



ASJ ^{the} AVIATION & SPACE JOURNAL

Aviation

Space

Miscellaneous Material of Interest

Events

Managing Editor:
Anna Masutti

Co-editor:
Pablo Mendes de Leon

Board of Editors:
Donatella Catapano
Vincent Correia
Massimo Deiana
Nikolai P. Ehlers
Liu Hao
Stephan Hobe
Anna Konert
Sergio Marchisio
Sofia M. Mateou
Alan Meneghetti
Sorana Pop
Alessio Quaranta
Kai-Uwe Schrogl
Francis Schubert
Benjamyn Scott
Filippo Tomasello
Leopoldo Tullio
Alexander Von Ziegler
Stefano Zunarelli
Serap Zuvim

Support Committee:
Ridha Aditya Nugraha
Hajime Akamatsu
Ottavia Carla Bonacci
Niall Buissing
Sara Dalledonno
Daniele D'Antonio
Wataru Inagaki
Vikrant Pachnanda



Aviation

- The Unique Link Between an Airline and a State** p. 4
by Niall Buissing
- Just Culture in the Era of Digitalization: How Artificial Intelligence is Expected to Influence Just Culture in the Air Traffic Management System?** p. 17
by Stathis Malakis and Marc Baumgartner
- Social Clauses in Air Services Agreements: Is Labour Protection Saving Fair Competition?** p. 26
by Yuran Shi

Space

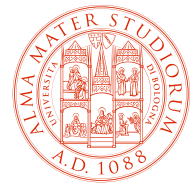
- Space Diplomacy: a Multi-Purpose Lever Guaranteeing Global Sustainability, Safety and Security** p. 37
by Luisa Santoro
- IRIS²: The New (Material) Girl on the Block. Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²)*** p. 45
by Sara Dalledonne

Miscellaneous Material of Interest

- The New European Union Space Strategy for Security and Defence: Perspectives and Opportunities** p. 51
by Gilda Caso
- The Legal Regulation of Drones, General Report for the International Academy of Comparative Law (IACL)** p. 54
book review by Anna Masutti
- Drones – Future of Aviation Law? Interference of Public Law in Private Law** p. 58
by Piotr Kasprzyk and Anna Konert
book review by Anna Masutti

Events

- | | |
|--|---|
| <p>13th McGill University and PEOPI Annual Conference, International Aviation: Liability, Insurance & Finance</p> <p><i>Paris, 21-22 April 2023</i></p> <p style="text-align: right;">p. 61</p> | <p>European Space Agency (ESA), Space2Connect Conference</p> <p><i>Matera (Italy), 7-9 June 2023</i></p> <p style="text-align: right;">p. 63</p> |
| <p>ICUAS Association, International Conference on Unmanned Aircraft Systems 2023 (ICUAS 2023)</p> <p><i>Warsaw, 6-9 June 2023</i></p> <p style="text-align: right;">p. 62</p> | <p>Worldwide Airport Lawyers Association (WALA), Annual Conference</p> <p><i>Paris, 28-30 June 2023</i></p> <p style="text-align: right;">p. 64</p> |



Aviation

The Unique Link Between an Airline and a State

by Niall Buissing

Just Culture in the Era of Digitalization: How Artificial Intelligence is Expected to Influence Just Culture in the Air Traffic Management System?

by Stathis Malakis and Marc Baumgartner

Social Clauses in Air Services Agreements: Is Labour Protection Saving Fair Competition?

by Yuran Shi

The Unique Link Between an Airline and a State*

by Niall Buissing**

1. Introduction

In February 2023, the Organisation for Economic Cooperation and Development (OECD) released technical guidance to assist governments to implement a global minimum corporate tax rate of 15%¹. In 2021, after years of preparations and negotiations, the G7 and G20, reached this breakthrough in the global effort to address tax challenges arising from globalisation and the digitalisation of the world economy. The landmark accord, backed by over 130 States, aims to put a hold on tax evasion by multinational companies by proposing a global minimum tax rate and creating a new taxing right for the largest multinational companies, where the nexus is no longer exclusively determined by reference to a *physical presence* in a country and regardless of where headquarters are located.

This shift constitutes a monumental break with the historical '*race to the bottom*' whereby governments attract multinational companies to establish in their country with favourable tax regimes or other enticements such as lower labour standards. In turn, multinational undertakings would orchestrate their company structure using tax havens, with parent companies and subsidiaries, by setting up headquarters and other physical establishments, or even just letterboxes, all with the objective to pay fewer taxes.

For certain companies, it is less relevant what place they run their business from, on paper or in real, or which corporate nationality or structure they must assume to make use of tax or other legal loopholes. Companies like Google, Facebook and Amazon are '*home*' to the United States, but run their European operations from headquarters in tax friendly countries such as Ireland and Switzerland.

Nationality is not always based on a so-called home country or whether a company has an anchor or genuine link with the country it is located in. Neither do we necessarily identify companies with their corporate nationality; even if a company is closely linked or associated with a nationality like IKEA is to Sweden, its headquarters may very well be located elsewhere, in this case in the Netherlands.

Air services, like digital services, in essence, do not require one fixed location to operate or offer services from; an aircraft can fly to and from a country regardless of the airline having an establishment there, and passengers can buy and '*consume*' tickets from any airline and fly from any -or at least most- points in the world. However, that is where the analogy ends. Air transport does not fall under the regime of the World Trade Organization, nor are tax regimes so much a decisive factor for airlines' establishment. The new tax accord will not change the practice of airline nationality, as to which see section 5.

So why does airlines' nationality retain its relevance? This article will explore the origins of airlines '*of*' a State from the Chicago Convention and will analyse the rationale and current status of this link with the State, and the subsequent allocation of nationality.

* Niall Buissing. This article is part of the Ph.D. study: "*Who 'governs' the airline?*" (working title), a comparative analysis of airlines' nationality in light of new perceptions on ownership and control requirements and changing company structures in the European and international airline industry.

** LLM, PhD Researcher Leiden University, Partner & Managing Director Lexavia Aviation Consultants, Board Member Dutch Transport Law Association, Member of Support Committee of the Air and Space Journal. Email: t.n.buissing@lexavia.aero.

1 OECD (2023), Tax Challenges Arising from the Digitalisation of the Economy – Administrative Guidance on the Global Anti-Base Erosion Model Rules (Pillar Two), OECD/G20 Inclusive Framework on BEPS, OECD, Paris. www.oecd.org/tax/beps/administrative-guidance-global-anti-base-erosion-rules-pillar-two.pdf. (last visited 20 March 2023).



2. International Law on the Link between a State and its Nationals

Much has been written about the relationship between an airline and a State in practice²; from the economical need of State-funding that was - and turns out still is - necessary, to the policy involvement of the State when negotiating transit and traffic rights with other States, required by the airline to operate international services³. This section takes a step back for a different approach, by concentrating on the formal legal status of the link between a State and its nationals, that is legal entities, both natural and juridical, under international law.

2.1. Nationality under International Law

For natural persons, *citizenship* denotes the legal link between an individual and a political community, such as a city, State or territory, conferring both rights and obligations onto the citizen and the institutions⁴. Within the context of State citizenship, it is often used interchangeably with *nationality*, stemming from being a citizen of a nation. On the premise that this article focusses on the link with a State, nationality will be the leading concept.

Nationality for individuals can be determined on the place of one's birth, through descent or inheritance from parents, on the basis of residency or via a process of naturalization. While it is within each State's jurisdiction to set criteria in its own laws on who are its nationals, international law and principles must be respected⁵. This practice was first codified in The Hague Convention on Nationality of 1930⁶, and further expanded into a right to a nationality by the Universal Declaration of Human Rights of 1948⁷.

Issues regarding individual's nationality have been brought before the International Court of Justice (**ICJ or the Court**) under the doctrine of diplomatic protection. In the famous *Nottebohm* case of 1955, Mr Nottebohm, a German national living in Guatemala, had obtained the '*neutral*' Liechtenstein nationality while on a trip to Europe, the Court ruled that:

*"According to the practice of States, to arbitral and judicial decisions and to the opinion of writers, nationality is a legal bond having as its basis a social fact of attachment, a genuine connection of existence, interest and sentiments, together with the existence of reciprocal rights and duties"*⁸

States must thus recognise nationality awarded by another State to a natural person, only insofar there is a *genuine and effective link* between the State and that individual.

2 See H.P van Fenema, *Substantial Ownership and Effective Control*, in: T.L. Masson-Zwaan, and P.M.J. Mendes de Leon (ed.s in chief), *Air and Space Law: De Lege Ferenda: Essays in Honour of Henri A. Wassenbergh* 27-42 (1992); P.P.C. Haanappel, *Airline Ownership and Control, and Some Related Matters*, 26(2) *Air & Space Law* 90-103 (2001); P.M.J. Mendes de Leon, *The Future of Ownership and Control Clauses in Bilateral Air Transport Agreements: Current Proposals and Legal Obligations*, S. Hobe et al. (ed.s), *Consequences of air transport globalization* 19-36 (2003).

3 Transit rights grant airlines the right to fly through the airspace of another State, without making a stop, unless for emergency reasons. Traffic rights concern rights of the designated carriers under an Air Services Agreement (ASA) to carry traffic between States on the points and terms agreed upon in the ASA, see also section 3.2.

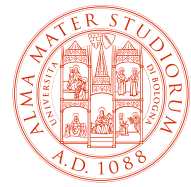
4 See, for instance, P.J. Spiro. *The rights and obligations of citizenship*, 21(3) *The William and Mary Bill of Rights Journal*, p.899 (2013).

5 See PCIJ Advisory Opinion on *the Tunis and Morocco Nationality Decrees* of 1923.

6 The Hague Convention on Certain Questions Relating to the Conflict of Nationality Laws of 1930, Art. 1: "*It is for each State to determine under its own law who are its nationals. [...]*" 179 LNTS 89.

7 Universal Declaration of Human Rights of 1948, Art. 15.

8 *Nottebohm Case (Liechtenstein v. Guatemala); Second Phase*, ICJ, 6 April 1955.



This raises the question whether the same genuine and effective link with the State also extends to legal personality for juridical entities, such as companies. In the *Interhandel* case of 1959⁹, the subject of German control over Interhandel, a company registered in Basel holding the majority of shares of a company incorporated in the United States, was at the core of the issue in 1942. At the time of proceedings, however, neither of the parties questioned Interhandel's Swiss nationality or referred to this connection with the State. The Court ultimately dismissed the case and did not deal with the companies' nationality¹⁰.

2.2. Corporate Nationality

The differentiation between corporate nationality and the nationality of shareholders was at the heart of the case leading to the ICJ's *Barcelona Traction* judgement of 1970¹¹.

In short, Belgian shareholders predominantly owned Barcelona Traction, Light & Power Co., Ltd., a company incorporated in Canada, conducting all its activities in Spain. Following bankruptcy proceedings in Spain, Belgium brought a claim before the ICJ to protect the Belgium shareholders. Amongst other things, the case concerned whether Belgium had *ius standi* to bring a claim protecting a Canadian corporation.

A small majority of the Court considered that the '*genuine connection*' test for corporations could not be equated with the nationality of its shareholders and take precedence over that of the State of incorporation. The Court stated:

*"In allocating corporate entities to States for purposes of diplomatic protection, international law is based, but only to a limited extent, on an analogy with the rules governing the nationality of individuals. The traditional rule attributes the right of diplomatic protection of a corporate entity to the State under the laws of which it is incorporated and in whose territory it has its registered office. These two criteria have been confirmed by long practice and by numerous international instruments"*¹².

Concurrently, the Court continuously put forward that States adopt different practices, and some State require a company to have "*its seat (siège social) or management or centre of control in their territory, or when a majority or a substantial proportion of the shares has been owned by nationals of the State concerned*"¹³.

Indeed, States can apply two different concepts; the first, the Real Seat Doctrine (*siège réel*), referred to above, links the legal capacity to the company's main business location, i.e., where the majority of the tasks are performed or where the management and administration are located, whereas the Incorporation Theory determines the legal capacity of a company by the State in which it is incorporated; where it conducts or coordinates its business is irrelevant¹⁴. Variations between these two concepts are also possible. Via the latter, companies can '*choose*' to establish themselves in a country for its favorable corporate and tax law regimes or less stringent labour and environmental rules¹⁵.

9 *Interhandel Case (Switzerland v. United States of America)*, ICJ, 21 March 1959.

10 David Harris, "*The Protection of Companies in International Law in the Light of the Nottebohm Case*", *The International and Comparative Law Quarterly* Vol. 18(2), 1969, at p. 286.

11 *Barcelona Traction, Light and Power Company, Limited (Belgium v. Spain)*, ICJ, 5 February 1970.

12 *Barcelona Traction*, para 43.

13 *Ibid.*

14 See, for instance, J. Wouters, *European Company Law: Quo Vadis?*, 37(2), *Common Market Law Review*, pp. 257-307 (2000), and J. Wouters, *Private International Law and Companies' Freedom of Establishment*, *European Business Organization Law Review* 2(1) pp. 101-39 (2001).

15 Mendes de Leon P.M.J. & Maarsen-Neumann E. (2009), *Ausländische Luftfahrtunternehmen mit Hauptsitz in der EU/EWR*. In: Hobe S., von Ruckteschell N. (Eds.) *Kölnner Kompendium des Luftrechts. Bd.2: Luftverkehr*. Köln: Carl Heymanns Verlag. 708-740.



In *Barcelona Traction*, the Court concluded that, for corporate entities, “no absolute test of the ‘genuine connection’ [with a State] has found general acceptance”¹⁶ seemingly referring to the *Nottebohm* case, but it then proceeded with an analysis of factors indicating a ‘close and permanent connection’ with the State of incorporation, in this case, the length of incorporation in Canada, the maintenance of its registered office and board meetings held there, and the listing in the records of local tax authorities¹⁷.

Although the case dealt primarily with the question of which State could exercise diplomatic protection, it confirms corporate nationality based on the incorporation theory, thus leaving such requirements to national law. At the same time the ICJ acknowledges that in certain cases, the ‘link’ with a State requires a more ‘close and permanent connection’ than only bearing the State’s corporate nationality. Obviously, this position of general international law can be further specified in Treaties or other special agreements, as is the case under international air law as further discussed in Section 3, below¹⁸.

Under international trade law, the General Agreement on Trade in Services (**GATS**) of the World Trade Organization, takes a broad view, considering juridical persons, or legal entities, ‘duly constituted or otherwise organized under applicable law,’ and ‘engaged in substantive business operations’ in the territory of that Member State, as well as having a ‘commercial presence’ in the State’s territory, which includes ‘any type of business or professional establishment’¹⁹. However, further analysis of these requirements is not relevant to this article, as the GATS does not apply to the operation of air services²⁰.

3. The Link between an Airline and a State under International Air Law

International civil aviation is governed by the Convention on International Civil Aviation of 1944 (the **Chicago Convention** or **the Convention**). This convention primarily lays down the safety and security provisions for international air transport. Within this context, a State requires a link with an airline and its aircraft to perform safety oversight, as further explained in Section 3.2. However, the link, between a State and ‘its’ airline also serves an important purpose in the economic regulation of air transport. In that area, such a link is used to designate airlines as the economic beneficiaries of a State’s transit and traffic rights under the Convention and international agreements, which the State concludes with other States.

3.1. Nationality of Airlines under International Aviation Conventions

The original text of the predecessor of the Chicago Convention, the *Convention Relating to the Regulation of Aerial Navigation* of 1919 (the **Paris Convention**), explicitly linked corporate ownership of an airline to nationality, that is, the same nationality of its aircraft:

“No incorporated company can be registered as the owner of an aircraft unless it possesses the nationality of the State in which the aircraft is registered, unless the President or chairman of the company and at least two-thirds of the directors possess such nationality, and unless the company fulfills all other conditions which may be prescribed by the laws of the said State”²¹.

16 *Barcelona Traction*, para 43.

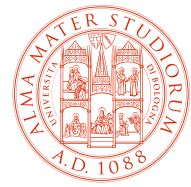
17 *Ibid.*

18 Rodley, Nigel S. „Corporate Nationality and the Diplomatic Protection of Multinational Enterprises: The *Barcelona Traction* Case,” *Indiana Law Journal*: Vol. 47: Iss. 1 (1971).

19 General Agreement on Trade in Services, Art 1.2(c) and (d), jo. Art 28(d), (l) and (m).

20 See, General Agreement on Trade in Services, Annex on Air Transport Services, Art. 1.3.

21 Article 7 of the Paris Convention (before amendment).



Thus, an airline company shall be considered a national of the State under the laws of which it is created. In addition, the text imposed what has come to be known as nationality requirements, here specifically aimed at the control of the company exercised by the chairman and its directors. The importance States at that time attached to the nationality of an airline, specifically concerned with accepting foreign airlines in their airspace, is apparent in the drafting discussions; the United States did not sign the Convention, insisting on more strict requirements, namely two-thirds of the company's stock to be owned by nationals of the State and all their directors to be nationals of such State²².

The Chicago Convention is silent on the 'nationality' of an airline. In various instances, the Convention refers to "airline of a contracting State" or "the airline of any other State"²³. Hence, the authors of both Conventions proceeded from the point of view that there should be a link between an airline and the State, but the Chicago Convention leaves the establishment of such a link to its Member States.

3.2. Designation of Airlines under Air Services Agreements

Economic regulation of air transport, as such, is not drawn up in the Chicago Convention (1944). However, pursuant to Article 6, States must engage into agreements on the operation of international air services. Such Air Services Agreements (ASAs), form the exclusive basis for the operation of cross-border air services from one State to another.

Each State designates an airline(s) for the operation of international air services under the Air Services Agreement. This procedure is a special, if not unique one in the world of economic activities. This designation *externally* serves to balance the beneficiaries of the exchanged traffic rights between the States and ensures that airlines of third countries cannot make use of said traffic rights. *Internally*, it is designed to ensure that the rights continue to be used by an airline of the States' nationality²⁴.

In principle, the nationality of an airline is restricted. The requirements that the carrier's 'substantial ownership' and 'effective control' (O&C requirements) reside with the designating State, its nationals, or a combination thereof, are found in the Agreements attached to the Chicago Convention²⁵, and the mentioned ASAs between States.

The scope and meaning of these terms 'substantial ownership' and 'effective control' are usually discussed in policy discussions rather than legally defined or refined. Over the years, States have given different interpretations to nationality conditions, either involving a test of 'substantial ownership', one of 'effective control', or a combination of the two²⁶.

The first requirement, that of substantial, or sometimes even majority, ownership is tested through ownership of shares of an airline or holding company²⁷. The United States caps foreign ownership of *voting* shares in an airline at 25%²⁸. In the EU, "community air carriers" must be *majority-owned* by EU-nationals²⁹.

The 'effective control' test leaves more room for interpretation, an example being the *Daetwyler* case where an airline, despite satisfying the ownership percentage, could not establish actual control to reside with US nationals³⁰. A successful example, is the acquisition of up to 49% equity interest, but only 20% of the voting stock in the holding company of Northwest, a US airline, by KLM Royal Dutch Airlines (KLM) in the 1990s³¹.

22 John C. Cooper, *United States Participation in Drafting Paris Convention 1919*, 18 J. AIR L. & COM. 266 (1951), page 278.

23 See Art 7, 81 en 82, 89 of Chicago Convention (1944).

24 H.P. van Fenema, *Ownership Restrictions: Consequences and Steps to be Taken*, 23(2) Air & Space Law, 63-66 (1998).

25 See, for instance, Article I(5) of the International Air Services Transit Agreement (IASTA) and Article I(6) of the International Air Transport Agreement.

26 J. Walulik, *At the core of airline foreign investment restrictions: A study of 121 countries*, 49 Transport Policy, 234-251 (2014).

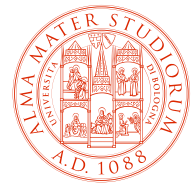
27 See Pablo Mendes de Leon, *A New Phase in Alliance Building: the Air France/KLM Venture as a Case Study*, 53 Zeitschrift für Luft- und Weltraumrecht 359-385 (2004).

28 Title 49 U.S.C. § 40102(a)(15)(C) as amended.

29 Regulation (EC) No.1008/2008, Art. 2, 4(a) and (f).

30 Willey Daetwyler, D.B.A. *Interamerican Airfreight* (CAB Docket 2214 (1971)).

31 P.P. Fitzgerald, *A level playing field for "Open Skies"* (2016), 76-77.



In the *Swissair/Sabena* merger³², the EU Commission set out elements to assess effective control, being “*the power, direct or indirect, actual or legal, to exercise decisive influence on an airline*”³³. This addresses the real questions of who, ultimately, has the decision-making power, final say in the daily management or on key issues such as business planning or annual budgets.

The ownership and control structure of an airline is an internal matter. Hence, this structure, including the requirements for complying with ownership and control conditions, is determined by provisions of national law, including corporate law, and the Articles of Association of the airline, including rights of shareholders and their influence on management decisions. Consequently, when determining nationality, one must look up the corporate tree and at the factual circumstances to assess who really owns the airline and can exercise effective control under the mentioned regulations. However, since this article focusses on the legal connection between an airline and a State, an analysis of airline’s internal structures falls outside its scope.

3.3. Safety Oversight and Regulatory Control under the Chicago Convention (1944)

Regarding the connection between an airline and a State for safety oversight, specifically through the certification of the airworthiness of the aircraft and licensing of personnel operating said aircraft³⁴, the Chicago Convention (1944) initially exclusively looked at the State *in which the aircraft is registered*. Accordingly, aircraft have the nationality of the State in which they are registered, and aircraft can only be registered in one State³⁵. As a corollary, the State of registry carries out ‘functions and duties’ as to the responsibility for safety oversight of the aircraft in its registry.

While in the early days of international civil aviation, aircraft was registered in the same State as the airline, by 1980, the sector’s growth required more opportunities for airlines to finance aircraft and alternatives to owning such aircraft directly. To maintain a single State’s responsibility for safety oversight, Article 83 bis, and the term ‘*principal place of business*’ therein, were introduced in the Chicago Convention to allow arrangements for the transfer of functions and duties of the State of registry of an aircraft to the State in which the operator of the aircraft, the airline, has its principal place of business or permanent residence:

*“[...] when an aircraft registered in a contracting State is operated pursuant to an agreement for the lease, charter or interchange of the aircraft or any similar arrangement by an operator who has his principal place of business or, if he has no such place of business, his permanent residence in another contracting State, the State of registry may, by agreement with such other State, transfer to it all or part of its functions and duties as State of registry in respect of that aircraft [...]”*³⁶.

The term ‘*principal place of business*’ (**PPoB**) is not defined in the Chicago Convention (1944). However, it has been addressed extensively in guidance material of the International Civil Aviation Organization (**ICAO**) as an alternate and more liberal criterion for designation and authorization, as to which see the previous section³⁷.

32 95/404/EC: Commission Decision of 19 July 1995 on a procedure relating to the application of Council Regulation (EEC) No 2407/92 (*Swissair/Sabena*).

33 Ibid. section XI.

34 See Chicago Convention (1944), Articles 31 and 32, respectively.

35 Ibid. Articles 17 and 18.

36 Ibid. Article 83 bis.

37 See, ICAO, *Policy and Guidance Material on the Economic Regulation of International Air Transport* (Doc 9587, 3rd edn, 2008), its Annex 5 ICAO Template Air Services Agreement, and *Manual on the Regulation of International Air Transport* (Doc 9626, 3rd edn, 2018), Part IV.



In this context, it is used in conjunction with a requirement of *'effective regulatory control'*, not to be confused with *'effective control'* of the airline company pursuant to the O&C requirements. The requirement of *'effective regulatory control'* for safety purposes establishes a *'genuine'* link between the airline and the State responsible for the airline's safety oversight so that the competent authorities of the State concerned can exercise and maintain their control functions effectively. As concisely explained in section 3.3., regulatory control in safety management is manifested through certification, licensing and monitoring compliance with the conditions of the granted certification and licenses.

For authorities to exercise regulatory control effectively, there must be a permanent, stable, and effective link with the air carrier and the location of its core operational control and financial functions, i.e. the PPOB, so that these activities are visible, *'capable of physical inspection'* and of being overseen and monitored by said authorities.³⁸ The EU Court of Justice recognized that the special provisions on safety management, through licensing, regulatory control and monitoring create *"reciprocal regulatory obligations between airlines and these authorities and thus a specific, stable link between them"*³⁹.

While a distinction should be made between the nationality of an airline based on designation pursuant to ASA, and that for safety oversight through licensing, the two are often intertwined in domestic licensing conditions; an airline can only be designated under an ASA when it has received an (operating) license from the designating State.

3.4. Licensing Conditions

The requirements that enable a State to exercise regulatory control, and *de facto* establish a jurisdictional link between an airline and the national authority or authorities of the State concerned, are laid down in domestic licensing conditions.

In the EU, the conditions for obtaining an operating license are found in Regulation 1008/2008 on common rules for the operation of air services in the Community. The conditions cover several financial-economical aspects but also require an *'Air Operator Certificate'* (AOC) containing technical, safety and environmental standards, as well as ownership and control requirements. Indeed, national licensing conditions can, on the one hand, internalize the requirement for carriers to meet the requisite safety standards and for authorities to exercise control thereof, and on the other, include nationality requirements on ownership and control for the purpose of economic regulation of air transport.

In other words, although States must agree on the designation criteria on both sides in an ASA, they are, in principle, free to establish their own criteria for airlines' designation as laid down in national licensing provisions or, in the case of the EU, in Community legislation, requiring, for instance, a principal place of business in the EU, on top of O&C requirements⁴⁰.

In the EU's internal air transport market, the PPOB is defined as *"[...] the head office or registered office of the undertaking within which the principal financial functions and operational control of the activities referred to in this Regulation are exercised"*⁴¹. This definition is closer to the Real Seat Doctrine than it is to that of the Incorporation Theory, as discussed in section 2.2. Such a distinction is understandable to determine whose authorities are to perform safety oversight. Corporate law, on the other hand, is not harmonized at the EU level, and an undertaking's connection with a State is based on national law. It is, therefore, questionable whether EU Regulation 1008/2008 should make reference to such a definition of PPOB, as to which see section 3.2.

³⁸ UK Civil Aviation Authority CAP1539, UK CAA Interpretation of Principal Place of Business, March 2017. Available at: <https://www.caa.co.uk/cap1539> (last visited 31 March 2023).

³⁹ EU Court of Justice, Case T-259/20, Ryanair DAC v European Commission, judgement of 17 February 2021, para 39.

⁴⁰ Reg. EU 1008/2008, on common rules for the operation of air services in the Community, Art 4(a).

⁴¹ See, EU Regulation 1321/2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks, Art. 2(m), and similar definition in EU Reg. 1008/2008 2(26).



For safety oversight, where the beforementioned definition is insufficient, the following factors can be used to identify an airline's PPOB and to prevent airlines from "*authority shopping*" in which they create firms and subsidiaries in different countries to set up a favorable supervision regime⁴²:

- Where the carrier's headquarters is located;
- Where it is registered and pays corporate taxes;
- Where its main administrative and financial functions are performed;
- Where the principal operational control of its activities is located;
- Where its key personnel controls and coordinates daily operational activities;
- where it employs a significant number of nationals in managerial, technical and operational positions;
- Where records regarding the operational and financial decisions affecting the direction, control, planning and coordination of finances of its activities are kept;
- Where it has a substantial amount of its operations and capital investments in physical facilities and where its aircraft are registered and based.

This is not a complete list. International companies can be constituted in a variety of ways, and each organizational structure should be evaluated individually, taking into account the different factors to determine an airline's PPOB. This should guarantee that an airline's oversight and control be given to the competent national authority that is best suited for it. As remarked in Section 2.2 above, there are indeed variations between the 'real seat' and 'incorporation' concepts as tests for defining the PPOB.

Finally, the '*EU air carrier clause*' laid down in EU Regulation 1008/2008 has been '*exported*' to third States, and other regional organizations such as ASEAN⁴³ and WAEMU⁴⁴ in order to permit designation by the EU and its Member States of airlines under ASAs, including Horizontal and Vertical Air Transport Agreements with such third States and other regional organizations for the operation of the agreed international air services. Therefore, an EU airline may operate its air services from a point outside of its PPOB under such agreements. For instance, Air France is entitled to operate a service between Frankfurt (Germany) and Boston (US) under the EU – US Agreement on air transport of 2007, as amended in 2010. However, relatively little use has been made of these opportunities.

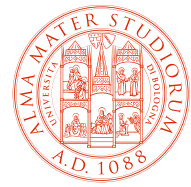
4. Airlines are Undertakings under International Air Law

The previous sections have shown that a special link exists between an airline and the State; however, it is equally important to establish the boundaries of this connection with the State and to distinguish between the rights and obligations of each. This section will consider the airline as an undertaking under private international air law and competition law, and whether an airline can be considered a part of or an agent of the State.

⁴² See, EASA and EU Commission Information Letter on Principal Place of Business, published by Icelandic Transport Authority, FOI003, 06 October 2022.

⁴³ ASEAN refers to Association of Southeast Asian Nations.

⁴⁴ WAEMU stands for West African Economic and Monetary Union.



4.1. Private International Air Law

The Chicago Convention (1944) and the 19 safety, security and environmental Annexes attached to it clearly distinguish between the rights and obligations of States, on the one hand, and the operating airlines, on the other hand. States are responsible for safety regulation and supervision, whereas airlines are liable when they cause an accident.

The Convention defines an airline as “*any air transport enterprise offering or operating an international air service*”⁴⁵ (*italics added*). Airlines, not States, must compensate the damages which they cause to passengers, their luggage and cargo they carry on their services. The liability conditions are laid down in the Warsaw Convention for the Unification of Certain Rules Relating to International Carriage by Air (1929), as variously amended, and the Montreal Convention (1999), bearing a nearly identical title.

Indeed, the Warsaw Convention of 1929 was drawn up because of the rather close link between States and ‘*their*’ airlines. At that time, these were mandated to carry cargo, mail, and government officials to the colonies of European States. This convention was designed to de-link State and airline: airlines were not allowed to shield behind the diplomatic protection of governments to avoid liability for the compensation of damages pursuant to reliance on, for instance, the defence of ‘sovereign immunity’ from such claims.

The Warsaw and Montreal Conventions attach liability to the “*carrier*” which is not defined, but the first article explicitly refers to carriage performed for reward by an air transport *undertaking*:

*“This Convention applies to all international carriage of persons, baggage or cargo performed by aircraft for reward. It applies equally to gratuitous carriage by aircraft performed by an air transport undertaking”*⁴⁶.

The two Conventions clearly detach the State from any liability regarding the international carriage performed by carriers, whether they have their nationality or not; hence, airlines are sued in court. As to the courts competent to hear and decide on cases falling within their scope, a link between the carrier and a State is among the general principles for establishing jurisdiction⁴⁷. In the Montreal Convention (1999), for instance, these include the court of the ‘*domicile*’ of the carrier, referring to the carrier’s headquarters (see section 2.2) and the ‘*principal place of business*’ of the carrier (see section 3.2), which is normally where the carrier is incorporated⁴⁸.

It is not within the scope of this article to fathom out the case law that exists on the interpretation of the court’s jurisdiction, but it is undeniable that across different legislation, similar terms are used to describe the necessary link between an airline and the State; the Warsaw Convention (1929) identifies the courts competent where the carrier is ‘ordinarily resident’⁴⁹, which for companies seems to coincide with the PPOB.

In the EU, Regulation 593/2008 on the law applicable to contractual obligations (the former Rome I Convention), under contracts of carriage, lists the courts of carrier’s ‘*habitual residence*’ or ‘place of central administration’ competent.⁵⁰ Despite the different names, each implies that a *genuine connection* with a State must exist to prevent passengers from forum shopping.

45 See, Art. 96 (c) of the Chicago Convention (1944).

46 Article 1 — *Scope of Application* 1. Montreal Convention.

47 Article 28(1) Warsaw, Article 33(1) Montreal.

48 Article 33(1), Montreal Convention, as to which see Aikpitanhi v. Iberia, 553 F.Supp. 2d 872, 876 (E.D. Mich. 2008).

49 Article 28(1) Warsaw Convention.

50 Regulation (EC) No 593/2008 of the European Parliament and of the Council of 17 June 2008 on the law applicable to contractual obligations (Rome I), Article 5.2(a) and (b).



4.2. Air Transport Competition Law

Under EU Regulation 1008/2008, airlines are defined as “*an undertaking with a valid operating licence or equivalent*”⁵¹ (*italics added*). The qualification of “*undertaking*” means airlines, like any other business, are subject to EU competition law:

*“The following shall be prohibited as incompatible with the internal market: all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market”*⁵².

This provision applies to the conduct of undertakings, excluding the State or State bodies from its scope, as to which see also the next section. Airlines are also liable for collusive actions and the abuse of dominant positions under US antitrust law⁵³, and the competition laws of other jurisdictions.

The liability of airlines for engagement in collusive action in air transport has been manifested in a recent and important decision of the Court of Justice of the EU.⁵⁴ While airlines have attempted to argue that their collusive behaviour in these proceedings was governed by mandates of ‘*their*’ States as derived from Air Services Agreements, the Court of Justice of the EU concluded that these airlines act independently from their governments and cannot hide behind them. The concerned airlines were based in all parts of the world, but the EU and US antitrust/competition laws operate irrespective of the nationality of these airlines or of the special link they have with their State.

4.3. An Airline Undertaking as an Agent of the State

When an airline is considered an undertaking, but maintains close ties with its government, this can raise questions as to the relation between the State and the airline and the independence of the latter. This was the case in court proceedings in Canada, where Air India was accused of being an ‘*alter ego*’ of the Indian State⁵⁵.

The term ‘*alter ego*’ is unknown under international law. Either an entity is a State, or it is not. The Montevideo Convention (1933) is often used as a benchmark for the ‘definition’ of a State, which, as a person of international law, must possess: 1) a permanent population, 2) a defined territory, 3) a government, and 4) the capacity to enter into relations with other States⁵⁶. Obviously, this is not the case for an airline.

Alternatively, an airline could be considered as an *organ of the State* under Articles 4, 5 and 8 of the Articles of the International Law Commission (ILC) containing the applicable principles of attribution. These principles are quoted in the Arbitral Sentence of the Permanent Court of Arbitration (PCA) in the case of *Devas and other companies v. the State of India* of 2016 (‘the Devas case’)⁵⁷. The PCA found that:

51 See, Art. 2(10) of EU Regulation 1008/2008.

52 Article 101 of the Treaty on the Functioning of the EU (TFEU).

53 See, for instance, Sherman Act, 15 U.S.C. §§ 1–7 (2018).

54 See EU Court of Justice of the European Union, Cases T-323/17 *Martinair Holland v Commission*, T-324/17, *SAS Cargo Group and Others v Commission*, T-325/17 *Koninklijke Luchtvaart Maatschappij v Commission*, T-326/17, *Air Canada v Commission*, T-334/17, *Cargolux Airlines v Commission*, T-337/17, *Air France-KLM v Commission*, T-338/17, *Air France v Commission*, T-340/17, *Japan Airlines v Commission*, T-341/17, *British Airways v Commission*, T-342/17, *Deutsche Lufthansa and Others v Commission*, T-343/17, *Cathay Pacific Airways v Commission*, T-344/17 *Latam Airlines Group and Lan Cargo v Commission*, T-350/17, *Singapore Airlines and Singapore Airlines Cargo v Commission*.

55 Court of Appeal Québec, Canada, *Devas and other companies v. Air India Ltd.* of 2022.

56 See, the Montevideo Convention on the Rights and Duties of States (1933), Article 1.

57 PCA Case No. 2013-09, Award on Jurisdiction and Merits, Decision of 25 July, 2016, (PCA Decision (2016)).



“The acts of such a company can only be attributed en bloc to the State when it is considered a governmental body under domestic law”⁵⁸.

Furthermore, in a case decided by the International Court of Justice, the Court stated that: *“in determining whether a company possesses independent and distinct legal personality, international law looks to the rules of the relevant domestic law”⁵⁹.*

In the Devas case, the PCA concluded that the Indian company in question (Antrix), acting in the described circumstances, was a *“private company limited by shares”* within the meaning of the Indian Companies Act⁶⁰, and did not act as an organ of the State of India⁶¹.

This case confirms that, under international law, States ultimately decide on who it considers its nationals, and that domestic law prevails when it comes to the determining criteria for corporate nationality. For airlines specifically, this practice is further amplified by the nationality conditions contained in ASA as explained in Section 3 above.

5. Changing Nationality Conceptions

Now that it is clear than an airline must have a nationality link with the State in order to be entitled to operate the agreed air services, this last section touches upon the question if an airline could change its corporate nationality and seek a more advantageous *‘link’* with another State, which practice the new tax accord referred to in the introduction is attempting to change. We have seen such moves in other sectors, like in the Netherlands, where Unilever and Shell relocated their headquarters to London, to shake of their dual nationality, for various reasons, in the wake of Brexit.

More often, these relocations take place within the context of mergers; where two foreign companies merge and choose one of the originating States as the residence State for the parent company. In the US, inversions, where the headquarters of the parent company is moved to the State of the smaller foreign company that it is merging with, often for tax evasive purposes, have been made more difficult in 2016⁶².

Again, aviation provides a stark contrast; even where airlines merge, are subjected to a takeover, or otherwise consolidate or enhance their cooperation, great attention is paid to maintaining the original nationality of the individual airline(s) through protective schemes; the Air France – KLM merger⁶³, the AirAsia Joint Ventures and subsidiaries⁶⁴, and the acquisition attempts of Air Berlin by Etihad and Alitalia by Qatar Airways, demonstrate that nationality, based on *‘substantive ownership’* and *‘effective control’* remains important to safeguard the exercise of traffic rights of the home State.

Similarly, the relevance of maintaining the PPOB of an EU air carrier for the operation of traffic rights, was recognized by the EU Court of Justice; the Portuguese government was allowed to draw up measures preventing the relocation of the

⁵⁸ Ibid, Section 270.

⁵⁹ See, Ahmadou Sadio Diallo (*Republic of Guinea v. Democratic Republic of the Congo*), Preliminary Objections, Judgment, I.C.J. Reports 2007, p. 582, para. 61. Statement of Defence, para. 147.

⁶⁰ See, section 272 of the PCA Decision (2016), referring to the Indian Companies Act, Section 3(l)(iii) (Ex. R-105).

⁶¹ See, section 281 of the PCA Decision (2016).

⁶² See, James A. Doering, *New Temporary Regulations Restrain Inversions*, 42 INT’L TAX J. 5 (2016).

⁶³ Pablo Mendes de Leon, *New Phase in Alliance Building: The Air France/KLM Venture as a Case Study, A / Die Allianz zwischen Air France und KLM / L’Alliance entre Air France et KLM*, 53 ZLW.

⁶⁴ Michelle Dy, Jae Woon Lee, *‘Mitigating ‘Effective Control’ Restriction on Joint Venture Airlines in Asia: Philippine AirAsia Case’*, (2015), 40, Air and Space Law, Issue 3, pp. 231-253.



PPoB of TAP, following its privatisation, because it “*follows from those bilateral agreements that TAP would lose its traffic rights on routes to or from those third countries if it were to transfer its principal place of business outside of Portugal*”⁶⁵.

The loss of nationality as a real threat for airlines, is also illustrated by other examples, such as when Virgin Nigeria was initially denied operations to New York because it was substantially owned by Virgin Atlantic and perceived as a British airline⁶⁶. States have also threatened to ban airlines’ flights over this issue, for instance, when Russia questioned the nationality of Austrian Airlines after the take-over by the Lufthansa Group⁶⁷. It even has a preemptive effect when a US private equity firm, being its largest stakeholder, reduced its stake in the Wizz Air to comply with EU ownership rules after Brexit⁶⁸.

6. Concluding remarks

Although the Chicago Convention (1944) does not explicitly mention the link between an airline and a State, it is clear from the text and general practice that a link must be established between the airline and (“of”) a State. In regulating international air transport, this link between an airline and a State has a twofold purpose; first, to determine the State responsible for safety oversight, and second, to designate an airline a nationality for economic considerations.

The link is established per agreement between States, referred to as Air Services Agreements (ASAs). For the purpose of economic regulation, licensed airlines are designated pursuant to nationality requirements such as ‘*substantial ownership*’ and ‘*effective control*’ and occasionally the requirement of a ‘*principal place of business*’ agreed upon in ASAs. In the context of safety management, the jurisdictional link between an airline and the national authorities of the State mandated to conduct of safety oversight, a stable and permanent link is often determined on the basis of the airline’s PPoB.

In other industries, the legal capacity of a company, for instance for tax purposes or the application of domestic laws, is based on this principal place of business, either assessed pursuant to its corporate domicile, or based on the State in which it is incorporated. Air transport is one of the few industries, if not the only industry, where the nationality of the undertaking is relevant, if not essential, for the performance of its operations, and where such nationality is predominantly based on nationality criteria of ownership and control.

Art. 83 bis of the Chicago Convention (1944) determines that an airline, as the operator of an aircraft, ought to have a ‘*principal place of business*’ which is a fixed location. However, PPoB is not defined as such in international law. In practice, using the PPoB to establish the link with a State for safety oversight is more broadly accepted. For more economical and market-oriented regulation, its definition depends on a jurisdiction’s policy.

The concept of PPoB is increasingly presented as an alternative or additional nationality requirement covering both designation and safety oversight. However, even the most free-trade nations with an open-market oriented approach towards air transport, like the EU countries, US, and Canada, require that the designated airlines are substantially owned and effectively controlled by their nationals⁶⁹.

Trade in air services, including traffic rights, is governed by a web of over 3,000, mostly bilateral (State to State) ASAs. These ASAs continue to establish the nationality of airlines through O&C requirements, and exceptionally, or as an extra

65 See, Court of Justice of the EU, Case C-563/17, *Associação Peço a Palavra and Others v Conselho de Ministros*, decision of 27 February 2019.

66 See Virgin Nigeria Airways Limited, Dockets DOT-OST-2005-23460/23461.

67 Financial Times, Russia threatens to ban Austrian flights, 28 February 2010 <https://www.ft.com/content/e27168fa-24a2-11df-8be0-00144feab49a> (last visited: 31 March 2023).

68 Reuters, Wizz Air’s top shareholder cuts stake to comply with ownership rules, 4 February 2020 <https://www.reuters.com/article/us-wizz-air-hldgs-investors/wizz-air-s-top-shareholder-cuts-stake-to-comply-with-ownership-rules-idUSKBN1ZY18G> (last visited: 31 March 2023).

69 See, for instance, Agreement on Air Transport between Canada and the European Community and its Member States, Annex 2, section 1.



requirement as to which see the EU air carrier clause, the PPOB of the operating airline, confirming the *'genuine link'* between a State and/or its nationals on the one hand and an airline on the other.

While there exists both in law and in practice a very special link between an airline, in particular, the air carrier on the one hand, and the State that licenses and designates it to operate the agreed international air services on the other hand, international air law, including public air law (the Chicago Convention (1944)) and private air law (the Montreal Convention (1999)), as well as US and EU antitrust/competition law, identify airlines as undertakings which are liable for the implications of their conduct, independent of their governments. From that perspective, airlines are no different than other economic actors, that is, undertakings, in the marketplace.

Still, where in other industries it may be interesting for companies to move their principal place of business or headquarter to a different country, so as to enjoy more advantageous tax, social or environmental conditions, this is not the case for airlines. The very nature of the air transport business, through the exercise of traffic rights, of which the airlines is dependent on the State and its connection with it, make it unique one in the world of economic activities. The regime of trade in air services, including traffic rights between States is unlikely to change drastically any time soon.

Just Culture in the Era of Digitalization: How Artificial Intelligence is Expected to Influence Just Culture in the Air Traffic Management System?

by Stathis Malakis* and Marc Baumgartner**

Abstract

While the Air Traffic Management system is fast transiting towards the vision of a Digital European Sky and Artificial Intelligence is seen as the key enabler, the questions concerning Just Culture have developed into: how Artificial Intelligence is expected to influence Just Culture and do we need to rewrite the Just Culture playbook? In this article we provide an initial attempt to answer these questions. We enumerate the limitations that are expected to be influential and identify two layers of concerns that prompt the rewriting of the Just Culture playbook.

1. Introduction

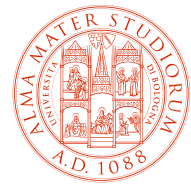
It is not far too long that computers were seen as foolproof machines that processed numerical inputs into numerical outputs and whose calculations were never wrong. Nowadays, digital machines ranging from smartphones and tablets to personal computers and data warehouses are dealing with humanlike tasks that go beyond basic number crunching and enter the realm of higher cognitive processes such as information analysis, pattern recognition, predictive insights, and decision-making. These are achieved via the ubiquitous application of Artificial Intelligence (AI) and Machine Learning (ML). AI and ML have already proved themselves to be viable technologies, and their applications in many domains are increasing every day. This trend of collecting and learning from data is expected to continue even stronger in the near future¹. Analysis of data allows us to both understand the process that underlies the past data and also predict the behavior of the process in the future. A system that is in a changing environment should have the ability to learn; otherwise, we would hardly call it intelligent. ML is not just a database or programming problem; it is also a requirement for AI that enables learning.

From disruptive events to pandemics, political unrest, war conflicts and climate change, winning the future depends on adaptation. To survive and thrive, organizations must maintain a competitive advantage and enable an ability to win in a way that doesn't just withstand changes but embrace them to generate new strategic possibilities. The imperative for change is increasingly the creation of an adaptable organization—one that can thrive in the digital economy. An adaptive organization in the 21st century is archetypically digitally powered, leading many organizations to pursue digital transformation. Air Navigation Service Providers (ANSPs), which are the building blocks of the Air Traffic Management (ATM) system are not an exception to this rule. Sustained adaptability is a constant call for ANSPs and refers to the ability to continue to adapt to changing environments, stakeholders, demands, contexts, and constraints within the wider aviation system.

* Stathis Malakis PhD, Air Traffic Controller, Hellenic Aviation Service Provider & IFATCA Joint Cognitive Human Machine Systems Group. This article is written in a personal capacity and any views expressed are those of the author and do not necessarily reflect the views of any organization the author is affiliated with. Email: stathis.malakis@gmail.com

** Marc Baumgartner, Swiss Air Traffic Controller, IFATCA SESAR and EASA coordinator. This article is written in a personal capacity and any views expressed are those of the author and do not necessarily reflect the views of any organization the author is affiliated with. Email: sesar.coord@ifatca.org

1 Alpaydin, E. (2021). Machine learning: the new AI. Cambridge, MA: MIT Press.



In recent years, there has been a realization that AI/ML is introduced in the safety critical domains building upon:

- advances in capacity to collect and store massive amounts of data;
- significant increases in computing power, and
- development of increasingly powerful algorithms and architectures.

The main advantages of AI/ML are the following:

- rapid identification of patterns in complex real-world data that humans and conventional computer assisted analyses struggle to identify;
- real-time support in decision making, and optimization of multi-parameter problems.

The ATM system is a leading example of a cognitively complex safety critical system where AI/ML applications are introduced. ATM systems comprise several airspace sectors and aerodromes with varying air traffic flows that interact in complex ways and evolve dynamically. As safety critical situations arise (e.g. separation minima between aircraft are violated), Air Traffic Controllers are applying clearances, instructions and information in order to keep safe separations between aircraft². Controllers are expert decision makers who employ cognitive strategies developed over years of operational experience, recurrent training, and sheer accumulation of ATC systems knowledge. Quite often improvise in situ to meet the challenges of traffic imposed by novel events, unfortunate actions and shortcomings of the work system.

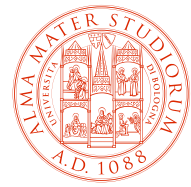
The ATC is a complex safety critical system with the following work characteristics³:

- rapidly escalating situations: the transition from normal to abnormal situations can be rapid (e.g., an aircraft experiencing a decompression can initiate a rapid descend of 6,000 ft per minute affecting the safety of other aircraft, without any prior notice);
- time pressure: available time for decision-making and coordination is severely constrained (e.g., in a loss of separation scenario, the conflict geometry must be detected and resolved within a few seconds);
- severe error consequences: errors can lead to disasters when compensating mechanisms (e.g., automation safety nets) are not present or act in destabilizing ways;
- complex, multi-component decisions: Air Traffic Controllers may have several degrees of freedom (e.g., change the flight level, the speed and the route of aircraft) but their decisions may be in conflict with other goals;
- conflicting/shifting goals: the goals of Safe, Orderly and Expeditious flow as imposed by the International Civil Aviation Authority⁴ are conflicting and consequences may cascade from system design down to the tactical level of day-to-day operations. For example, an orderly flow of air traffic may be a safe flow but not an expeditious one. Another example refers to following noise abatement procedures in the selection of the runway in use when weather conditions dictate the change of runway.

2 ICAO, (2016). Air traffic management. Procedures for air navigation services, Document 4444. 16 ed. Montreal: International Civil Aviation Organization.

3 Malakis, S., Kontogiannis, T., and Kirwan, B. (2010). Managing emergencies and abnormal situations in air traffic control (Part I): Taskwork strategies. *Applied Ergonomics*, 41, 620–627.

4 ICAO, (2018). Air Traffic Services: ANNEX 11 to the Convention of International Civil Aviation. 15th edition. Montreal: International Civil Aviation Organization.



In the next years AI/ML systems are expected to support -more than now- Air Traffic Controllers in performing their safety critical tasks within the ATM ecosystem. Furthermore, the widespread introduction of AI/ML is expected to create a new ATM environment, which will be tightly coupled, more complex to manage, and with pressing needs for:

- minimization of delays;
- reduce the cognitive workload of the Air Traffic Controllers and thus permitting a higher throughput of aircraft in an en-route sector, approach sector and aerodrome tower;
- accommodating a diverse array of autonomous aircraft;
- operating smoothly in adverse weather conditions;
- smoothing out 4D aircraft trajectories, and minimizing environmental impact.

European Union⁵ is envisioning a Digital European Sky⁶ and an irrevocable shift to low and ultimately no-emission mobility. With this goal in mind, ATM and aviation will evolve into an integrated digital ecosystem characterized by distributed data services. This is planned to be accomplished mostly by leveraging digital technologies to transform the aviation sector. The aim is to deliver a fully scalable ATM system for manned and unmanned aviation that is even safer than today's, and, based on higher air ground integration. While the essence of ATM is and will always remain, to ensure the safe and orderly execution of all flights it needs to do so in the most environmentally friendly and cost-efficient way.

In the years to come ATM infrastructure will become more data-intensive. If we consider the ATM comprised of three layers, then current architecture is characterized by:

- airspace layer: limited capacity, poor scalability, fixed routes, fixed national air-space structures;
- air traffic service layer: limited automation, low level of information sharing;
- physical layer: fragmented ATM infrastructure.

Digitalization and especially the introduction of AI/ML, which lies at its core, is expected to enable:

- dynamic & cross FIR airspace configuration & management free routes high resilience at the airspace layer;
- automation support & virtualization Scalable capacity at the air traffic service layer;
- integrated and rationalized ATM infrastructure at the physical layer.

The ATM provides an essential service for aviation and AI/ML are considered the key enablers to overcome current shortcomings and provide the necessary abilities to adapt to the increasing demands of normal operations and disturbances/crisis for the ANSPs. It is envisioned that ATM practitioners will be able to design and eventually operate a system that is smarter and safer, by constantly analyzing, gaining insights, and learning from all aspects of the ATM ecosystem by utilizing AI/ML, deep learning algorithms and big data analytics.

New and emerging AI/ML capabilities are required for the future ATM and U-space environment to provide the necessary levels of performance beyond current limits. Full scale implementation of ATM virtualization that will allow the

⁵ SESAR JU, (2020). Strategic Research and Innovation Agenda - Digital European Sky

⁶ SESAR JU, (2020). EUROPEAN ATM MASTER PLAN- Digitalising Europe's Aviation Infra-structure.



complete decoupling of ATM service provision from the physical location of the personnel and equipment is highly dependent upon digitalization and most importantly to state of the art AI/ML algorithms.

2. Safety and Just Culture in the ATM system

Commercial Aviation counts amongst the safest means of transport per distance travelled. This success is attributed to the philosophy of accident and incident investigation which was developed in the early days of aviation. This has provided a rich source of understanding and learning which has led to the development of improved technological, procedural, organizational facets of the aviation industry as well as human factors. From the very onset of commercial aviation, a large part of the success in increasing safety has been attributed to lessons learned from investigations and hazard identifications. However, it should be recognized that many other factors have contributed to increased safety records in aviation, such as:

- continuous oversight by national regulatory agencies;
- rigorous training of front-line personnel (e.g., Air Traffic Controllers, flight crews and maintenance engineer) for their certification;
- use of airworthiness specifications;
- regulatory imposed backup and redundant safety systems;
- failure containment design principles (e.g., standard design precautions to minimize aircraft hazards in the event of engine rotor failures);
- use of Human Factors Engineering principles in design of aircraft and ATM systems;
- controlled experimentation of systems, components, and procedures (e.g., use of Level D flight simulators, use of wind tunnels to explore the aerodynamics of new designs, etc.);
- simulator training for Air Traffic Controllers;
- institutionalizing evidence-based training;
- operation of mandatory and voluntary reporting systems;
- promotion of Just Culture principles;
- independent industry, agencies, and user associations' efforts to increase safety (e.g., Flight Safety Foundation, pilots' associations, IFATCA, IATA, CANSO, AIRBUS, Boeing);
- circulation of safety knowledge in the form of narratives of safety occurrences and stories of near miss events within communities of practice (Air Traffic Controllers, flight crews, engineers, ramp agents, flight dispatchers).

In recent years, the understanding has evolved so that any incident or occurrence should be reported – voluntary or otherwise, to further increase safety of commercial aviation through the disclosure of incidents and occurrences. Mandatory and voluntary reporting schemes have been developed and are part of national and international law. Whereas accident and incident investigation shall not be used to apportion blame there is, however, a risk that the information disclosed by the reporter will be used in a criminal proceedings. The notion of Just Culture has been created as a counterbalance to keep intact the safety information flow.



James Reason is attributed as the first to coin the term 'Just Culture' and describes it as a part of a larger safety culture⁷. Reason also identified key limitations of no-blame reporting cultures. As a solution to this, the idea of a Just Culture was introduced. He introduced the language of Just Culture, foundational ideas, and principles that ground the notion, and most notably that of gross negligence. Envisaging safety culture to have five components, one of which is Just Culture, Reason argues that a just culture is not the same as a no-blame culture but is a culture where individuals are accountable for their willful misconduct or gross negligence. Reason defined Just Culture as an atmosphere of trust in which people are encouraged (even rewarded) for providing essential safety-related information, but in which they are fully aware about where the demarcation line between acceptable and unacceptable behavior is. An effective reporting culture is therefore underpinned by a 'Just Culture', in which there exists a line of acceptable practice. To this, Reason introduced an algorithm, later to be known as the substitution test, by which an individual practitioners' actions, could be examined, and tested against characteristics of the event and occurrence. Subsequently, Dekker provided further avenues by successions of books⁸ and journal papers⁹ of what later would become the widely accepted view by which aviation organizations and the industry conceived Just Culture.

It is also recognized that Safety Science will also need to evolve to cope with the safety challenges posed by the introduction of AI/ML. Currently, safety assurance frameworks, are not adapted to AI/ML and new ones are being developed¹⁰.

It has long been recognized that ATM safety, is based upon open and insightful safety information "flowing" through the "information veins" of the system. The Just Culture concept as conceived by James Reason, developed by Sidney Dekker and adopted by organizations¹¹, is fundamental to keep the safety information flowing from the operations rooms (i.e. the sharp end of the ATM system) to the executive team (i.e. the blunt end) by institutionalizing that ATM front line operators are able, allowed and willing to share safety information by reporting incidents and other safety-related issues, and when there is a commitment to act on what is shared in order to learn and make things better.

Just Culture is defined by the European Union as¹²: *"a culture in which front-line operators and others are not punished for actions, omissions or decisions taken by them which are commensurate with their experience and training, but where gross negligence, willful violations and destructive acts are not tolerated"*.

Before proceeding any further it is stressed that "gross negligence", "willful violations" and "destructive acts" are legal and not human factors terms.

The concept of Just Culture essentially addresses the mutual recognition of two key functions, aviation safety and the administration of justice and represents the fundamental recognition that both would benefit from a carefully established equilibrium, moving away from fears of criminalization, balancing and satisfying the interests of the two unique and basically not compatible domains. Just Culture does not mean complete protection of front-line operators in the event of aviation incidents and accidents. Particularly, it does not offer protection in case of gross negligence, willful misconduct and/or destructive acts, severe and serious disregard of an obvious risk and/or profound failure of professional responsibility¹³.

7 Reason, J. (1997). *Managing the Risks of Organizational Accidents*. Aldershot: Ashgate.

8 Dekker, S. (2012). *Just Culture, Balancing Safety and Accountability*. Second edition, Ashgate.

9 Dekker, S. W. A. (2009). Just Culture: Who draws the line? *Cognition, Technology and Work*, 11(3), 177-185.

10 EASA, 2020. *Artificial Intelligence Roadmap 1.0*. European Aviation Safety Agency.

11 EUROCONTROL, (2018). *Model for a Policy Regarding Criminal Investigation and Prosecution of Aviation and Railway Incidents and Accidents*. Brussels: Eurocontrol.

12 REGULATION (EU) No 376/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council and repealing Directive 2003/42/EC of the European Parliament and of the Council and Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007.

13 HELVETICA, (2022). *Just Culture Manual for ATCO, ANSE & ATSEP: Behavior after an incident and further proceedings*. V2.0, October 2022. HelvetiCA (Swiss Controllers' Association).



Keeping the Just Culture equilibrium at a balance is based upon:

- the notions of acceptable and unacceptable behaviors, and
- the concept of the “*honest mistake*”.

And this is where AI/ML inherent limitations comes into play.

3. AI/ML and Just Culture

From the state-of-the-art multimodal large language models that are currently available to general public down to the dedicated AI/ML systems that support non-critical tasks these systems come with known limitations. For instance, for a multimodal large language model, known limitations may, such as social biases, hallucinations, and adversarial prompts¹⁴. Before the introduction of AI/ML into the ATM system it was difficult but possible to draw the red line between “*gross negligence*”, “*willful violations*” and “*destructive acts*” on the one side and “*honest mistakes*” on the other side.

To implement an AI/ML project in the Operations Rooms there are several multi-level challenges that must be addressed¹⁵, such as:

- explainability issues of the AI/ML models. If an Air Traffic Controller is presented an AI/ML system that portends to explain how it works, how do we know whether the explanation works, and the user has achieved a pragmatic understanding of the AI/ML? This question entails some key concepts of measurement such as explanation goodness and trust¹⁶;
- function allocation issues. Avoiding leftover strategy where the Air Traffic Controllers are expected to assume control when AI/ML fails;
- development validation and harmonization of the integration of AI/ML technologies in the whole system, among all users (Air Traffic Controllers, flight crews, aerodrome operators and Network Manager);
- keeping the Air Traffic Controllers ‘in the loop’ and situationally aware and able to intervene;
- disruption of established patterns in coordinated activity between Air Traffic Controllers’ and between Air Traffic Controllers’ and flight crews;
- disruption of established patterns of resilience;
- increasing instances of AI/ML induced surprises and clumsiness;
- demand for the development of new mental models, how the AI system works, how it fails, why it fails, and how to adapt¹⁷.

14 GPT-4 (Generative Pre-trained Transformer 4) created by OpenAI. <https://openai.com/product/gpt-4>

15 Malakis, S. Baumgartner, M. Berzina, N. Laursen, T. Smoker, A. Poti, A. Fabris, G. (2022). Challenges from the Introduction of Artificial Intelligence in the European Air Traffic Management System, IFAC-PapersOnLine, Volume 55(29), 1-6

16 Hoffman, R., Mueller, S., Klein, G., & Litman, J. (2023). Measures for explainable AI: Explanation goodness, user satisfaction, mental models, curiosity, trust, and human-AI performance. *Frontiers in Computer Science*, 5. <http://doi.org/10.3389/fcomp.2023.1096257>. Retrieved from: <https://digitalcommons.mtu.edu/michigantech-p/16886>.

17 Borders, J., Klein, G., and Besuijen, R. (2019). An operational account of mental models: A pilot study. *Proceedings of the 2019 International Conference on Naturalistic Decision Making*, San Francisco, CA.



Apart of them there always exist the in-built technical ones due to the nature of algorithms, data and statistics used, such as:

- avoiding data leakage between training validation and testing data sets;
- bias management. Undesirable bias should be identified, evaluated, and when possible, eliminated to contribute to data representativeness:
 - bias introduced by any sampling which could be applied to the data;
 - bias introduced when performing data cleaning or removal of presupposed outliers;
 - recall bias introduced during data annotation or data labelling;
 - bias introduced by adversarial attack resulting in data poisoning.
- capturing singularities: singularities in data refer to the presence of discontinuities or more generally speaking non-linearities characterized by steep variations of various frequency. The intensity, density and complexity of these singularities are the main obstacles to an AI/ML model accuracy;
- consistency checks against the Operational Design Domain (ODD);
- data labelling: labelled data highlights data properties, characteristics, or classifications that can be analyzed for patterns that help predict the target. Data labelling is the process of detecting and tagging target data;
- dimensionality reduction: this step aims to reduce the number of input variables by projecting input data into a lower-dimensional feature space;
- explainability of AI/ML models;
- feature selection: a method that discards the uninformative features and keeps only those that are informative; it is another method for dimensionality reduction;
- generalization: how well a model trained on a training set performs on new data unseen during training;
- hyperparameters tuning: hyper-parameters are identified during the building of the model (training agnostic) like (but not limited to) number of hidden nodes and layers, input features, learning rate, activation function in neural networks (e.g., for neural networks: number of layers, number of neurons in each layer, and their connections, selection of the activation functions in each layer, learning rate);
- identifying missing data;
- limit checks (e.g., Range limits, min., and max. values for the parameter);
- normalization and standardization (scaling): the aim is to get most inputs in the range of 0.0 to 1.0 or -1.0 to +1.0 or something similar;
- overfitting;
- removing bad data (e.g., Garbage characters or error codes);
- representativeness: a dataset is representative when it is complete, and the distribution of its key characteristics is similar to the intended space of the ODD of the targeted application;
- selection of the training stopping criterion(criteria) for ML models;
- split test vs cross validation.



For instance, state of art algorithms for AI/ML systems such as neural networks are essentially “*black boxes*” in terms of explainability. Arguably, the best-known disadvantage of neural networks is their “*black box*” nature. Simply put, you don’t know how or why the neural network came up with a certain output given a certain input. In other words, they are tremendously successful in providing accurate predictions based on historical data, but no-one can understand why.

So, consider an Air Traffic Controller in the operations room who is provided a rather “odd” suggestion for a course of action from an AI/ML digital assistant that employs neural networks. If something goes wrong who is to blame?

With the introduction of AI/ML, as responsibilities for the execution of tasks are progressively delegated to technology, liability will also tend to shift from human operators to the organizations that designed and developed the technology, defined its context and uses, and are responsible for its deployment, integration, and maintenance. Such a shift implies not only that a different target will be moved on the first line for liability attribution (from human operators to technology manufacturer/users), but also that different grounds will be taken into account: from the assessment of human negligence in carrying out his/her duties, to the assessment of the defectiveness of a technology in carrying out its function. It is evident that with the introduction of AI/ML they are triggered by different conditions, have different defenses and different rules for the evaluation of evidence and the burden of proof.

This is the first level of concerns we face for Just Culture in the AI/ML era.

The second level refers to the training of Air Traffic Controllers. The definition of Just Culture speaks of “*...actions, omissions or decisions taken by them which are commensurate with their experience and training...*” but right now, Air Traffic Controllers do not receive any formal training to AI/ML and especially to the state-of-the-art algorithms such as neural network and their limitations. So, do we have to train the controllers on AI/ML and at what level? Do we have to train controllers into understanding bias-variance trade-offs, explainability issues, data validation, feature engineering, hyper-parameters selection, overfitting, limitations of data driven models and all that stuff from AI/ML before providing them with digital assistants in the OPS room?

This is the second layer of concerns.

For both layers the answers are difficult and we don’t pretend we have them. Current playbooks for Just Culture cannot give definitive answers to these questions.

4. Conclusions

Changes in the ATM domain are of permanent nature and challenges of research, development, and transition to introduce these changes are a daily life for ANSPs and their staff. Be it Air Traffic Controllers, technicians, engineers, managers, and decision makers. New Technologies leading digitalization, including AI and ML are finding their ways into the ATM working environment. Whereas lot of expectation is linked to a so-called technology hype introduction of new technology will have to follow the path of introducing new technological component into a running ATM system. Linked to the regulatory and certification challenges, a lot of the modern technology will have to be interwoven into the existing architecture. This will create new challenges, surprises not only at the operational level but also – as we argue in this paper – in safety critical concepts, such as Just Culture.

The introduction of AI/ML can be so transformative as it was the RADAR in the ATC back in the 50s. Since then, it became the standard tool for the Air Traffic Controllers. Controllers now take an extensive formal and on-the-job training in the fundamentals of the radar systems theory and the data processing systems.

We don’t know yet how radical this transformation will be, but we need to influence it to the right direction. Is this some-

thing that needs to change in terms of Just Culture?

The answer is yes.

We argue that the introduction of AI/ML in essence clouds the drawing of a red line between “*gross negligence*”, “*willful violations*” and “*destructive acts*” on the one side and “*honest mistakes*” on the other side (Figure 1).

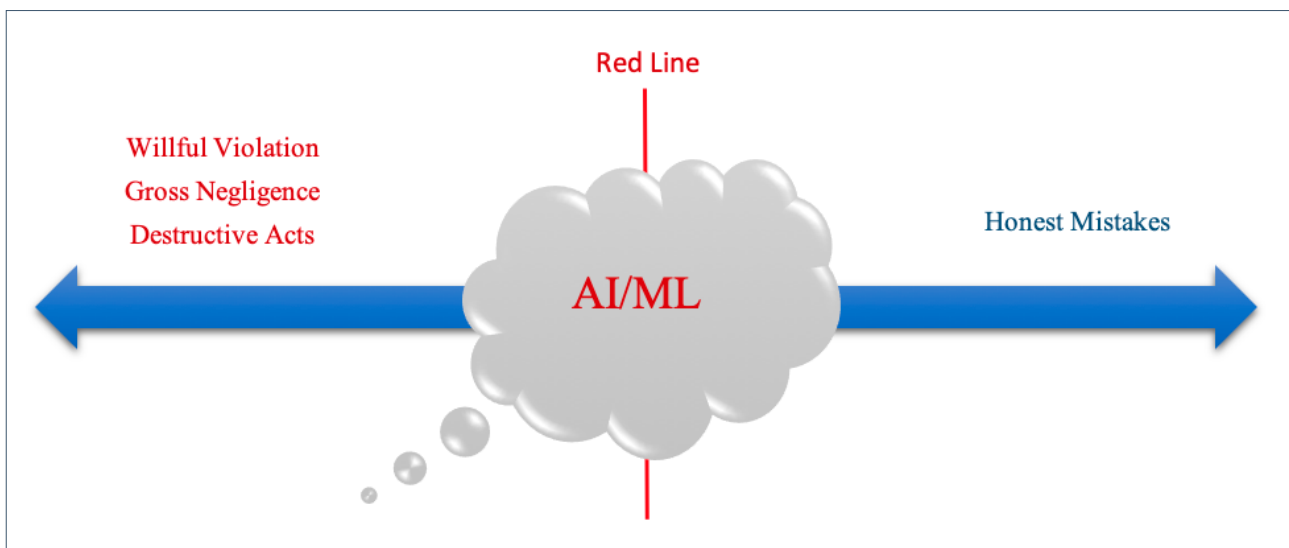


Figure 1 AI/ML clouds the drawing of a red line between “gross negligence”, “willful violations” and “destructive acts” on the one side and “honest mistakes” on the other side

We need to redefine Just Culture and rewrite its playbook in the era of digitalization.

Social Clauses in Air Services Agreements: Is Labour Protection Saving Fair Competition?

by Yuran Shi*

Abstract

In the comprehensive European Union-level air services agreements with Qatar, Ukraine and ASEAN, lawyers and policy-makers can find social clauses addressing labour and employment in the aviation sector. While ambiguity remains as to interpretation and regulation of these types of social clauses in air service agreements, relevant State practices can help supplement international labour standards and may result in less regulatory discrepancies between the European Union Member States and other jurisdictions.

1. Introduction

In October 2021, the European Union (EU) and Qatar signed Agreement on Air Transport between the European Union and its Member States, of the One Part, and the State of Qatar, of the Other Part (EU-Qatar ASA). This is a comprehensive air services agreement (ASA) upgrading rules and standards for flights between the EU and Qatar.¹ As the first comprehensive aviation agreement negotiated between the EU and a Gulf State, the EU-Qatar ASA sets its ambitions high by aiming to regulate matters beyond traffic rights.² According to the EU, the ASA provides a platform for future cooperation in areas such as safety, security and air traffic management while covering environmental matters and committing both Parties to improving labour policies. Social clauses attract the attention of lawyers and policymakers given the poor track record of Qatar when it comes to the legal protection of workers.³ Article 20(1) defines the purpose of social clauses which is to create obligations incumbent on the Parties to cooperate on labour matters in relation to fundamental rights at work, working conditions, social protection, and social dialogue.

There are also social clauses in the Common Aviation Area Agreement between the EU and Ukraine (EU-Ukraine ASA), as well as the Comprehensive Air Transport Agreement between the EU and the Association of Southwest Asian Nations and the EU (EU-ASEAN). Social clauses in ASAs are related to the regulatory concerns around labour and working conditions, as well as the obligations derived from membership of the International Labour Organization (ILO), on the one hand, and the view that labour standards should not be undermined for purposes of competitive advantages, on the other.⁴

Despite the importance of labour clauses in ASAs, it is not automatically clear how provisions relating to labour and employment apply to the air transport industry. Any meaningful analysis of ASAs will invariably have to shift attention or criticism from the efforts of aviation labour protection to how to translate labour protection into meaningful and mandatory obligations. A number of questions arise: why the EU proactively includes labour and employment into ASAs with third countries; whether social clauses are compatible with the Convention on International Civil Aviation (the Chicago Convention (1944)); how social clauses of ASAs can contribute to the protection of aviation workers. This article seeks to discuss these questions by first providing a historical context in Section 2, looking at the role of labour cost in airline competition. Section 3 examines the legitimacy of including social clauses into ASAs, through a normative analysis of the

* PhD candidate in Air and Space Law, Leiden University. The views expressed are purely those of the author and thus may not in any circumstances be regarded as an official position of the Leiden University. Email: yuran.shi@outlook.com.

1 European Commission, EU and Qatar Sign Landmark Aviation Agreement, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5344 (accessed 15 March 2023).

2 Giacomo Restellini, *Labour Relations in Aviation*, Kluwer Law International BV, 2022, at 77.

3 Andrea Trimarchi, *The EU External Aviation Strategy at a Crossroads-The New Regulation (EU) No. 2019/712 on Safeguarding Competition in Air Transport*, 68 ZLW 576 (2019).

4 Andrea Trimarchi, *International Aviation Labour Law*, Routledge, 2022, at 85.

Chicago Convention (1944). Section 4 examines the efficacy of social clauses in improving labour standards and preventing the abuse of tough working conditions to increase airlines' competitiveness. Social clauses create legal obligations relating to the ILO regime, and regional or national laws. The article then concludes with a summary of the answers to these issues and the related questions.

2. Fair Competition and Social Clauses in ASAs

2.1. Labour Cost and Airline Competitive Advantages

Airlines must address a variety of operating cost items, such as aircraft fuel, station expenses, administration expenses, and insurance charges.⁵ Among these costs, labour accounts for a significant portion of an airline's total operating costs. Flight crew expenses represented a 10.9% cost share in 2019 according to an industry average statistic from the International Air Transport Association (IATA), behind only aircraft fuel costs of 17.9%, as well as depreciation and amortisation costs of 13.1%.⁶ Unlike fuel costs, landing charges, and aircraft charges, however, labour costs are one of the few variable costs under direct and more immediate control of airline management.⁷

The notion of competitive advantage is by no means a novelty. Michael E. Porter defined it as the value an entity can create for its buyers that exceeds the entity's cost of creating it.⁸ Airlines find two types of competitive strategies which can contribute to an advantage over their competitors, namely, cost leadership and differentiation.⁹ The extent to which airlines might differentiate themselves from their competitors is an important element in the aviation market. Since deregulation and liberalisation of the United States (US) and EU aviation markets, the structure of the air transport sector has undergone significant changes.¹⁰ Airlines are now able to manoeuvre successfully within or along the edge of competition rules to achieve efficiencies.¹¹ There are all kinds of elements impacting on airline services, including: tangible elements such as seat selection and inflight food and drink service; reliability elements such as reservation service and transit service; empathy elements such as family seat requests and frequent flyer programs; responsiveness elements such as responses to flight delays.¹² All these differences in service quality impact consumer perception which, in turn, impacts consumer choice, something which is especially important in the competition between legacy carriers and low-cost carriers.¹³

2.2. The EU External Aviation Policy

The European Transport Workers' Federation pointed out that every airline surveyed cites unfair competition to justify tougher working condition and impose more flexibility, wage cuts or a weakening of the welfare of its workers, such as use of unsafe working practices, which increase risks of industrial accidents.¹⁴ In 2012, the EU Commission published the report titled '*The EU's External Aviation Policy - Addressing Future Challenges*' which highlighted that:

5 John F. O'Connell, The Rise of the Arabian Gulf Carriers: An Insight Into the Business Model of Emirates Airline, 38 *Journal of Air Transport Management* 43 (2011).

6 IATA, Shares of Major Cost Components in Total Costs, Difference between 2020 and 2019 (Industry Average), <https://www.iata.org/en/iata-repository/publications/economic-reports/shares-of-key-cost-items-changed-during-the-crisis/> (accessed 15 March 2023).

7 Natia Jiniuzashvili, Jurisdiction of Courts and Applicable Law in Aircrew Employment Disputes: Special Reference to Ryanair Employment Disputes, 45(4) *Air and Space Law* 485 (2020); see also Peter Turnbull, Paul Blyton & Geraint Harvey, Cleared for Take-off? Management-Labour Partnership in the European Civil Aviation Industry, 10(3) *European Journal of Industrial Relations* 287 (2004).

8 Michael E. P., *Competitive Advantage: Creating and Sustaining Superior Performance*, The Free Press, 1998, at 3.

9 Ibid.

10 See Juhwan Lim and Hyun Cheol Lee, Comparisons of Service Quality Perceptions between Full Service Carriers and Low Cost Carriers in Airline Travel, 23(10) *Current Issues in Tourism* 1261(2020).

11 See Steven Truxal, *Competition and Regulation in the Airline Industry: Puppets in Chaos*, Routledge, 2012, at 2.

12 See Juhwan Lim and Hyun Cheol Lee, Comparisons of Service Quality Perceptions between Full Service Carriers and Low Cost Carriers in Airline Travel, 23(10) *Current Issues in Tourism* 1261(2020).

13 Fabio Domanico, The European Airline Industry: Law and Economics of Low Cost Carriers, 23 *European Journal of Law and Economics* 203 (2007).

14 European Transport Workers' Federation (ETF), *Social Dumping in Civil Aviation* (2014).



*"Labour costs related to high labour standards and well developed social protection systems are also higher in Europe than in most other world regions as are costs related to compensation for passengers' rights and the cost of carbon emissions. Some of these additional economic burdens and costs for flights to and from Europe compared to the situation in other regions may prevail, at least for some time, while others may, to some extent, be offset by innovation, earlier deployment of new technology in Europe or productivity gains or may be addressed in negotiations with partner countries aiming to create a level playing field, e.g. by respect for international labour and environmental standards."*¹⁵

The wide range of diverging labour standards between the EU carriers and their non-EU competitors was identified as one of main reasons for the lack of competitiveness of the EU aviation sector.¹⁶ For example, the absence of income tax might readily be regarded as a significant competitive advantage of Emirates Airlines, based in the United Arab Emirates, resulting in labour costs comprising a lower percentage of its total operating costs.¹⁷ The European Commission adopted an Aviation Strategy for Europe in 2015¹⁸ which underscored the need to have an effective and efficient regulatory framework so as to give the aviation industry more flexibility to thrive and remain competitive globally.¹⁹ The Commission would reinforce social dialogue and employment conditions in aviation.²⁰

On 17 April 2019, the European Parliament and the Council of the EU adopted Regulation (EU) No. 2019/712 on safeguarding competition in air transport and repealing Regulation (EC) No. 868/2004. Welcomed by the entire aviation community, the new Regulation included some relevant developments such as the identification of, and protection against, distortive practices carried out by non-EU States to the detriment of the EU air transport market.²¹ Recital 7 of Regulation (EU) No. 2019/712 reads that:

*"Fair competition between air carriers should preferably be addressed in the context of air transport or air services agreements with third countries. However, most air transport or air services agreements concluded between the Union or its Member States, or both, on the one hand, and third countries on the other do not so far provide for adequate rules for fair competition. Efforts should therefore be strengthened to negotiate the inclusion of fair competition clauses in existing and future air transport or air services agreements with third countries."*²²

The fine balance between, on the one hand, the relevance of ASAs in the field of subsidies and fair competition and on the other hand, the will of the EU to unilaterally control market distorting behaviour, is one of main focuses of Regulation (EU) No. 2019/712.²³ Remarkably, Article 14(3) confirms two types of redressive measures, including financial measures, and operational measures such as suspension of concessions and air services. According to Article 14(5), the adoption of operational measures shall not result in a violation of international obligation. To this end, Regulation (EU) No. 2019/712 prohibits the Parties to suspend or limit traffic granted under an ASA. Operational measures could potentially lead to a violation of an ASA, as distortive or anticompetitive practices do not usually constitute a cause for unilateral termination

15 European Cockpit Association, *The Case for Fair Competition in Europe's Aviation – Why Action is Needed to Safeguard Our Aviation's Future* (2014).

16 See European Commission, *The EU'S External Aviation Policy – Addressing Future Challenge*, COM(2012) 556 final (2012).

17 Jaap G de Wit, *Unlevel Playing Field? Ah Yes, You Mean Protectionism*, 41 *Journal of Air Transport Management* 23(2014).

18 See European Commission, *An Aviation Strategy for Europe*, SWD(2015) 261 final (2015).

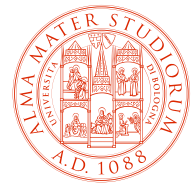
19 *Ibid.*

20 *Ibid.*

21 See Trimarchi, *supra* note 3, at 576.

22 Regulation (EU) 2019/712 of the European Parliament and of the Council of 17 April 2019 on safeguarding competition in air transport, and repealing Regulation (EC) No 868/2004.

23 See Trimarchi, *supra* note 3, at 576.



of ASAs.²⁴ Should any uncertainty remain, the design and enforcement of redressive measures can only be answered on a case-by-case basis in light of all relevant circumstances, including any possible consequences for compliance with labour protection requirements as envisaged by social clauses in ASAs.

2.3. Social Aspects in ASAs

The continuous evolution of ASAs has determined a significant expansion in their scope.²⁵ As early as 2009, the ASA between the EU and Canada (EU-Canada ASA) included a specific clause concerning labour. Article 19 of the EU-Canada ASA noted that the Parties recognised the impact of the ASA on labour, employment and working conditions, and provided for either Party a right to request a meeting of the Joint Committee in order to discuss labour matters in the context of implementation of the EU-Canada ASA. This provision represented a unique example in the regulatory arena of international aviation relations, at least until 2021, when the EU-Qatar ASA expanded upon the social aspects of air transport. Article 19 of the EU-Canada ASA, to the best of my knowledge, contributed to few discussions during its implementation.

Negotiations between the EU and Qatar commenced in 2016 as a result of the authorisation granted to the European Commission to conduct bilateral talks to negotiate comprehensive EU-level air transport agreements with a number of States, including Saudi Arabia, Bahrain, Mexico, Armenia and others.²⁶ In the EU-Qatar ASA, Article 20 provides for three obligations related to labour and employment that: (1) the Parties recognise the right of each Party to establish its own level of domestic labour protection as it deems appropriate, and to adopt or modify relevant laws and policies accordingly, in a manner consistent with its international obligations; (2) the Parties ensure that rights and principles contained in their respective laws and regulations are not undermined but effectively enforced. The violation of fundamental principles and rights at work cannot be used in order to obtain a comparative advantage and labour standards should not be sued for protectionist purposes; and (3) the Parties reaffirm their commitment and obligations pertaining to the ILO regime. All of this said, the EU-Qatar ASA does not provide remedies other than for either Party to request a meeting of the Joint Committee to address labour issues.

Article 14 of the EU-Ukraine ASA presents a different set of obligations when compared with the ones laid down in Article 20 of the EU-Qatar ASA. The former agreement highlights labour obligations relating to the respective laws and policies of the Parties, including: (1) the Parties are to act in accordance with their respective laws concerning the requirements and standards relating to social aspects specified in Annex I, Part E to the Agreement. Part E includes references to Council Directive 89/391/EEC on the safety and health of workers at work,²⁷ Directive 2003/88/EC on the organisation of working time,²⁸ and Council Directive 2000/79/EC on the organisation of working time of mobile workers in civil aviation²⁹; (2) Ukraine is required to adopt the necessary measures to incorporate in its legislation and implement requirements and standards referred to in (1) above; (3) the Parties agree to cooperate so as to ensure the implementation of legislation incorporating requirements and standards referred to in (1) above. Article 14 of the EU-Ukraine ASA provides for transitional periods for the parties to implement relevant legislation as required under the ASA; however, the EU-Ukraine ASA does not provide for any form of mechanism to address possible labour issues which arise under or related to the agreement.

²⁴ Ulrich Schulte-Strathaus, *Is the European Commission Fulfilling its Ambitious Aviation Strategy?*, 42(6) *Air & Space Law* 528 (2017).

²⁵ See Trimarchi, *supra* note 4, at 50.

²⁶ Magdalena Kučko, *The EU-Qatar Air Transport Agreement: Bound to Succeed?*, 45(3) *Air & Space Law* 231 (2020).

²⁷ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.

²⁸ Directive 2003/88/EC of the European Parliament and of the Council of 4 November 2003 concerning certain aspects of the organisation of working time.

²⁹ Council Directive 2000/79/EC of 27 November 2000 concerning the European Agreement on the Organisation of Working Time of Mobile Workers in Civil Aviation concluded by the Association of European Airlines (AEA), the European Transport Workers' Federation (ETF), the European Cockpit Association (ECA), the European Regions Airline Association (ERA) and the International Air Carrier Association (IACA).



The EU-ASEAN ASA has the privilege of being the first bloc-to-bloc air transport agreement in the world.³⁰ The Parties concluded it in order to provide a foundation for closer cooperation between the EU and the ASEAN in areas of fair competition, aviation safety, air traffic management, consumer protection, environmental, as well as social matters.³¹ Article 22 on social aspects, borrowed verbatim from Article 20 of the EU-Qatar ASA, attempts to ensure compliance with international labour law principles, and to ensure adequate protection for aviation workers who fall within the scope of the EU-ASEAN ASA.

3. Compatibility of Social Clauses in ASAs with the Chicago Convention (1944)

3.1. Articles 1 and 6: The Role of Bilateralism

The Chicago Convention (1944), which is widely regarded amongst aviation lawyers as the *Magna Carta* of international civil aviation, provides for a foundational legal framework for international aviation.³² Article 1 confirms the sovereignty of States over their airspace. In this connection, Article 6 of the Chicago Convention (1944) states that special permission must be granted for the operation of scheduled international air services, which is the corollary to the principle of sovereignty in the air. ASAs are designed to open the airspace of signatory States to the operators of air services in other signatory States which would otherwise be closed for such services.³³ ASAs are the traditional vehicle that States have used to negotiate and exchange air traffic rights and afford aviation market access to other States.³⁴ Having developed as early as shortly after the entering into force of the Chicago Convention (1944), ASAs have significantly evolved, both numerically and qualitatively.³⁵

Article 6 of the Chicago Convention (1944), together with the ASAs regime, remain the starting point for the operation and successful functioning of scheduled international air services. One of the main reasons why bilateral ASAs have become so important in this regard is the flexibility and adaptability of contents.³⁶ States can include clauses into ASAs addressing varieties of matters more than opening up national air service markets to airlines of other States. Over the years, bilateral agreements have changed their main focus from technical aspects of overflight to the regulation of certain commercial elements of air transport, such as competition and, eventually, labour conditions.³⁷ For example, a handful of ASAs, most notably the 2007 EU-US ASA, contain open-ended provisions calling for cooperation on competition issues, although what that means in practice is hazy.³⁸

3.2. Article 11: Non-Discrimination with Respect to Air Regulations

The fact that the Chicago Convention (1944) does not explicitly mention the use of ASAs as the mechanism to exchange of traffic rights does not mean that States have unlimited discretion over contents of ASAs. The principle of complete and exclusive State sovereignty has not prevented States from fulfilling their obligations under the Chicago Convention (1944). Article 11 of the Chicago Convention (1944) notes that air regulations of a contracting State shall be applied to the aircraft of all contracting States without distinction as to nationality. This provision established the principle of

30 The ASEAN consists of ten countries, namely Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

31 See Restellini, *supra* 2, at 80.

32 Benjamyn I. Scott & Andrea Trimarchi, *Fundamentals of International Aviation Law and Policy*, Routledge, 2022, at 32.

33 Pablo Mendes de Leon & Erik Jaap Molenaar, Still a Mile Too Far? International Law Implications of the Location of an Airport in the Sea, 14 *Leiden Journal of International Law* 234-245 (2001).

34 Bin Cheng, *The Law of International Air Transport*, Oceana, 1962, 300-321; see also, Pablo Mendes De Leon, *Air Transport as a Service under the Chicago Convention*, 19(2) *Annals of Air and Space Law* 523 (1994).

35 See Trimarchi, *supra* note 4, at 49.

36 Andrea Trimarchi, *Airline Non-Commercial Advantages and Fair Competition*, Jan Walulik ed, *Harmonising Regulatory and Antitrust Regimes for International Air Transport*, Routledge, 2019, at 151.

37 Brian F. Havel & Gabriel S. Sanchez, *The Principles and Practice of International Aviation Law*, Cambridge University Press, 2014.

38 *Ibid.*



non-discrimination with regards to applicability of a signatory State's air regulations. Labour and employment challenges in civil aviation such as atypical employment and pilot fatigue have negative effects on the safe completion of air transportation. It would thus not contradict the purpose of the Chicago Convention (1944) to identify regional or national labour standards as air regulations to the extent that labour conditions of aviation workers impact the safety and reliability of air navigation.³⁹ Such a way of interpretation can find evidence from State practices and aviation labour law discussions.

On the one hand, the liberalisation and deregulation of aviation markets and the emergence of new business models, especially low-cost carriers (LCCs), have given rise to numerous trends in contemporary employment relationships concluded in relation to pilots and cabin crew.⁴⁰ There is rising concern that application and usage of new types of employment contracts, such as zero-hour contracts, pay-to-fly schemes, self-employment, and fixed-term work may be subject to potential abuse, to the obvious detriment of pilots and cabin crew members concerned.⁴¹ The mental and physical conditions of airline workers can impact their fitness for air transport operations.

On the other hand, discussions have examined the probability that a hypothetical Annex to the Chicago Convention (1944) to address aviation labour law which would fit particularly well in the current network of international technical specifications, *i.e.* Standards and Recommended Practices (SARPs). Article 12 of the Chicago Convention (1944) reaffirms the binding status of Standards laid down in SARPs, noting that “[e]ach contracting State undertakes to keep its own regulations in these respects uniform, to the greatest possible extent, with those established from time to time under this Convention”. The fact that SARPs address labour and employment in air transport would lead to the conclusion that, to the extent precarious working conditions exert pressure on the aviation safety, labour standards can also be air regulations.

Whereas an ASA only creates rights and obligations between the contracting Parties, social clauses therein might be incompatible with the principle of non-discrimination as recognised by Article 11. States can treat all other States equally during the negotiation and conclusion of social clauses in ASAs, so as to ensure that applicable national or regional aviation labour regulations are imposed upon foreign carriers without discrimination. The different obligations imposed by the EU-Qatar and the EU-Ukraine may lead to incompatibility with the Chicago Convention (1944). It remains to be seen whether and to what extent States would actually do this considering that the exchange of traffic rights and guarantee for labour standards can be used a negotiating leverage for States. Moreover, the success of the Chicago Convention (1944) and ICAO owe much to the focus on technical matters. It is not easy to picture how SARPs might bring States to harmonise their very fragmented and variegated social and labour policies.⁴²

3.3. Preamble to the Chicago Convention (1944)

The Preamble to the Chicago Convention (1944) provides that “*international air transport services may be established on the basis of equality of opportunity and operated soundly and economically*”. Despite the non-binding character of the Preamble, it permits consideration of the mission of the Chicago Convention (1944) in the interpretation and implementation of statutory clauses, as suggested by Article 31(2) of the Vienna Convention on the Laws of Treaties.⁴³ Where air

39 Atypical employment refers to all those contractual forms of employment other than open-ended employment contracts, which are increasingly used in the aviation industry, including fixed-term work, self-employment, pay-to-fly schemes and zero-hour contracts. See Yves Jorens et al, *Atypical Forms of Employment in the Aviation Sector*, European Commission (2005).

40 *Ibid.*

41 See Jiniuzashvili, *supra* note 7, at 479.

42 See Trimarchi, *supra* note 4, at 148.

43 Article 31(2) of the Vienna Convention on the Laws of Treaties: The context for the purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes: (a) any agreement relating to the treaty which was made between all the parties in connection with the conclusion of the treaty; (b) any instrument which was made by one or more parties in connection with the conclusion of the treaty and accepted by the other parties as an instrument related to the treaty.



carrier advantages may derive from differences in national legislation concerning employment and work in the aviation industry, these legal discrepancies would result in comparative advantages having a direct impact on competition between airlines.⁴⁴ States shall pay attention to harmonisation of relevant domestic legal regimes. Furthermore, the Preamble underscores importance of economic development of international air transport services, allowing the possibility of reviewing effects of labour and employment issues on fair competition in global aviation market.

States have ASAs as the key legal basis for reciprocal market access with respect to air services and, although having treaty-law status related to Article 6 of the Chicago Convention (1944), having a peculiar and flexible contract-like form.⁴⁵ The shift from traditional bilateral ASAs of the Bermuda style to more liberal and progressive open skies agreement has possibly enlarged the scope of application. These agreements include new aspects worth of receiving reciprocal governmental approval, such as, for instance, fair competition and equality of opportunities clauses.⁴⁶ As noted in the Sixth Worldwide Air Transport Conference, “*liberalisation is a means and process, not an end*”.⁴⁷ ASAs can help create a favourable environment in which international air transport may develop and flourish in an economical and sustainable manner, while respecting social and labour standards.⁴⁸ The social clauses provide an available option to address the concerns related to airline fair competition through the advocacy of high labour standards.

4. Enforceability of Labour and Employment Obligations

4.1. International Labour Standards

4.1.1. Ratification of Fundamental ILO Conventions

International labour standards are legal instruments drawn up by the ILO’s tripartite constituents, *to wit* governments, employers, and workers, setting out basic principles and rights work.⁴⁹ The ILO has established a system of international labour standards, including International Conventions and Commendations, covering all matters to work. In this connection, the EU-Qatar ASA and the EU-ASEAN ASA highlight obligations pertaining to the ILO regime.

Article 20(6) of the EU-Qatar ASA advocated that the Parties undertake to make best endeavours towards ratifying fundamental ILO Conventions. Article 22(6) of the EU-ASEAN ASA has the same set of obligations. While the EU Member States have ratified initial eight fundamental Conventions, the 110th Session of the International Labour Conference included safety and healthy working environment in the ILO’s framework of fundamental principles and rights at work.⁵⁰ As a result, the ILO Declaration on Fundamental Principles and Rights at Work has been amended to the effect that the Protocol of 2014 to the Forced Labour Convention, the Occupational Safety and Health Convention (No. 155) and the Promotional Framework for Occupational Safety and Health Convention (No. 187) are now considered as fundamental Conventions.⁵¹ The successful completion of the EU-Qatar ASA adds new pressure to the EU Member States that have not ratified all fundamental ILO Conventions.⁵² In comparison, Qatar have ratified five fundamental ILO Conventions, with the latest ratification in 2007 of the Abolition of Forced Labour Convention (No.105).⁵³ The ASEAN States provide different performance of ratification of fundamental ILO Conventions. While Brunei has only ratified the Worst Forms of

44 See Trimarchi, *supra* note 36, at 152.

45 *Ibid.*

46 See Truxal, *supra* note 11.

47 ICAO, *Sixth Worldwide Air Transport Conference: Sustainability of Air Transport* (2013).

48 *Ibid.*

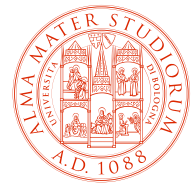
49 ILO, *Rules of the Game: An Introduction to the Standards-Related Work of the International Labour Organization* (2019).

50 ILO, *Resolution on the Inclusion of a Safe and Healthy Working Environment in the ILO’s Framework of Fundamental Principles and Rights at Work*, ILC.110/Resolution I (2022).

51 ILO, *Ratifications of Fundamental Instruments by Country*, https://www.ilo.org/dyn/normlex/en/f?p=1000:10011:::NO:10011:P10011_DISPLAY_BY,P10011_CONVENTION_TYPE_CODE:1,E (accessed 15 March 2023).

52 *Ibid.*

53 *Ibid.*



Child Labour Convention (No.182) in 2008 and the Minimum Age Convention (No. 138) in 2011, Indonesia has ratified nine fundamental Conventions.⁵⁴

Social clauses in ASAs have not witnessed legal disputes relating to ratification of fundamental ILO Conventions. Lessons could in particular be drawn from national and international experiences in other types of bilateral or multilateral agreements containing social clauses. On 17 December 2018, the EU requested consultations with the Republic of Korea concerning certain measures, including provisions of the Trade Union and Labour Relations Adjustment Act.⁵⁵ The Panel of Experts found that:

"Article 13.4.3 imposes a legally binding obligation on the Parties to make 'continued and sustained efforts towards ratification' of the core ILO Conventions. This is an obligation of 'best endeavours': the standard against which the Parties are to be measured is higher than undertaking merely minimal steps or none at all, and lower than a requirement to explore and mobilise all measures available at all times."⁵⁶

Similarly, neither Article 20 of the EU-Qatar ASA nor Article 22 of the EU-ASEAN ASA provides a clear and transparent timeline for performing obligations related to ratification of fundamental ILO Conventions. Interpretation of 'best endeavours' would be dependent on a case-by-case analysis, resulting in much legal ambiguity due to complex and domestic nature of States' relations with the ILO regime. Furthermore, these two ASAs mention that the Parties will also "consider the ratification of other ILO Conventions". The different usage of languages between 'undertakes' and 'will also consider' can contribute to interpretation of binding effects of obligations thereunder. The non-binding character of soft obligations favoured States which do not consider accelerating their progress of ratifying non-fundamental ILO Conventions.

4.1.2. Effective Implementation of the ILO Conventions

Article 20(6) of the EU-Qatar ASA and Article 22(6) of the EU-ASEAN ASA mention the obligation that the Parties shall consider effective implementation of ratified international labour standards in labour and social domain of relevance for civil aviation sector. Ratification is purely voluntary and sovereign act whereby a State undertakes to implement provisions of the ILO Conventions.⁵⁷ Most international labour standards have a specific technical content and often require an adaptation of domestic legislation and administrative arrangements. Others are programmatic in nature and tend to require that the State adopt a genuine policy in a given field rather than laws and policies.⁵⁸ In the ILO's practice, however, there have been increasingly poor rates of ratification, adherence, and compliance.⁵⁹ This is in part reflects the perception that the ILO is becoming less predominant as developing States compete to reduce their labour practices in a classic race to the bottom. As a result, it is not easy to ascertain whether the ILO Conventions would be effective in providing international legal protection in a number of social, labour and employment issues in the context of civil aviation.⁶⁰

⁵⁴ *Ibid.*

⁵⁵ Panel of Experts Proceeding Constituted Under Article 13.15 of the EU-Korea Free Trade Agreement, Report of the Panel of Experts, https://trade.ec.europa.eu/doclib/docs/2021/january/tradoc_159358.pdf (accessed 15 March 2023).

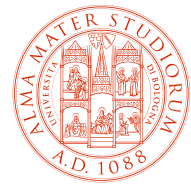
⁵⁶ *Ibid.*

⁵⁷ Jean-Michel Servais, *International Labour Law*, Kluwer Law International BV, 2022, at 58.

⁵⁸ *Ibid.*

⁵⁹ See Trimarchi, *supra* note 4, at 138.

⁶⁰ See Yuran Shi, *Labour Protection and Civil Pilots in China: Training Cost in the Legal Swamp*, 47(4&5) *Air & Space Law* 467 (2022).



4.1.3. Non-Legally Binding ILO Instruments

The EU-Qatar ASA and the EU-ASEAN ASA also provide obligations relating to some important non-legally binding ILO instruments:

"The Parties reaffirm their commitment, in accordance with their obligations deriving from their membership of the International Labour Organization (ILO) and the ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up, adopted by the International Labour Conference at its 86th Session in 1998, to respect, promote and effectively implement and apply the Fundamental Rights and Principles at Work."⁶¹

These obligations are independent of ratification and implementation of the ILO Conventions. In other words, the Parties commit to respect and promote labour standards laid down in listed instruments even before they have not ratified corresponding ILO Conventions. Whereas legal effects of obligations arise from bilateral agreements, the non-binding nature of those ILO instruments does not impact implementation and supervision of the commitment.

4.2. Laws and Policies of the Contracting Parties

Besides the commitment to meet requirements set out in international labour Conventions and in the ILO Declaration on Fundamental Principles and Rights at Work, as well as a commitment to ratify current and future relevant ILO Conventions, the ASAs may also include respect of domestic labour regulations. Article 20 of the EU-Qatar ASA and Article 22 of the EU-ASEAN ASA provide two types of obligations in the context of domestic laws. On the one hand, the Parties shall continue to improve laws and policies in a manner consistent with their international obligations and shall strive towards providing and encouraging high levels of labour protection in aviation sector. On the other hand, the Parties shall ensure that rights and principles contained in their respective laws and regulations are not undermined but effectively enforced. In particular, violation of fundamental principles and rights at work cannot be invoked or otherwise used as a legitimate comparative advantage. Labour standards should not be used for protectionist purposes. Social clauses in the EU-Qatar and the EU-ASEAN ASAs make it clear that there is the commitment to establish appropriate levels relating to labour standards and labour protection. The ASAs have had a promotional nature with regard to aviation industries in third countries. For example, there has been a lot of attention surrounding the decision of Qatar Airways to discontinue the practice of dismissing female aircrew members due to the fact that they were getting married or after communicating their pregnancy.⁶²

Article 14 of the EU-Ukraine ASA established a different regime covering obligations related to domestic laws of Ukraine. This provision provides that *"Ukraine shall adopt the necessary measures to incorporate in its legislation and effectively implement the requirements and standards"* relating to social aspects. Article 14 lays down essence of this horizontal agreement, according to which Ukraine is requested to integrate the *acquis communautaire* in its domestic legislation.⁶³ According to transitional periods stipulated in Annex III to this agreement, the transition towards effective implementation of all provisions and conditions stemming from the EU-Ukraine ASA is subject to inclusion of the exclusive list of the EU standards into the legislation of Ukraine. What seemingly remains is a looming cloud of uncertainty on the length of transitional periods and a lack of uniformity in approach on how the EU Member States, on the one hand, and Ukraine, on the other, deal with incorporation of requirements and standards as enshrined in the EU Directives referred to in Annex I, into their respective laws and policies.

⁶¹ Article 20(4) of the EU-Qatar ASA and Article 22(4) of the EU-ASEAN ASA.

⁶² The Guardian, *Qatar Airways Will No Longer Sack Cabin Crew Who Become Pregnant or Marry*, <https://www.theguardian.com/money/2015/aug/27/qatar-airways-will-no-longer-sack-cabin-crew-who-become-pregnant-or-marry> (accessed 15 March 2023).

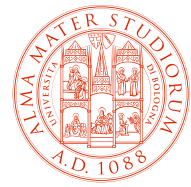
⁶³ See Trimarchi, *supra* note 4 at 52.



5. Conclusion

There can be little doubt that ASAs have, more than any other instrument in aviation regulation, contributed to a progressive liberalisation and deregulation of air services. When negotiating comprehensive EU-level ASAs with third countries, the EU Commission seeks to ensure, amongst other things, that the respective policies and laws of the relevant counterparties support high levels of protection in the labour and social domains, and that opportunities created by the ASA do not weaken domestic labour legislation and standards as well as their enforcement. In this connection, the EU-Qatar ASA and the EU-ASEAN ASA include the same sets of labour and employment obligations relating to the ILO regime and their respective laws. The EU-Ukraine ASA provides obligations focusing more on the domestic regulations of Ukraine.

ASAs find their roots in the Chicago Convention (1944), although the Convention itself never expressly refers to ASAs or bilateralism. Flexibility and adaptability in ASAs have allowed the inclusion of labour clauses within the scope of more recently concluded agreements, so as to allow these ASAs to regulate challenges and regulatory concerns arising out of atypical employment, pilot fatigue, and labour cost. To ensure compatibility with the Chicago Convention (1944) imposes restrictions on the inclusion and interpretation of social clauses into ASAs. And, more importantly, the efficacy of social clauses to improve labour standards and the lack of mechanisms for the enforcement of labour clauses in ASAs, as well as the complexity of domestic labour conditions, could well result in uncertainty in the supervision and implementation of social clauses. To this end, given the importance of social clauses, caution is necessary in evaluating the effects of labour clauses in ASAs. Nevertheless, these ASAs should, in the author's view, be permitted to supplement prospective international labour standards, regional regulations, and national laws, especially if this would result in a more uniform and labour legislative regime. Lessons learned therefrom can also be utilised to address aviation labour issues at the international level.



Space

Space Diplomacy: a Multi-Purpose Lever Guaranteeing Global Sustainability, Safety and Security

by Luisa Santoro

IRIS²: The New (Material) Girl on the Block. Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²)

by Sara Dalledonne

Space Diplomacy: a Multi-Purpose Lever Guaranteeing Global Sustainability, Safety and Security

by Luisa Santoro*

Abstract

Space has become an integral part of the national strategies of all economically and technologically advanced countries, that exploit its diplomatic potential to gain tangible and intangible cultural and socio-economic benefits. The “most spectacular space diplomacy exercise” dates back to the dawn of the space era, i.e. to July 1975, when, in the midst of the Cold War, the first collaboration between the United States and the Soviet Union took place, thanks to an approach that since then has gradually become an essential part of the governmental strategies of all space-faring countries, so that today, within the international space community, ‘space diplomacy’ represents the basis on which specific capacity- and confidence-building platforms are created and developed, making it possible for countries, organisations and individuals to establish, maintain and/or strengthen bilateral and multilateral collaborations as a first step towards much more engaging and structured projects or programs. This article reviews some of the main multilateral space coordination platforms, providing also two specific examples of best practices in action.

1. Introduction

Space has become an integral part of the national strategies of all economically and technologically advanced countries, that exploit its political and diplomatic potential to gain tangible and intangible cultural and socio-economic benefits ranging from precision agriculture and climate change or critical infrastructures’ monitoring for the provision of most accurate specific reports, to hydrogeological risk assessment and geo-spatial positioning, including even contributions - in terms of competitiveness and innovation - to entrepreneurship (large companies, SMEs, start-ups and/or micro-enterprises), thus guaranteeing concrete answers and solutions to citizens, for their well-being and the one of the entire planet.

Captivating and characterised by a very strong symbolic value, beyond constituting a strategic sector of the world economy, space activities represent a source of national and international prestige, a real “trademark” for one country’s identity; a distinctive feature that is easily identifiable beyond national borders, often capable of turning into a strategic and game-changing diplomatic lever, both in geopolitical terms and in international collaborations¹; capable even to promote or strengthen relations, often making the difference in the midst of opposing forces, as, for instance, experienced with the Apollo-Soyuz Test Program, i.e. the first collaboration between the United States and the Soviet Union, which, on 17 July 1975, at 16:19 Utc, led to the docking in orbit of the Apollo spacecraft with the Russian Soyuz capsule, and to the transfer of their respective crews from one spacecraft to the other. In the midst of the Cold War, that was considered the “most spectacular space diplomacy exercise”², or, rather, an approach that since then has gradually become an essential part of the governmental strategies of all space-faring countries, including Italy, where in 2019 Prime Minister Giuseppe Conte issued specific national guidelines on space and aerospace indicating as a priority the definition of “a space diplomacy which envisages strengthening international cooperation and national supervision at the highest institutional levels of all the international organisations in the industry, in order to ensure a constant and influential Italian presence,

* Head of the Space Studies and Scenario Analyses Office, Italian Space Agency.

The opinions expressed in this article are purely the views of the author, and thus may not in any circumstances be regarded as an official position of the institution the author belongs to.

1 https://ec.europa.eu/info/files/space-strategy-europe_en

2 Roberto Della Ceca, “Alle origini della space diplomacy” (<https://www.media.inaf.it/2020/07/16/space-diplomacy/>). The author also underlines that the event is considered to be the fourth in importance in the conquest of space, after the launch of Sputnik 1 (October 4, 1957), Yuri Gagarin’s space enterprise (April 12, 1961) and the landing of the first man on the moon (Neil Armstrong, July 21, 1969).

through active participation in the United Nations, ESA, European Commission and in joint programmes with NASA and the Space Agencies of other countries”³; and where the Italian Space Agency echoes the same concepts both in its Strategic Vision Document⁴ and the (more operational) Three-year Activity Plan⁵. Because space diplomacy is not just a useful tool to be used in order to manage and soften differences between countries or address shared global problems; it is also a multi-purpose - scientific, technological, economic, industrial, social, etc - lever for the international promotion of common values and goals, thus stabilising potential tensions in the space field and beyond.

2. International Coordination Initiatives in the Space Field

Within the international space community ‘space diplomacy’ represents the basis on which specific capacity- and confidence-building⁶ platforms are created and developed - even before the elaboration of research projects - in various thematic areas, making it possible for countries, organisations and individuals to establish, maintain and/or strengthen bilateral and multilateral collaborations as a first step towards much more engaging and structured projects or programs.



Among such multilateral platforms the first to be mentioned is - given its universal character - the **United Nations Committee for the Peaceful Use of Outer Space - UNCOPUOS**, an inter-governmental body established by the United Nations General Assembly in 1958 (Resolution 1348 XIII of 13 December 1958) in order to govern the peaceful and safe exploration and use of outer space for the development of all mankind. More specifically, COPUOS also encourages space research programs and space-related activities that could be undertaken or supported by the United Nations, and investigates legal issues arising from space exploration. It was instrumental for the elaboration of the five Treaties⁷ and the basic principles⁸ governing space activities, and it addresses international cooperation in space exploration and the use of space technology and applications aimed at achieving the SDGs, on the basis of an agenda in continuous transformation because of the rapid progress of technologies. The initial 18 Members (Italy among them) constituting COPUOS in 1958 have been constantly increasing in time, so that they were 102 as at the end of 2022, with a number of permanent observers that contribute to its work, too. COPUOS carries out its activities by means of two subcommittees, the Legal Subcommittee (LSC) and the Scientific and Technical Subcommittee (STSC), that convene in Vienna twice per year (once separately and once in a plenary meeting) and whose decisions are taken by absolute consensus of all the member States: *“Unlike other UN bodies, there is no voting; matters are discussed until consensus is reached, or if no consensus can be reached, the discussion is either suspended or the matter dropped. This is significant, because it means that the*

3 Government guidelines on space and aerospace, https://presidenza.governo.it/AmministrazioneTrasparente/Organizzazione/ArticolazioneUffici/UfficiDirettaPresidente/UfficiDiretta_CONTE/COMINT/DEL_20190325_aerospazio-EN.pdf

4 https://www.asi.it/wp-content/uploads/2020/04/DVSS-2020-2022-Finale_compressed_compressed.pdf

5 https://www.asi.it/wp-content/uploads/2022/05/2022_04_28-DEL-052-PTA-2022-2024.pdf

6 “Confidence Building Measures (CBMs) are broadly defined as measures that address, prevent, or resolve uncertainties among states. Designed to prevent wanted and especially unwanted escalations of hostilities and build mutual trust, CBMs can be formal or informal, unilateral, bilateral, or multilateral, military or political, and can be state-to-state or non-governmental. They are particularly pertinent in addressing and working towards the resolution of long-term political stalemates. First conceived of in the context of European conflict management in the 1970s, the concept of CBMs includes military, cultural, and social exchange, and has been applied to conflicts throughout the world...” ([https://www.csis.org/programs/international-security-program/isp-archives/asia-division/cross-strait-security-initiative-1#:~:text=Confidence%20Building%20Measures%20\(CBMs\)%20are,or%20resolve%20uncertainties%20among%20states](https://www.csis.org/programs/international-security-program/isp-archives/asia-division/cross-strait-security-initiative-1#:~:text=Confidence%20Building%20Measures%20(CBMs)%20are,or%20resolve%20uncertainties%20among%20states)).

7 They are: the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space (1967); the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968); the Convention on International Liability for Damage caused by Space Objects (1972); the Convention on Registration of Objects Launched into Outer Space (1975); the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979).

8 The principles are defined in a specific declaration adopted in 1962 by the United Nations’ General Assembly and can be summarised as follows: exploration and use of outer space for the benefit and in the interests of all mankind; free and equal exploration and use of outer space and celestial bodies by all States and in accordance with international law; non appropriation of outer space and celestial bodies; States’ international responsibility for national activities in outer space (whether carried on by governmental agencies or by non-governmental entities); co-operation and mutual assistance to guide States in the exploration and use of outer space (see <https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/legal-principles.html>).

decisions of COPUOS are unanimous and therefore politically binding on all COPUOS member States”⁹. The Committee is supported by the United Nations Office for Outer Space Affairs (UNOOSA), that implements a complex programme covering the scientific, technical, legal, and policy aspects of space-related activities.

As mentioned above, in addition to COPUOS a number of voluntary, non-binding coordination thematic bodies can be found in the space arena, that support both national interests and the entire international community. Consistently with its role as member of the European Union and NATO Italy, too, participates in most of them - mainly through the Italian Space Agency. The most important of such platforms are:



The **Group on Earth Observations - GEO**, “a partnership of more than 100 national governments and in excess of 100 Participating Organizations that envisions a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.”¹⁰. It was formally established in 2005 and until then preceded by the “Ad Hoc GEO”, its embryonic form dating back to 2003. The GEO community is developing the Global Earth Observation System of Systems (GEOSS) in order to help address global needs and knowledge gaps in this domain, and has also already “made more than 400 million data and information resources accessible via www.geoportal.org”¹¹. The GEO Plenary is the main body, formed by designated representatives of the Members and Participating Organizations. The Members hold decision-making authority. Supported by a Secretariat, an Executive Committee oversees GEO’s activities. It consists of 16 representatives¹², with three Participating Organizations acting as observers;



The **Committee on Earth Observation Satellites - CEOS**, that was formed in 1984 under the auspices of the G7 Economic Summit of Industrial Nations Working Group on Growth, Technology, and Employment following a recommendation elaborated by a Panel of Experts on Remote Sensing, who “recognized the multidisciplinary nature of space-based Earth observations and the value of coordinating international Earth observation efforts to benefit society”¹³. Initially tasked with the coordination and harmonisation of Earth observations so as to make it easier for the user community to have access to and then use space data, over time CEOS has gradually expanded its objectives and activities, so that today it works “more closely with other satellite coordinating bodies (e.g. the Coordination Group for Meteorological Satellites, CGMS)”¹⁴, with a recognised leading role as international forum for the coordination of space-based Earth observations. Today it consists of five Working Groups¹⁵ that address topics ranging from calibration/validation, data portals, capacity building, disaster management, climate, and common data processing standards shared within a number of Earth observation domains. In addition, CEOS also played an influential role for the establishment of the Group on Earth Observations (GEO) and the realisation of the Global Earth Observation System of Systems (GEOSS);

9 <https://www.sciencedirect.com/science/article/abs/pii/S2468896721000094>

10 https://www.earthobservations.org/geo_community.php

11 Ib.

12 For 2023 they are: Nigeria, Senegal, South Africa, Costa Rica, Peru, United States, Australia, China, Japan, Korea, Armenia, Russian Federation, European Commission, France, Italy and Spain.

13 <https://ceos.org/about-ceos/overview/>

14 Ib.

15 WGCapD: Working Group on Capacity Building & Data Democracy; WGClimate: CEOS/CGMS Working Group on Climate; WGCV: Working Group on Calibration & Validation; WGDisasters: Working Group on Disasters; WGISS: Working Group on Information Systems & Services.



The **Inter-Agency Space Debris Coordination Committee - IADC**, an inter-governmental forum founded in 1993 that promotes the exchange of information and best practices relating to the study of space debris - i.e. man-made and/or natural orbital debris posing a risk to spacecraft. Exactly as the already-mentioned Committees, it adopts by consensus mitigation measures aimed “to preserve the near-Earth space environment for future generations.”¹⁶ and reviews the progress of related ongoing co-operative activities, “while recognising the unique nature of the following regions, A and B, of outer space (see Figure 1), to ensure their future safe and sustainable use”¹⁷;

“while recognising the unique nature of the following regions, A and B, of outer space (see Figure 1), to ensure their future safe and sustainable use”¹⁷;

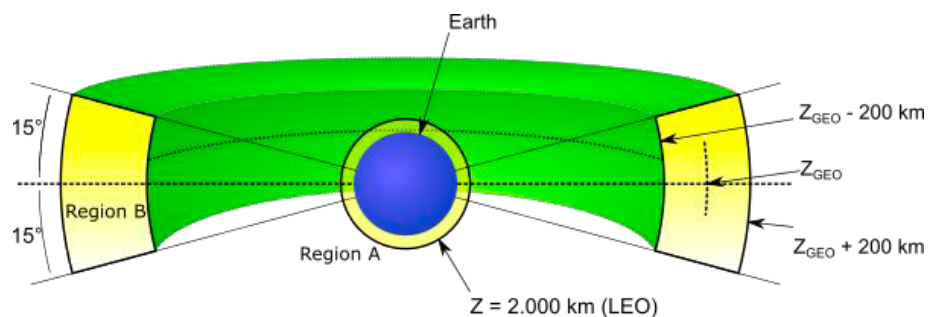


Figure 1 - Protected regions



The **International Committee on Global Navigation Satellite Systems - ICG**, that, informally established in 2005 under the aegis of the United Nations¹⁸, promotes “voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services”¹⁹, encouraging cooperation and coordination between providers of global navigation satellite systems (GNSS) and regional systems, so as to ensure

increased compatibility and improved interoperability and transparency, facilitating also the adoption and utilization of those services and their further development beyond space-faring countries, and thereby benefiting the global community;



The **International Space Exploration Coordination Group - ISECG**, which is an “open and inclusive, flexible and evolutionary, effective, supportive of mutual interests”²⁰ forum established between 2006 and 2007, today composed of 14 space agencies that, through it, “may exchange information regarding interests, objectives, and plans in space exploration with the goal of strengthening both individual exploration programmes as well as the collective effort”²¹.

Working groups supported by ad-hoc teams and a secretariat conduct activities on specific subjects, holding regular meetings and monthly teleconferences, that take place as plenaries whenever approval – by consensus – is to be reached;

16 https://web.archive.org/web/20090318000849/http://www.iadc-online.org/docs_pub/IADC-UNCOPUOS-final.pdf

17 <https://orbitaldebris.jsc.nasa.gov/library/iadc-space-debris-guidelines-revision-2.pdf> (March 2020).

18 The ICG portal is hosted by the UN Office for Outer Space Affairs (UNOOSA).

19 <https://www.unoosa.org/oosa/en/ourwork/icg/icg.html>

20 https://www.globalspaceexploration.org/wordpress/?page_id=50

21 https://www.globalspaceexploration.org/wordpress/?page_id=50



The **International Space Exploration Forum - ISEF**, i.e. a ministerial-level forum established in 2014 and “targeted at promoting international collaboration in space exploration”²², that conducts and promotes high-level policy discussions about the future of space exploration – both human and robotic - and the importance of international cooperation “in an appropriate framework for international space exploration including its sustainable development”²³. So far, two editions of the ISEF have been held, hosted by the USA in 2014 and by Japan in 2018;



The **International Astronautical Federation - IAF**, a non-profit and non-governmental organization established in 1951 under French law, the Constitution of which defines it as a federation of organizations where decisions are made by a General Assembly composed of delegates from each member organization. The Bureau, which is composed of the IAF President and 12 IAF Vice-Presidents, is the main organ; it usually meets twice, in March - during the IAF “Spring Meetings” - and then in three rounds during the International Astronautical Congress (IAC), generally in autumn. Through 16 administrative and 30 technical committees²⁴, IAF promotes cooperation thanks to unique collaborative

platforms for experts from space agencies, the industrial sector and research centres; advances International Development by “bringing together experts from experienced and emerging space nations alike”²⁵; contributes to the preparation of tomorrow’s workforce with activities targeting students and young professionals; and stimulates awareness of space activities worldwide. To this regard, the Italian Space Agency has been extremely (pro)active within IAF, where between 2015 and 2021, former ASI President Roberto Battiston and International Affairs Director, Gabriella Arrigo were appointed as Vice Presidents for Science and Academic relations, while the present ASI President, Giorgio Saccoccia, has been serving as Special Advisor to the IAF President concerning the International Space Forum (ISF) since 2021.

3. Best Practices in Action

The International Space Forum actually represents one concrete example of the type of initiatives resulting from the above-mentioned “specific relationship, coordination, capacity and confidence building platforms” enabling countries to preserve or strengthen bi- and multi-lateral relations. It was conceived by ASI in 2015 - as a ministerial-level initiative - and organised and launched in Trento (Italy) in 2016 –with the support of IAF, the International Academy of Astronautics (IAA) and local authorities - in order to “involve universities and research centres in the space programs around the world and, in particular, in those regions, which more than others need support in using space applications through ad-hoc training courses”²⁶. Structured in “Space Chapters”, since then dedicated ISF were held in Nairobi (2017), for the African continent; Buenos Aires (2018), for the Latin America and Caribbean countries; and Reggio Calabria, Italy, (2019), for the Mediterranean region.



Figure 2: International Space Forum 2019 banner - Photo credits: International Astronautical Federation

22 <https://www.mext.go.jp/isef2/about/>

23 Ib.

24 <https://www.iafastro.org/about/iaf-committees/>

25 <https://www.iafastro.org/about/history-and-missions.html>

26 <https://www.iafastro.org/events/international-space-forum-at-ministerial-level-isf/international-space-forum-at-ministerial-level-2016.html>



All of the ISF editions focused on the specific needs, characteristics and local capabilities of each region and country, while, on the other hand, they were also a unique opportunity to promote the Sustainable Development Goals (SDGs) of the UN 2030 Agenda for Sustainable Development, in the firm belief that *“cooperation is key; despite political differences, the world has proved repeatedly throughout the space age that we can come together through science, and work for the benefit of humanity”*²⁷. As a matter of fact, the 2030 Agenda and, more in general, the sustainability of space activities are believed to be achievable only provided that conventional bi- and multi-lateral cooperation be accompanied by international coordination initiatives that – by means of soft-law measures and best practices – prove capable of guaranteeing global security, preserving both our planet and outer space by disseminating training and cultural initiatives aimed to ensure the peace and well-being of mankind (Schrogl, 2012).

In this framework, on a non-ministerial level, a very recent example is provided by the *“SELPER/CEOS WGCapD Training Course – Remote Sensing Applications to Floods, Droughts and Fires”* held on 24 and 25 October 2022 as part of the XX SELPER²⁸ International Symposium of October 26 to 28 that took place at the Raul Rangel Frías University Library - in the city of Monterrey (Mexico) - with the objective of providing additional information about the fundamental role of space applications for the achievement of the SDGs²⁹.

The course was attended by 193 participants - 179 remotely and 14 in person - from 78 institutions representing Argentina, Bolivia, Canada, Colombia, Ecuador, Guatemala, Mexico, Pakistan, Paraguay, Peru, Spain, United States and Uruguay.

As described in detail in the final report³⁰ elaborated upon conclusion of the course by the Secretary General of the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean (CRECTEALC) and professor at the National Institute on Astrophysics, Optics and Electronics of Mexico, Dr. Sergio Camacho, along with Dr. Fabiola D. Yépez Rincón - Research Professor at the Autonomous University of Nuevo Leon and President of SELPER -, on the first day of the training Dr. Maurizio Fea (former Head of the promotion and training section of the European Space Agency’s Directorate of Earth observation programmes) focused on the fundamentals of geomatics and remote sensing in the microwave region of the electromagnetic spectrum, as well as on topics ranging from the visualization of satellite images, spatial, radiometric and temporal resolutions, spectral signatures, multispectral analysis and image classification, to examples of the visualization of forest fires and droughts, surface temperature detection, altimetry, and Sentinel Synthetic Aperture Radar (SAR) images.

Afterwards, Dr. Amalia Castro Gómez - Remote Sensing Advisory Consultant at ESA - presented the *“Mapping of Flooded Areas with Sentinel-1 in SNAP”* using the threshold value method in a practical case study in Tabasco (Mexico), and showing also how to download information from the Copernicus Open Access Hub, and pre-process images through the creation of a graph. She also provided insight on how to view results in RGB format, export them to Google Earth and create histograms for the distribution of the number of pixels per value, so as to generate a mask from a threshold value, concluding her training by showing how to calculate the extent of a flooded zone.

In his lecture Dr. Martin V. Phillipsen (ESA) presented ESA training materials on floods (in particular: Sentinel-2 mapping, Sentinel-1 SAR data, meteorological data, high-resolution global DEMs, and hydrological modeling), droughts (drought severity mapping with Sentinel-2 imagery and QGIS) and wildfires (particularly on how to map the extent and severity of fires through Google Earth Engine, SNAP, EO Browser, using Sentinel imagery and mapping changes in soil and vegetation humidity for fire risk prediction by using the ESA Climate Change Initiative Toolkit).

27 S. Di Pippo, The contribution of space for a more sustainable earth: leveraging space to achieve the sustainable development goals (<https://doi.org/10.1017/sus.2018.17>).

28 Sociedad Latinoamericana en Percepción Remota y Sistemas de Información Espacial.

29 *“A recent joint study conducted by United Nations Office for Outer Space Affairs (UNOOSA) and the European Global Navigation Satellite System Agency (GSA) found that, of the 169 targets underpinning the goals, nearly 40% are reliant on access to space science and technology.”* (S. Di Pippo, *“The contribution of space for a more sustainable earth: leveraging space to achieve the sustainable development goals”*, see above).

30 For more information see <https://www.selper.org.mx/curso-de-entrenamiento-selper-ceos-wgcapd-uso-de-percepcion-remota-en-aplicaciones-a-inundaciones-sequias-e-incendios/>

Dr. Isabel Cruz - from the Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, CONABIO - focused on the topic “*Satellite Observation Applied to Fire and Drought Detection*”, presenting a specific algorithm for active fire detection and burnt areas in the images under evaluation, including also the use of spectral indices, as well as the relation between active fire and precipitation in Mexico.

The presentation delivered by Dr. Azucena Pérez-Vega – from the Universidad de Guanajuato, México - was titled “*Extreme Weather Indices, CLIMEX using Python*” and, thanks to practical examples, showed how to create a CLIMEX project making it possible for weather-station data to be automatically downloaded. Dr. Pérez-Vega showed also in detail how to select in-situ stations with which to work, how to establish analysis periods, perform data quality control, run climatological indices, graph the trends of the indicators, and, finally, how to export data results for use in a GIS.



Sociedad Latinoamericana de Percepción Remota y Sistemas de Información Espacial
Capítulo México

UANL
UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN

esa

eo college

ASI

SERVIR

Geomatica

FIC

XX
Simposio Internacional
SELPER
MÉXICO 2022

SELPER/CEOS WGCapD
Training Course –
Remote Sensing applications
to floods, droughts and fires

The Working Group on Capacity Building and Data Democracy (WG CaPD) of the Committee on Earth observation Satellites (CEOS) is organizing a training course on the use of satellite data in flood, drought and fire applications. The course is offered on occasion of the XX SELPER International Symposium (26 to 28 October 2022) which is sponsored by the European Space Agency (ESA) and the Universidad Autónoma de Nuevo León (UANL) through the School of Civil Engineering and the Geomatics Department. The course instructors will also come from the space agencies of Argentina (CONAE), Germany (DLR), Italy (ASI) and the United States (NASA and NOAA) as well as from institutions from Colombia and Mexico (CONABIO, Mexico Campus of CRECTEALC, UNAM, Humboldt Institute).

24 and 25
october 2022

Figure 3: “SELPER/CEOS WGCapD Training Course – Remote Sensing Applications to Floods, Droughts and Fires” and XX SELPER International Symposium flyer - Photo credits: Sociedad Latinoamericana en Percepción Remota y Sistemas de Información Espacial – SELPER.



On 25 October the course began with the lecture of Dr. Laura Candela - Head of the Downstream and Application Services Office, Italian Space Agency - concerning *"Flood Risk Management: The Italian Experience"*, in which she illustrated the Italian Civil Protection Department service chain by proposing some examples of procedural use of satellite information, with a focus on the COSMO-SkyMed mission and the operational characteristics that make it particularly useful for on-demand services. Some examples of acquisition and use of satellite data for the management of flood events were presented, too, along with the algorithmic tool used in the processing phase. In addition, a practical part was carried out with the support of a demonstrative thematic platform from the Italian Civil Protection Competence Center, simulating how an entire data processing cycle is performed in Italy for emergency preparedness, response, and recovery. In the second part of her lecture, Dr. Candela focused on the use of radar images for planning purposes, explaining also how flood maps can be generated through the CosteLab platform.

The *"Use of High-Resolution Optic Images and SAR Images with Cloud Computing for Flood Monitoring"* was the topic of the next lecture, which was given by Dr. Betzy Hernandez Sandoval and Dr. Emily Cherrington - both from NASA - starting with a description of the NASA Capacities Development Program, through which the ARSET (Applied Remote Sensing Training) and DEVELOP³¹ programs are promoted and coordinated with SERVIR, the NASA-USAID initiative providing decision-makers with tools, training and services necessary to address such issues as disasters, agricultural security, water management and land use. Details regarding very high-resolution images were provided, too, along with examples of their use and how to access them through Google Earth Engine (GEE). Finally, additional resources from the Planet and NICFI (Norway's International Climate and Forests Initiative) programs were illustrated, as well as the Streamflow Prediction and HYDRAFloods tools used to determine precipitation and flood models.

Based on a *"Study of Floods and Droughts with Google Earth Engine (GEE)"*, PhD candidate Jonathan Vidal Solórzano Villegas (Universidad Nacional Autónoma de México), conducted an exercise for mapping the extent of flooded areas by using Sentinel-1 images, also comparing information from Sentinel-1 and Sentinel-2 satellites. With a second exercise, he also showed how to classify water bodies with GEE, as well as how to calculate and compare their extension.

The following session of the training course continued with the *"Study of Floods and Droughts with Google Earth Engine"* and, in particular, with an exercise conducted by PhD. Gabriel Alejandro Perilla (Instituto Humboldt de Colombia): he applied the use of Google Earth Engine on droughts and showed the process for the development of vegetation indices after having obtained Vegetative Condition indexes (VHI).

Dr. Sergio Camacho closed the training course with a lecture titled *"Calculation of Drought Indices using QGIS and SNAP"*, in which he focused on droughts, from the definition of the main concepts and principles to the use of Normalized Difference Vegetation Indexes, Normalized Difference Water Indexes, Water Stress Index, and Soil-Adjusted Vegetation Index. Additionally, he also explained how to access precipitation data from the website of the Center for Hydrometeorology and Remote Sensing (CHRS), proposing a final exercise on the use of related indices.

³¹ *"The DEVELOP Program bridges the gap between NASA Earth Science information and potential users through rapid feasibility studies that apply Earth observations to environmental decision-making needs."* (<https://appliedsciences.nasa.gov/what-we-do/capacity-building/develop/about>).

IRIS²: The New (Material) Girl on the Block. Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²)*

by Sara Dalledonne**

1. European political agreements to launch the EU's Secure Connectivity Programme

On November 17th, 2022, the Council and the European Parliament reached a provisional agreement on the Regulation establishing the EU's space-based Secure Connectivity Programme for the period 2023-2027, aimed at deploying the Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²)¹. On November 22nd-23rd, 2022, ESA established a new optional Programme related to EU Secure Connectivity under its Telecommunications and Integrated Applications Directorate (TIA), during the ESA Council at the Ministerial Level (CM22)².

At the EU level, the provisional trilogue agreement (European Parliament, Council and European Commission)³ has been consequently validated in the European Parliament Committee on Industry, Research and Energy (ITRE) on November 29th, 2022, and it is currently going through the formal steps of the adoption procedure⁴. The implementation of the programme will be based on an incremental approach, including the objective to deliver initial services in 2024 and reach full operational capability by 2027⁵. Implementing acts and tender specifications are being prepared by the European Commission. In February 2023, the European Parliament adopted the Report on the proposal for a Regulation establishing the EU's space-based Secure Connectivity Programme for the period 2023-2027, aimed at deploying the Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²).

Unlike Galileo and Copernicus, it is the first time that an operational EU space programme element is established within the context of an already existing and mature commercial market, with European operators already developing and serving a connectivity market that is forecasted to double between 2020 and 2030 to \$20.6 billion⁶.

IRIS² can benefit from the expertise and world-renowned excellence of the European space industry in the telecommunications sector, integrating the know-how of commercially well-established industrial players, including manufacturers, technology providers and operators with the dynamism of an emerging new space ecosystem and new entrants. For the first time, such an operational programme has the ambition to ensure a minimum of 30% of the EU-funded component for start-ups and SMEs⁷. ESA ARTES is also already operating in that market since more than a decade, with an accumulated 2.2 billion industrial co-funding in public-private partnerships with European space industry.



Figure 1: Regulation Adoption Process
(Credit: European Parliament, ESPI)

* Source: ESPI "ESPI Briefs" No. 61, December 2022. All rights reserved. ([Link](#))

** European Space Policy Institute (ESPI), Research Fellow - Lead on Regulatory Affairs, Vienna, Austria.

1 Council of the EU, Council and European Parliament agree on boosting secure communications with a new satellite system ([Link](#))

2 ESA; CM22 ([Link](#))

3 See European Parliament, REPORT on the proposal for a regulation of the EP and of the Council establishing the EU Secure Connectivity Programme for the period 2023-2027 ([Link](#))

4 EP, ITRE 28-29/11: Energy crisis, secure connectivity, critical technologies ([Link](#))

5 European Commission, IRIS²: the new EU Secure Satellite Constellation ([Link](#))

6 Euroconsult, Satellite Connectivity and Video Market Report ([Link](#))

7 EPP, Deal on new EU satellite telecommunications programme ([Link](#))



The new element is conceived as a multi-orbital satellite constellation covering the full spectrum of needs for secure communication services to European governments by 2027. While the IRIS² should prioritise the delivery of governmental services, it allows “for the provision of commercial services by the European private sector”⁸. The programme has the objective to enable the provision of affordable connectivity in Europe, while it will also improve secure connectivity over geographical areas of strategic interest, such as Africa and the Arctic. While the governmental part of the programme represents an evolution of the GOVSATCOM component of the EU Space Programme⁹, the commercial ambition of the programme can be seen as a major extension of the GOVSATCOM objectives, with the goal to further stimulate the competitiveness of the already existing market.

This represents a new challenge for all stakeholders in a public-private setting how to realise the synergies between government objectives of the EU stakeholders and the market objectives of industry and satellite operators in particular.

2. Who picks up the tab?

During the institutional meeting on November 17th, the major point of discussion between the European Parliament and the EU Council concerned the budget. The resulting agreement on the EU budget component represented a milestone with effects beyond the EU, also incentivising political agreements on investment in the newly established ESA optional Programme related to EU Secure Connectivity during the ESA CM22.

In the Impact Assessment Report accompanying the Proposal for a Regulation establishing the Union Secure Connectivity Programme in February 2022, the European Commission highlighted the budget assessment to design the Secure Connectivity space architecture. It provided an estimated cost associated with the development and deployment of the infrastructure of approximately €6 billion, including a blending of funds in the form of a public-private partnership (PPP) with €4 billion from the public sector (EU and Member States) and €2 billion from the private sector¹⁰.

Based on the impact assessment, the programme will provide economic benefits related to the deployment of a new infrastructure consisting of a GVA of €17-24 billion and additional jobs in the EU space industry, with further spill-over effects on the economy through downstream sectors using innovative connectivity services¹¹. As such, the result of the return on investment from the Secure Connectivity Programme is expected to yield up to four times increase in revenue in terms of GVA.



Figure 2: Budget to reach full ambition

8 Council of the EU, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the Union Secure Connectivity Programme for the period 2023-2027 - Letter to the Chair of the ITRE Committee of the European Parliament (November 2022) ([Link](#))
 9 European Commission, Welcome to IRIS² ([Link](#))
 10 European Commission, Executive Summary of the Impact Assessment Report ([Link](#))
 11 European Commission, Executive Summary of the Impact Assessment Report ([Link](#))
 12 French Government, Press room ([Link](#))



As a key financial contributor, the European space industry is also expected to co-fund a significant share of the programme to reach the full financial requirements for the constellation. It would be critical for the success of the programme to incentivize private actors and allow to develop commercial services, which can take benefit of the public investment in governmental infrastructure and services¹³.

3. Governmental needs and commercial opportunities: challenges of a public-private symbiosis?

As previously highlighted, it is the first time that there is an ambition to develop an EU space programme within a mature commercial market, with the private sector called to significantly invest into the programme. IRIS², therefore, needs to answer (perhaps for the first time in such set-up) a set of questions related to commercial contributions.

Based on the Regulation, IRIS² shall consist of a governmental infrastructure and a commercial infrastructure. Governmental infrastructure *“shall include all the related ground and space assets which are required for the provision of the governmental services”*, while the commercial infrastructure *“shall include all space and ground assets other than those being part of the governmental infrastructure without impairing its performance or security”*¹⁴. Going into detail, the European Commission:

“Shall be the owner of tangible and intangible assets which form part the governmental infrastructure developed under this programme”, with EU-owned governmental infrastructure to be procured through public-private partnerships via competitively awarded contracts to industry (*“hard gov”*)¹⁵.

Non-EU-owned commercial infrastructure will also be used to provide governmental services (“light gov”) under the IRIS² umbrella¹⁶.

Furthermore, the programme *“should allow for the provision of commercial services by the European private sector, through a commercial infrastructure”*¹⁷.

The change in paradigm is that IRIS² seek synergies with the business goals of private partners and *vice versa*. This requires innovative governance schemes, which must ensure that the programme is built on a symbiotic public-private partnership that would allow for the co-creation and operation of a programme/infrastructures while preserving the objectives of partners.

A critical element of the overall success of IRIS² will be in the conditions under which commercial services can be provided by private actors through the IRIS² commercial infrastructure and IRIS² ability to boost entrepreneurial energies for the development of a new range of commercial services from Low Earth Orbit on that infrastructure. This may include services, which today are entering the market globally like for connectivity to handhelds or for mobile services to maritime, airlines and in support of autonomous driving. Provided that attractive conditions are negotiated between the partners, this could establish IRIS² as a true catalyst for the development of new multibillion-euro markets, in synergy with the development of the institutional solution in response to EU requirements, but well beyond those EU institutional needs.

¹³ Twitter, Peter B. de Selding ([Link](#))

¹⁴ Council of the EU, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the Union Secure Connectivity Programme for the period 2023-2027 - Letter to the Chair of the ITRE Committee of the European Parliament (November 2022) ([Link](#))

¹⁵ Council of the EU, Proposal for a Regulation establishing the Union Secure Connectivity Programme for the period 2023-2027 - Letter to the Chair of the ITRE Committee of the European Parliament (November 2022)

¹⁶ Council of the EU, Secure space-based connectivity: Council adopts negotiating mandate ([Link](#))

¹⁷ Council of the EU, letter to the Chair of the ITRE Committee of the European Parliament ([Link](#))



In this light, several satellite operators, including SES, Hispasat and Eutelsat have expressed their interest in contributing to the programme, however, subjecting it to certain conditions for its governance, funding, procurement and operations/service provisions. In particular, several satellite operators highlighted the need to play a more prominent role and to be on the front line in the definition of the mission, co-sharing the financial and technological risks, while also leading the procurement process with the manufacturers¹⁸.

The increasing interplay of commercial satellite providers in governmental security communication services has most recently also been demonstrated by Starshield: SpaceX's newly created business segment plans to leverage the commercial LEO Starlink constellation to develop products and services to support the national security of government agencies in three areas, comprising communications, remote sensing and hosted payloads¹⁹.

4. Who gets to participate in the EU's sovereignty programme?

IRIS² is planned to comprise a sovereign constellation for government services, which implies a series of strict eligibility criteria and security requirements to be defined by the EU for the manufacturing and operation of the constellation. Based on the proposal for the Regulation, those requirements should aim to *"ensure the security of the EU and the Member States and to strengthen the resilience across key technologies and value chains"*²⁰, thus showing the increasingly prominent place of security in the European space policy agenda.

Already in June 2022, Iceland, Liechtenstein and Norway submitted a joint EEA EFTA Comment on the Commission's proposed Regulation to suggest some amendments, to ensure full and efficient participation of EEA EFTA States based on the EEA Agreement²¹.

The EU programme will be carried out in cooperation with ESA under ESA procurement and project management rules. Indeed, at the ESA CM22, Director-General Josef Aschbacher distinguished between "hard" security element of the programme, and "soft", more commercial, component that may allow for the participation of ESA's non-EU Member States and private contributions²².

Additional concerns have been raised by a part of the space industry, especially Amazon's Project Kuiper, Eutelsat (in the process to combine with UK-based OneWeb, see ESPI Brief 60) and Germany-based, but U.S.-financed, Rivada Space Networks, that risk being kept out of their involvement in the new EU programme²³.

The ongoing combination between Eutelsat and OneWeb, and the UK government "Class B" share (which will remain at the level of OneWeb as a subsidiary of future Eutelsat),²⁴ raised questions on how the EU will reconcile its security requirements (and stricter control) with the ever-increasing role of private actors, so to foster a flourishing commercial ecosystem²⁵. In particular, the Eutelsat and OneWeb multiorbital system, in perspective of the deployment of the Gen-2 constellation, might be a candidate for and be a part of the EU's Secure Connectivity solution, also creating and then leveraging synergies in terms of schedule, co-funding stimulation, key technologies and coordination of spectrum.

18 Space Intel Report, Satellite operators Hispasat, SES to European Commission: We'll invest in your constellation if we can run it on our terms ([Link](#))

19 SpaceX, Starshield ([Link](#))

20 European Parliament, Report on the proposal for a regulation of the EP and of the Council establishing the EU Secure Connectivity Programme for the period 2023-2027 ([Link](#))

21 EFTA, EEA EFTA Comment on the proposal for Union Secure Connectivity Programme ([Link](#))

22 Space Intel Report, EU Commission to ESA: Keep non-EU-sourced critical components out of connectivity, navigation & Copernicus missions ([Link](#))

23 Space Intel Report, Mega-constellations Amazon Project Kuiper, Eutelsat OneWeb, Rivada Space Networks pitch their European bona fide ([Link](#))

24 UK, OneWeb merger with Eutelsat ([Link](#)); and Space Intel Report, With Eutelsat OneWeb investment, UK government's 'golden share' has new meaning ([Link](#))

25 Euronews, Europe's space sector hesitates between independence and cooperation ([Link](#))

Nevertheless, Commissioner Thierry Breton declared that OneWeb's UK pedigree will make it incompatible with the EU Secure Connectivity Programme. Successively, Christophe Grudler, Rapporteur of the ITRE Committee of the European Parliament claimed that: *"the EU needs to have full control over its satellites without a risk of hindrance by an outside actor"* and that *"the EU cannot accept a UK veto on a secure connectivity infrastructure"*, ruling out the combined company as a likely qualifying candidate²⁶. However, in September 2022, the ITRE Rapporteur specified after a work session with Eutelsat CEO, Eva Berneke, that Eutelsat can compete in the Secure Connectivity programme like all the other players, in strict compliance with EU eligibility rules²⁷.

On its end, the European Parliament Report on the Regulation Proposal states that *"the Programme should, where appropriate, be open to participation of third countries (...)"* and that *"the Commission shall ensure control over the infrastructure shared with the private partner, thereof contractual provisions shall be considered in the concession agreement such as buy-back option in case of default, veto right in case of acquisition by a third country company and vetting of key personnel"*²⁸.

European stakeholders should continue to evaluate whether and on which terms the EU may benefit from the options already present on the European market, in terms of engineering, operations, access to space, and availability of spectrum. The framework to be developed should be mindful of establishing requirements that would disincentivise a true catalysation of the commercial market or which could discourage commercial actors and new entrepreneurs to engage and invest.

5. From theory to practice: towards an "open" European strategic autonomy

After Galileo and Copernicus, the inclusion of an additional space component to the European portfolio of strategic space infrastructures is a representation of the European ambition to safeguard key communications services and reduce the dependence on international public and private actors, responding to the exceedingly present security challenges.

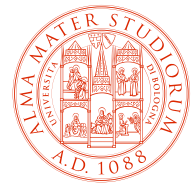
On the other hand, more than ever before, the EU, and Europe at large, has the opportunity to leverage the profound transformation of its space sector, and be a catalyst of new commercial services "Made in Europe". This will require a European approach to public-private relationships, catalysing existing and evolving commercial markets in the spirit of European strategic autonomy, open to a European solution and to private European actors, while safeguarding EU strategic interest.

An institutionally centric approach like for Galileo and Copernicus, in the case of IRIS² would come with non-negligible risks to the long-term success and a commercially sustainable competitive European space ecosystem.

26 Bloomberg, France and UK Try to Put Brexit Behind Them - In Space (July 2022) ([Link](#))

27 Christophe Grudler, Twitter (September 2022) ([Link](#))

28 European Parliament, REPORT on the proposal for a regulation of the European Parliament and of the Council establishing the Union Secure Connectivity Programme for the period 2023-2027 ([Link](#))



Miscellaneous Material of Interest

The New European Union Space Strategy for Security and Defence: Perspectives and Opportunities

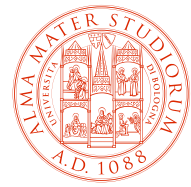
by Gilda Caso

The Legal Regulation of Drones, General Report for the International Academy of Comparative Law (IACL)

book review by Anna Masutti

Drones – Future of Aviation Law? Interference of Public Law in Private Law by Piotr Kasprzyk and Anna Konert

book review by Anna Masutti



The new European Union Space Strategy for Security and Defence: Perspectives and Opportunities

by Gilda Caso*

1. Introduction

On the 10th of March 2023, the European Commission and the High Representative of the Union for Foreign Affairs and Security Policy published a Joint Communication addressed to the European Parliament and the Council, issuing the European Union Space Strategy for Security and Defence¹ (hereinafter, also “*the Communication*”).

The Communication establishes a course of action for the European Union (EU) to strengthen and develop its autonomy and strategic position in the space domain. It follows the increased competition in the geopolitical power and the intensification in the threats targeting the EU and the Member States, where Countries are carrying out actions that could potentially disrupt or destroy space systems and services to enlarge their presence in the space domain.

Considering a hostile geopolitical context, the EU aims at introducing measures to protect its strategic interests, rendering space systems more resilient and developing space-enabled services, while simultaneously privileging international cooperation to prevent irresponsible behaviours and to deter hostile actions.

2. Threats in the space domain

The space domain, which includes any element relevant for the functioning of space systems and delivering of space-based services, in both the EU and the Member States, is threatened not only by technical incidents, accidents and natural hazards, but also by “*counterspace activities*”, namely intentionally hostile activities used to damage competitors or impair their capabilities to utilize their space systems².

Considering the variety of counterspace capabilities, the Single Intelligence Analysis Capability (SIAC) and the Member States military and civilian intelligence services shall increase the strategic understanding of threats and counterspace. To this end, the High Representative will prepare a classified yearly analysis covering the evolution of counterspace capabilities³.

3. A new space security framework

To prevent divergences between Member States and to enhance security and resilience, the European Commission is considering the proposal for an EU space law. The legislative proposal should increase the resilience of space systems and services ensure coordination between Member States and should be combined with the CER Directive⁴ and the NIS2 Directive⁵ to provide a comprehensive framework for space systems and services. The Commission will consider including common minimum levels of resilience for critical services and coordinated national preparedness and resilience plans, developing security monitoring centres and introducing minimum requirements for those space systems which deliver essential services⁶.

* University of Bologna.

1 JOIN(2023) 9, Joint Communication to the European Parliament and the Council, *European Union Space Strategy for Security and Defence*, 10 March 2023, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=JOIN:2023:9:FIN>.

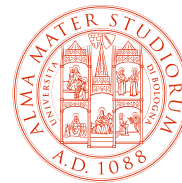
2 See point 1.1. and 1.2. of the Communication.

3 See point 1.3. of the Communication.

4 See Directive (EU) 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC, [EUR-Lex - 32022L2557 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022L2557-EN).

5 See Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148, [EUR-Lex - 32022L2555 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022L2555-EN).

6 See point 2.1. of the Communication.



Nevertheless, the European Union has not the competence, pursuant to Articles 4(3) and 189 of the TFEU⁷, to create such a legislative act. Article 189 introduces a competence for the creation of the European Space Policy, but it does not permit harmonization of Member States' laws and regulations. These limitations have been the object of discussion and criticism, with many pointing out that the competence bestowed upon the Union was not shared but rather a "*sui generis*" parallel competence. The Communication does not clarify how the European Union will circumvent this legitimation problem. It is possible that EU institutions will rely on the acquiescence of the Member States considering that, before having a proper competence in the space sector, they had already intervened multiple times.

Along with the legislative instrument, the Commission plans a series of specific measures to incentivise the exchange of information. The European Union Agency for the Space Programme (EUSPA) should develop security monitoring for all EU space programmes. Additionally, the Commission will work to raise awareness and facilitate exchange of best practices between commercial entities, targeting specifically SMEs and the private space industry, known as "*New Space*".

Supported by EUSPA, the Commission will also establish an Information Sharing and Analyses (ISAC) Centre, in cooperation with commercial entities, relevant public entities and (possibly) the European Space Agency (ESA). EUSPA is identified as the key entity in space security monitoring and operations centre, assisting operators of essential space systems and services⁸.

4. Enhancement of space cyber-security

To strengthen the resilience of the space infrastructure and the security of the supply chain, the Communication considers that the EU shall reduce strategic dependencies on third countries and become more resilient. Horizon Europe and the European Defence Fund (EDF) will both be instrumental to this end. The Commission, the European Defence Agency (EDA) and ESA will also strengthen their coordination through the establishment of a Joint Task Force⁹.

By mid-2024, the Commission, coordinating with EDA, ESA and under the authority of the High Representative, commits to proposing a roadmap to reduce strategic dependencies on critical technologies for the EU space program. Additionally, the Commission will ensure that pre-existing European initiatives are implemented in a way that strengthens security of supply and resilience.

5. Role of competition law

The Communication considers the protection of the supply chain as a relevant component of its security programmes. To this end, the Commission has to ensure that competition rules and international trade instruments are applied in the space and defence domains, particularly to prevent any distortion of the market by illegal foreign subsidies. Prohibiting acquisitions or rendering them conditional upon binding commitments are two instruments that the Communication indicates as available to remedy possible distortions¹⁰.

6. Detecting and responding to space threats

The Communication highlights the need to update, collect and analyse security incidents under the EU Space Programme. To render the response to space threats more rapid and comprehensive, the High Representative proposes to amend Council Decision (CFSP) 2021/698, that should be broadened to i) cover all threats to EU security, ii) develop the cyber diplomacy toolbox and the hybrid toolbox and iii) mobilise a new dedicated toolbox with technical, diplomatic and economic measures. It is important to note that, with respect to the cooperation between Member States, any State should be able to invoke the mutual assistance clause for space threats or incidents¹¹.

⁷ Article 189 and Article 4(3) of the Treaty on the functioning of the European Union.

⁸ See point 2.1. of the Communication.

⁹ See point 2.2. of the Communication.

¹⁰ See point 2.3. of the Communication.

¹¹ See point 3.1., 3.2. and 3.3. of Communication.



7. Space systems supporting security and defence

Security sensitive services, applications and data for defence users may be developed in the future. Services such as positioning, navigation and timing (PNT), Earth Observation and secure communication are all instrumental for military activities. The Commission will therefore implement the evolution of Copernicus services, using the complementarity between SatCen and EUSPA and building on a pilot with the current Space Programme. The Commission also intends to fully exploit the upcoming Low Earth Orbit (LEO) constellations, called IRIS²¹².

8. EU future partnerships

The Communication commits to the support of multilateral legislative instruments in the UN General Assembly. The High Representative and the Commission also commit to strengthen their diplomacy campaign for Safety, Security and Sustainability in Outer Space and to deepen cooperation with like-minded partners. Specifically, in relation to the US, the Commission aims at rendering the relation not one of dependence but one of mutual partnership. The attempts to strengthen productive partnerships in the domain of space security will also include the cooperation within NATO institutions¹³.

9. Conclusions

The described Communication for the advancement of the EU Space and Defence strategy should be instrumental in shaping the future competitiveness, prosperity and security of the EU. To this end, the Commission and the High Representative commit to reporting to the Council on a yearly basis, sharing progresses achieved and exchanging the outcomes of their commitments, in order to propose and introduce potential further actions.

¹² See point 4.1.1., 4.1.2. and 4.1.3. of the Communication.

¹³ See point 5 and ff. of the Communication.



The Legal Regulation of Drones, General Report for the International Academy of Comparative Law (IACL)

*book review by Anna Masutti **

Abstract

The General Report for Topic XII, The Legal Regulation of Drones¹, has been set up in occasion of the International Academy of Comparative Law (IACL) General Congress, that took place in Asunción (Paraguay) from the 23rd to the 28th of October 2022. This contribution reviews the General Report for Topic XII, The Legal Regulation of Drones, and assesses some relevant aspects of the relationship between comparative law and the regulatory framework of Unmanned Aircraft Systems (UAS).

1. Introduction to the General Report and definitions

The General Report for Topic XII addresses the topic of the legal regulations of drones, firstly, by providing relevant definitions from various regulatory perspectives.

According to the definition provided at international level by the ICAO's "Model UAS Regulation" of 2011, a drone, or Unmanned Aircraft System (UAS), is an "aircraft and its associated elements which are operated with no pilot on board". Within the ICAO, it is also used the definition contained in the "Manual on Remotely Piloted Aircraft Systems (RPAS)" of 2015, defining Remotely Piloted Aircraft Systems (RPAS) as "remotely piloted aircrafts, their associated remote pilot station, their required command and control links and any other components as specified in the type design". ICAO's approach to UASs regulation has been based mostly on the existing rules on manned aircrafts. As the ICAO'S scope is the regulation of international aviation, the Organization's regulatory acts mainly focus on commercial and international operations with UAS. However, since local operations with UASs have drastically increased in the last years, ICAO's approach has led to a certain fragmentation in national rules.

From a regional perspective, according to the European definition – which is contained in the major regulatory act provided at EU level (Regulation (EU) 947/2019) – an Unmanned Aircraft System is "an unmanned aircraft and the equipment to control it remotely". The EU regulatory approach differs partially from the international one: European rules have established 3 categories of UAS' operations (open, specific and certified), which have been at the core of all subsequent legal acts. Drones' applicable rules and procedures vary depending on the category of operation, as the EU rules 1) are operation-centric and 2) risk and performance based. Hence, different risks mitigation measures are required by EU legislation, depending on the impact of the operations on safety.

As it emerges, while there is a general agreement on the use of the term "UAS" at European level, and while similarities can be detected between the definitions mentioned above, there's not a universal legal definition of drones. Therefore, one of the main objectives of the General Report is to assess and evaluate not only the various definitions provided but also the similarities and differences in the drones' regulatory framework across several jurisdictions.

* Partner, RP legal & Tax. Tenured Professor of Air & Space law, University of Bologna.

1 This article is written in a personal capacity and any views expressed are those of the author. All rights on the General Report are reserved to the International Academy of Comparative Law, Ius Comparatum – Global Studies in Comparative Law.



2. General Report overview

The jurisdictions composing the General Report have been chosen as to perform a deep comparative analysis of various legal systems of EU Member States (including Belgium, Cyprus, Czech Republic, Finland, France, Germany, Italy, Poland, Romania and Slovenia). This, without neglecting jurisdictions from the international community such as US, UK, Turkey and Venezuela.

The General Report covers the main aspects of UAS' regulatory disciplines, by evaluating key legal issues raised in the sector and similarities and differences existing among the national legislations. The focus was on:

- I) international Conventions signed and/or ratified in each jurisdiction;
- II) EU, international and national rules on drones' operations and
- III) relevant technical standards and requirements on UAS' characteristics and features.

Moreover, the General Report summarizes rules and standards for certification, registration and labelling of drones, as well as procedures to obtain flight authorizations and the related technical requirements. Particular attention has been reserved to existing:

- I) liability regimes in case of damage caused to third parties during and/or caused by drones' flight operations;
- II) compulsory and/or voluntary insurance coverage against damage;
- III) existing judiciary power to be activated in case of claims for compensation and measures to protect personal data and privacy during drones' flights.

Lastly, the General Report evaluates any economic activity, service and, eventually, service of public utilities, carried out in the various States using drones and their impact in the general development of each Country.

3. Best practices and regulatory gaps

The UAS sector is extremely innovative and technologically advanced. Often, regulations are not able to keep up with the highest technological innovations. To collect relevant information from the industry and to understand the regulatory needs from the private sector, policy makers and institutions shall follow strict legislative and regulatory procedures. This could impact the adaptation of the regulatory framework to technological developments, especially in domain, such as the drone sector, undergoing constant innovation. Hence, there's a concrete risk that the regulatory regime may be obsolete. As anticipated, every element included in the General Report has been carefully examined for each national legislation reported.

In this regard, National Rapporteurs have been asked to highlight aspects of their jurisdictions that they deem relevant for the use of drones and that, however, present regulatory gaps and need to be improved at national level. For example, a common element emerging from the analysis of EU Member States jurisdictions is that the reference made by the EU rules to domestic legislation of each Member State in relation to the third-party liability for damage caused by UAS has been source of uncertainty. This, for example, by hindering industry growth, namely in case of cross-border professional services.

Globally, jurisdictions are at different regulatory stages. For example, the United States legislation has many national rules (detailed, mature, and successfully enforced at federal level) which suit the US domestic needs and technical requirements. At the same time, in United States not so many federal laws, state laws or industry best practices adequately address the unique privacy and cybersecurity risks drone operations pose.

Until federal regulation catches up with the technology innovations, lawmakers could move to Courts to mitigate issues by arguing, for example, in favour of declarations of strict liability for UAS operators and manufacturers. The United



States legislation helps in understating one feature of the current drones' regulatory status: even the jurisdictions in which UAS regulation is more developed present regulatory gaps and room for improvement and amendments.

However, it is also important to recall recent regulatory initiatives aiming at creating safe and enabling environment in terms of digitalized and automated airspace organisation and management to support operations of UAS (for example, the European U-Space package).

4. Future challenges

Under the current regulatory framework, UAS can be used both for military and civil purposes. In relation to military usage, the history of UASs is arguably longer than that of manned aircraft (which are widely used for military purposes anyway). As a result, it is not surprising that UASs continue to be used in present military conflicts. This is well exemplified by the Russian invasion and war against Ukraine, whereby UASs have played a pivotal role. Many States including China, Iran, Israel, Turkey, and the United States are investing heavily in the development of more advanced combat unmanned aircraft.

Yet, the 21st century has seen a shift in focus to the non-military applications of UAS. In many jurisdictions, drones are now largely used:

- by national police forces for crime prevention;
- by border forces, monitoring international frontiers to prevent illegal crossings and rescue migrants;
- by both States and private entities deploying UAS for safety inspections of critical infrastructures, such as power plants and offshore platforms;
- by private entities operating UAS to support their primary commercial activities, for such things as photography and filming;
- by individuals partaking in amateur building and flying of UAS for recreational purposes.

The UASs applications in the civil sector are predicted to grow in terms of stakeholders, total number of aircraft, types of operations, jobs and revenue. For example, at the moment the EU expects the UAS sector to directly employ more than 100,000 people and exceed €10 billion per year just in Europe within the next 20 years.

At the same time, it should be considered for example that drones rely on real-time and simultaneous data exchanges between the operator, GPS positioning systems, cloud-based data storage systems and the drone itself. Besides the vulnerability of the data traveling between the drone and its control systems, drones are also physically vulnerable. UASs are, therefore, advanced systems, divided into several subsystem all exposing to new and various risks.

All this considered, future challenges for drones' regulation will surely include efficient safety and security systems to address the various problems posed by UAS technical requirements and applications.

In addition, detailed rules on safe data management and cybersecurity would be needed, especially in view of the increasing civil usage of UAS, which is expected both in commercial and economic activities in the private sector and in the provision public services.

5. The role of comparative law for the regulation of drones

At present, UAS operations are largely domestic or performed in small scale. As the majority of UAS operations are local and as the complexity and volume of domestic operations will also increase, national law will continue to be a relevant factor.

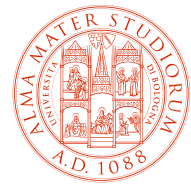


In the near future, however, UAS are predicted to operate commercially and internationally on major scale. For example, logistic companies plan to move to pilotless cockpits for cargo flights and manufacturers are already working in developing solutions to make this prospect a reality. In this sense, the role of the Comparative Law will be paramount. The implementation of international and EU legislation and the evaluation of the solutions adopted in the various jurisdictions will help in understanding how UAS, their components and operations shall be regulated in the future as to ensure safe, secure, and efficient flights.

While the regulation of UAS has traditionally focused on safety, this is not the only aspect necessitating major regulatory improvement. For example, there are issues relating to infringement of borders that shall be considered, especially in case of UAS international flights. Privacy, national security, and cybersecurity are equally relevant aspects. Although these are not aviation law traditional topics, when it comes to UAS flight the entire aviation community shall be involved in the regulatory development.

Regulation of UAS is diversified, heterogenous and always ongoing. Consequently, stakeholders, policy makers and institutions in each jurisdiction must be involved at highest level when drafting new rules or amending existing ones, in order to facilitate unmanned aviation on a global scale while accommodating local needs.

The process is on its way but far from complete. Since one of the most important functions of comparative law is to harmonize and unify existing rules, it can help in detecting both existing regulatory gaps and the most efficient solutions already adopted in various domains and in different jurisdiction to address them.



Drones – Future of Aviation Law? Interference of Public Law in Private Law by Piotr Kasprzyk* and Anna Konert**

*review by Anna Masutti****

The Authors of this book present the framework of aviation law, analyze manned aviation regulations and define the scope of their application in unmanned aviation. They pose the question of whether we are on the brink of a new era in aviation law: one that started due to the development of a new type of flying device. This question is related to the main research topic which is the establishment of a legal classification for drones. The concept may be understood in many different ways. Public law defines drones as aircraft that fall within the scope of aviation law, and only sometimes require new, special regulations that go beyond the framework of traditional aviation law. In private law, however, classifying drones into one category or another is of great importance. This issue is part of a larger discussion on new technologies, including robotics, that has been going on for years. The main research thesis in this book is that we are now facing the creation of a new branch of law: drone law.

The book shows the need for the strong integration of research on public and private law. The Authors aptly show that public law regulations have considerable relevance for determining private law regulations.

The issues covered by the monograph bear not only theoretical, but above all practical importance. The monograph will undoubtedly be useful to anyone interested in the contemporary problems and challenges caused by activities involving new technology, especially drones. It will also aid in teaching: university students of programs that include aviation law, public international law or air transport management may find it particularly useful. Moreover, the monograph will be very helpful for aviation-related institutions and any sector that is considering the use of drones as part of its activity.

With regard to the documentation, including primary sources and other scholarship, the Authors demonstrate very good awareness of legal materials (the primary sources in any legal study) and reference relevant existing studies, including books and articles. The source materials regarding drone-related legislation, doctrine and case law are well structured.

In terms of the overall structure, the book has a natural flow: it begins with general issues like terminology, then goes on to analyze public regulations, and ends with more specific issues like civil liability, insurance and privacy.

With regard to the mastery of the subject matter, the manuscript does a great job of explaining the legal basis of aviation safety at the international and EU levels. Additionally, facts such as statistics related to aviation safety are explained very well.

Issues regarding private law that are covered in the manuscript have scientific potential. The theses presented in this part of the monograph are excellent. Liability for damages caused by drones is approached in a multidimensional manner. The book's indisputable added value lies in its practicality. When analyzing selected public and private issues, the Authors reference the practices of different countries in which drone regulations are developed to a varying degree. The Authors propose the introduction of particular postulates based on a broad and in-depth analysis of hypothetical factual circumstances that is quite noteworthy. The section devoted to civil liability makes it clear that legislative work is necessary, and the presented conclusions will be helpful both in terms of the expected efforts made by legislators and also to unmanned aircraft stakeholders. The monograph helps to fill the void in literature by providing a broad analysis of civil liability for damages caused by drones. Based on their analysis of international, European and national legislation

* Ph.D. in Law, Member of the Institute of Air and Space Law, Lazarski University. Attorney at Law.

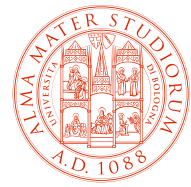
** Ph.D., Associate Professor, Institute of Air and Space Law, Lazarski University, Dean of the Faculty of Law and Administration, Department of Aviation Law.

***Tenured Professor of Air & Space Law, University of Bologna. Partner, RP Legal & Tax.



regarding private law, the Authors established specific conclusions both for legislators and drone users. This has practical implications and therefore affects the development of the scientific discipline and should be recognized as outstanding academic achievement.

The manuscript shows that the writers are aware and capable of finding the right sources and able to offer the right proposals and solutions.



Events

**13th McGill University and PEOPIIL Annual Conference,
International Aviation: Liability, Insurance & Finance**

Paris, 21-22 April 2023

**ICUAS Association, International Conference on Unmanned Aircraft Systems 2023
(ICUAS 2023)**

Warsaw, 6-9 June 2023

**European Space Agency (ESA),
Space2Connect Conference**

Matera (Italy), 7-9 June 2023

**Worldwide Airport Lawyers Association (WALA),
Annual Conference**

Paris, 28-30 June 2023



13th McGill University and PEOPIIL Annual Conference International Aviation: Liability, Insurance & Finance

Paris,
21-22 April 2023



The McGill University and PEOPIIL have announced their 13th Annual Conference on *International Aviation: Liability, Insurance & Finance*, that will be held in Paris on 21-22 April 2023.

This event will bring together world-leading aviation liability, insurance and finance experts to address, *inter alia*, the following topics:

- Recent Developments in Aviation Liability
- Air Carrier Passenger Liability and Comparative Jurisprudence Under the Warsaw System and the Montreal Convention of 1999
- Products Liability of Manufacturers of Aircraft, Engines and Component Parts
- Liability of Airports and ANSPs
- Air Cargo Liability
- Governmental Liability for Aviation Accidents and Acts of Terrorism
- Litigation Strategy: Procedural Tools
- Damages: Economic and Non-Economic
- Consumer Protection Regulation and Litigation
- Aircraft Leasing and Finance
- The Challenges of Settlement and Emerging Insurance Issues
- The Impact of Communicable Diseases on the Airline and Hospitality Industries
- Drones- Safety, Security and Liability
- French Language Breakout Session on Contemporary Issues in EU Law

The conference will host two events to facilitate networking among attorneys, insurers, air carriers, manufacturers and government representatives.

Detailed information about invited speakers and the programme is available [HERE](#).

ICUAS Association International Conference on Unmanned Aircraft Systems 2023 (ICUAS 2023)

Warsaw,
6-9 June 2023

The 2023 International Conference on Unmanned Aircraft Systems (ICUAS 2023), is organised for the first time on a university campus. It will be held on 6-9 June 2023, in Warsaw at Lazarski University.

The ICUAS 2023 offers unique opportunities to meet, interact and shape the future of unmanned aviation worldwide, bringing together the technical, regulatory, and legal communities.

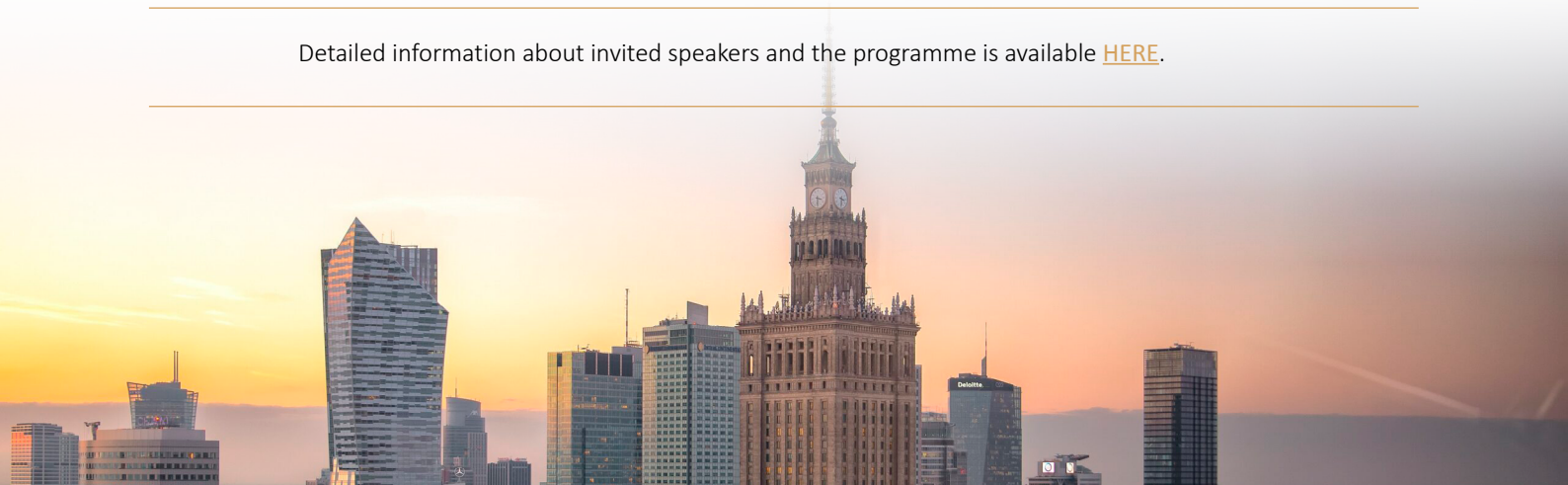
The central theme of ICUAS 2023 is threefold:

1. reconfigurable aerial platforms;
2. multi-purpose/hybrid aerial platforms;
3. regulations and standards for autonomy.

National and international organisations, agencies, industry, and authorities work towards defining roadmaps of Unmanned Aircraft Systems/Remotely Piloted Aircraft Systems (UAS/RPAS) expectations, technical requirements and standards, that are prerequisites to their full utilisation and integration into the national airspace. The next generation of UAS/RPAS will be used for a wide spectrum of civilian and public domain applications.

ICUAS 2023 aims to bring together different groups of qualified representatives worldwide, funding agencies, industry, academia, end-users and practitioners to discuss the current state of unmanned aviation, and the roadmap to their full utilisation in civilian and public domains. Special emphasis will be given to research opportunities, and to “*what comes next*” in terms of the tools, essential and support technologies, law and standards, which need to be utilised and implemented to advance the state-of-the-art nature of UAS.

Detailed information about invited speakers and the programme is available [HERE](#).



European Space Agency (ESA) Space2Connect Conference

Matera (Italy),
7-9 June 2023

Speaker:
Prof. Anna Masutti



This edition of ESA Space2Connect Conference 2023 is aimed at the entire satellite telecommunications value chain, covering both the commercial and institutional parts, to explore innovative space solutions to address society needs in terms of connectivity. Space2Connect 2023 programme starts with an overview of the connectivity habits and needs of Society, which will be used to shape the Ambition of the space telecommunications sector. By analysing the Enablers through which potential solutions can be made possible and focusing on what are the Values that must be an intrinsic part of this transformation, the goal of the conference is to shape the future of the Satcom sector, together.

DAY 1
Wednesday 7th June
**The Satcom
Ambition**

The first day of the conference will focus on using space to benefit citizens by exploring how Satcom can aid institutions and the commercial sector in providing essential services such as healthcare and education in rural areas. Attendees will discuss innovative ways to leverage Satcom to bridge the digital divide and improve access to critical services for those in remote and under-served areas. Moreover, the ambition of space is to continue to nourish human aspiration and call for joint efforts to enable connectivity to and for the Moon (and beyond!). This will create job opportunities and prosperity on Earth, while inspiring young people to pursue science, technology, engineering, and mathematics, creating a highly qualified workforce for the future.

DAY 2
Thursday 8th June
**The Satcom
Enablers
and Values**

On the second day of the conference, we will explore the key enablers that are necessary to ensure that new space-based solutions are made available to society in a timely manner. This will include discussions on emerging satellite communication systems, the role of Satcom in digital transformation, and the importance of technological innovation as the backbone of the sector. In the afternoon, we will focus on the values that the Satcom sector should embrace in order to provide new connectivity solutions to society. These values include sustainability and responsibility, which are integral to the DNA of Satcom, and are necessary for a prosperous and green future.

DAY 3
Friday 9th June
**The Satcom
Innovation**

Bridging to the third day, since it is also important to address the emerging connectivity needs driven by the new habits of end users such as gaming, metaverse, digital culture, art, tourism, we will have an evening event and "specials" dedicated to showcase and inspire NewSpace with new applications and new business models. Finally, on Friday the 2023 edition of Final Presentation Days, a unique opportunity for European and Canadian Industry and ESA technical experts to showcase the latest research and developments in advanced technology and products for the Satellite telecommunication market made within ESA's ARTES 4.0 programmes portfolio.

Detailed information about invited speakers and the programme is available [HERE](#).



Worldwide Airport Lawyers Association (WALA) Annual Conference

Paris,
28-30 June 2023



The 13th edition of the Worldwide Airport Lawyers Association (WALA) annual conference will be taking place in Paris, on June 28-30, 2023. The Conference will be followed, on the afternoon of 30 June, by the inaugural Urban Air Mobility Forum which will take place at the same venue and host panel discussions on the current state of the urban air mobility industry and the legislative regimes required in order to make urban air mobility a safe, accessible and legally compliant mode of transport.

The Conference is being held in partnership with ADP Groupe, which will host this event at their premises next to Terminal 3, Charles de Gaulle Airport. The Conference will include a visit to Charles de Gaulle's main airside facilities, a pre event seminar, and the usual worldwide agenda.

If you have any questions, wish to suggest a topic or be a speaker, or advertise, please contact WALA directly at wala@abjaxair.com.

For more information and registration please visit: <https://www.abjaxair.com/wala2023/registration.php#>



aviationspacejournal.com