at 1170 (1999) and *Pittston Co. v. Allianz Ins. Co.* 805 F.Supp. 1279, at 1370 (D.N.J. 1995).

¹⁹³16 F. 3d. 1083 (10th Circ. 1994).

¹⁹⁴885 F. 2d. 775 (11th Circ. 1989).

¹⁹⁵See, *supra*, note 187 in this chapter at 717, 727–728.

¹⁹⁶U.S. Fed. R. Evid. 901 (B)(9).

¹⁹⁷Carole E. Powell, Computer Generated Visual Evidence: Does Daubert make a Difference? 12 Ga. St. U.L.Rev. 577 at 585 (1996).

may use similar evidence, such as aerial photography or maps taken on the ground, to authenticate the accuracy and veracity of satellite images. Although distortion of imagery has to be addressed, generally the Courts have accepted that distortion would be remote if the criteria set, as discussed above, are met. The 1999 case of *Dolan v. Florida*¹⁹⁸ is a good example, where the Court admitted a computer enhanced image of a surveillance video camera which showed the accused battering a store clerk. Although the tape was of poor quality, the image of the accused and his characteristics were found to be sufficiently clear.

The final consideration pertains to the relevance of satellite imagery as evidence. Purely because of their unique characteristics, satellite images would be deemed to be relevant as evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.¹⁹⁹ Nonetheless, a Court will probably carefully examine the evidence to ensure that its probative value is not unduly affected and outweighed by possible unfair prejudice, and confusion of issues. Also important are that there is no undue delay, waste of time, unnecessary presentation of redundant evidence and misleading of the jury. On the last point, Courts have exercised caution in distinguishing between evidence which establishes facts and evidence which merely demonstrate facts. In *Datskow v. Teledyne Continental Motors*,²⁰⁰ the jury was shown a computer animated video to demonstrate how a fire could start and spread in a plane. The Court expressed confidence that the jury would not give the video undue weightage than it deserved. The judge held that the video did not purport to recreate the accident but that it merely demonstrated an expert's view or theory of what may have caused the accident. The conclusion reached by the Court was that, as long as the distinction was made clear to the jury, there was no cause for concern as to misleading the jury.²⁰¹ However, a satellite image which would purport to show different ways in which an event may occur may be considered unduly prejudiced. The principle in *Pino v. Gauthier*,²⁰² where a video animation demonstrating four possible ways in which a car could travel over an expressway was rejected as being prejudicial, would be relevant in this instance as precedent.

There is no room for doubt that, in the formulation of space law as a new legal regime, the international community has paid attention to the most significant influence over this discipline of the two superpowers which existed at the time. The two great power blocs, the United States of America and the Union of Soviet Socialist Republics were then the main protagonists (supported by their allies and a few neutral European States and the Third World). This polarization created an environment whereby an ideological balance was required to counter the possibility

¹⁹⁸1999 WL 512093 (Fla. App. 4th dist.).

¹⁹⁹U.S. Fed. R. Evid. 40.

²⁰⁰826 F.Supp 677 (W.D.N.Y. 1993).

²⁰¹*Id.* at p. 685, see also *In re Air Crash Disaster* 86 F. 3d. 498 (6th Cir. 1996).

²⁰²633. So. 2d. 638 at p. 652 (La. App. 1st Cir. 1993).

of encroachment by Realist thought which was calculated to establish an outer space legal regime that would have admitted of the creation of real property rights by one power bloc over the other in outer space to the detriment of humankind in general.

The detriment envisaged was not only in its physical attributes and apprehension for the physical welfare of humanity, but also in the economic imbalance a Realist approach to space law would have brought to bear. The segmentation of space law into municipal regimes would have resulted in the inexorable endorsement of Realist theory, that States are egotistical utility enhancers and that the freedom of internal legislation would have given States a legal licence to maximise their freedom of outer space activities, thereby obviating any possibility of cooperation with other States. The inevitable corollary to this scenario would have been the avoidance of spreading the benefits of outer space exploration and exploitation among the world.

The general delineation of outer space as a common area rather than as an area which could be conquered therefore rested on more traditional ground of international cooperation. However, the reason for the two power blocs to settle on commonality rather than on appropriation as the basis for the philosophy of space law is by no means the result of hard bargaining. It was the preferred choice of both parties. History records that there was no coercion or imposition of one system over another at the time of law making. One commentator says:

it resulted from a process of weighing competing proposals based on different analogies and converging on the view that one of the underlying analogies was better than the other.²⁰³

Be that as it may, it is not possible to dismiss the pervasive influence exerted by the international legal order in the late 50s when space law was being promulgated. It was this influence which made it possible for the philosophy of space law to be primarily founded upon the concept that, unlike in the formulation of air law in 1944 where States were aware of the economic and technical implications of a tried and tested product, outer space was an unknown quantity, controlled exclusively at that time by two power blocs who had ominous war power, and therefore its philosophy was destined to spread across the globe equally, ensuring commonality and responsibility.

Satellite image production commences when digital data are transmitted to the receiving station on the ground from a satellite and are recorded on a magnetic tape. Data so received is adjusted for atmospheric interference and corrected for geometric precision. These processes are necessary and are deemed to be appropriately carried out and if satellite images were to be accepted as evidence.

The proliferation of satellite imagery and its prodigious use as an effective source of spatial, temporal and spectral information makes images taken from outer space burgeoning tools for litigators in their quest for success in the trial

²⁰³Peterson (1997), p. 245 at 266.

process. The most fundamental driver in this process is the acceptance by Courts of satellite imagery as a credible source of information. As explained in this article, there are a few impediments that may preclude this particular kind of evidence as being admitted within the purview of traditional rules of evidence. Questions of authentication, reliability and relevance would be critical issues in this process, along with transparency. However, given the accuracy and safeguards now inherent in sophisticated technology and the advanced expertise of the professionals who analyse and interpret satellite images, this type of evidence may well be widely accepted in the future.

The freedom of the use of outer space would be meaningless if one were to reject its many benefits. If the space odyssey has already arrived in the Courts of law, it should not be an unwelcome visitor.

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