



# Committee on Aviation Environmental Protection – Topic 2

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<sup>1</sup> This paper reflects the author's personal views and cannot be considered as the views of ICAO.

## Topic 2

### Funding sustainable developments in aviation through in particular air navigation charge

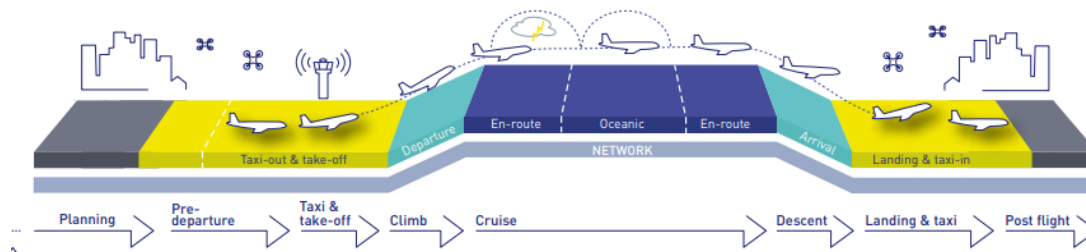
#### 1. Introduction – the funding of air navigation services

The 1944 Chicago Convention on International Civil Aviation<sup>2</sup> (hereafter the Chicago Convention) provides at article 28 a) that:

*Each contracting State undertakes, so far as it may find practicable, to:*

- a) *Provide, in its territory, airports, radio services, meteorological services and other air navigation facilities to facilitate international air navigation, in accordance with the standards and practices recommended or established from time to time, pursuant to this Convention;*

It is on the basis of this provision that air navigation services are provided by States (or by the entity they have entrusted to provide such services, referred to as air navigation services providers or ANSPs), ensuring safe and efficient aviation operations.<sup>3</sup> These services are essential for the safe movements of aircraft during the different phases of a flight:



*Every stages of a flight - Extract from Figure 3  
EUROPEAN ATM MASTER PLAN EXECUTIVE VIEW  
EDITION 2020<sup>4</sup>*

The drafters of the Chicago Convention also foresaw, at Article 15, the following:

*“(..) Any charges that may be imposed or permitted to be imposed by a contracting State for the use of such airports and air navigation facilities by the aircraft of any other contracting State shall not be higher,*

- a. *As to aircraft not engaged in scheduled international air services, than those that would be paid by its national aircraft of the same class engaged in similar operations, and*
- b. *As to aircraft engaged in scheduled international air services, than those that would be paid by its national aircraft engaged in similar international air services.”*

<sup>2</sup> Convention on International Civil Aviation, Chicago 7 December 1944, 15 UNTS 295.

<sup>3</sup> On the provision of ANS and the responsibility of States, see Dr Francis Schubert, *Le droit aérien*, 2017, Sculthess. ; Dr Schubert has written as well numerous articles on the subject.

<sup>4</sup> European ATM Master Plan Executive View, Edition 2020 <https://www.sesarju.eu/masterplan2020>

This article accordingly established the possibility for States to impose charges for air navigation services, charges that must be based on uniform and non-discriminatory conditions for all airspace users.

At the first ICAO Conference held in 1958 on “*Route Facilities Charges in International Air Transportation*”, when considering article 15, it was concluded by States that user charges would be inevitable. European States, at the 1967 ICAO Conference on “*Charges for Airport and Route Air Navigation Facilities*”, proposed that charging systems should be based on flight distance and aircraft weight. This is still the basis for the calculation and billing of route charges in a large number of States<sup>5</sup>, and for all 41 States part of the EUROCONTROL Route Charges System<sup>6</sup> (including all member States of the European Union).<sup>7</sup>

As developing a sustainable aviation industry is the only way forward, every element of the aviation ecosystem is being considered with respect to its potential input in meeting the long-term global aspirational goal (LTAG) of net-zero carbon emissions by 2050 adopted by the ICAO Member States as well as the targets of the European Green Deal adopted by the European Union (see *Guide for Topic 1 – The Challenges of Decarbonisation* – on the goals and targets adopted), including air navigation services. If the main discussion tying air traffic management (a part of ANS) and sustainability is usually centred around operational measures related to air traffic management, another dimension is of relevance when looking at the funding of environmental developments: the air navigation charges.

## 2. ICAO’s Policies on Charges

There are no ICAO standards addressing the specifics of air navigation charges. ICAO has however issued policies in this domain (as well as for airport charges) through Doc 9082, *ICAO’s Policies on Charges for Airports and Air Navigation Services, with the objective to provide guidance to States, which can be reflected in national legislation or policies. The first version of this document was approved by the Council and published in 1974. The document has evolved throughout the years: one of the objectives of ICAO Doc 9082 is, at the request of the Assembly and as specified in the foreword, “to ensure that the guidance and advice contained in Doc 9082 are current and responsive to the requirements of Contracting States”*.

*ICAO Doc 9082 contains, inter alia, four key charging principles:*

- *non-discrimination between all users through uniform conditions;*

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<sup>5</sup> For details of the fees and charges per ICAO State, please see ICAO Doc 7100 *Tariffs for Airports and Air Navigation Services* (Doc 7100)

<sup>6</sup> The EUROCONTROL’s multilateral route charges system was set up on that basis, beginning operations in 1971. The route charges system arrangements were formalised with the signature of the Multilateral Agreement relating to Route Charges in 1981., at the same time as the amendment of the EUROCONTROL Convention (Protocol amending the EUROCONTROL

International Convention relating to Co-Operation for the Safety of Air Navigation of 13 December 1960).. The Multilateral Agreement entered into force on 1 January 1986 for ten Member States; all 41 Member States of EUROCONTROL are Contracting States to the Multilateral Agreement.

<sup>7</sup>EUROCONTROL Think Paper 14 The Funding of Air Navigation Services <https://www.eurocontrol.int/publication/eurocontrol-think-paper-14-future-air-navigation-services>

- cost-relatedness of the charges to the facilities and services provided;
- transparency in the application of charges;
- consultation with users before introducing changes in charging systems or levels of charges.

The charging policies of ICAO Doc 9082 are complemented by two documents to assist States: the *Airport Economics Manual (Doc 9562)* and the *Manual on Air Navigation Services Economics (Doc 9161)*.

### **3. Environmental Charges – Air Navigation Charges**

#### **Global level - ICAO**

*At its 32<sup>nd</sup> Assembly, in addressing environmental charges and taxes, the ICAO Assembly welcomed the policy statement made by ICAO Council on 9 December 1996 on environmental levies on air transport, making “ICAO’s position clear on emission-related charges and taxes, wherein the Council strongly recommends that any such levies be in the form of charges rather than taxes”<sup>8</sup>.*

*The possibility to use charges to reduce or eliminate the adverse environmental consequences has been introduced in ICAO Doc.9082. This measure was introduced with respect to airport charges, and not air navigation charges, and integrating principles relating to noise related charges and emissions-related aircraft charges to address local air quality problems at or around airports.*

*While the focus of this guide is on charges for air navigation services, it is worth highlighting the provisions applicable to airport charges:*

- *Section II, paragraph 8 of ICAO Doc 9082 foresees in particular that “Although reductions are being achieved in aircraft noise at source, many airports will need to continue the application of noise alleviation or prevention measures. Costs incurred in implementing such measures may, at the discretion of States, be attributed to airports and recovered from the users.”*
- *Similarly, paragraph 9 provides the following with respect to emissions-related aircraft charges to address local air quality (LAQ) problems at or around airports: “Although reductions in certain pollutants emitted by aircraft engines that affect LAQ are being addressed by a variety of measures of a technical or operational nature, some States may opt to apply emissions charges to address LAQ problems at or around airports. Costs incurred in mitigating or preventing the problem may, at the discretion of States, be attributed to airports and recovered from the users.”*

*In both instances, while recognising that other measures are available, ICAO Doc 9082 provides the possibility to recover the related costs from airspace users, subject to a number of principles detailed respectively for aircraft noise and LAQ problems.*

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<sup>8</sup> ICAO Resolution A 32-8, Appendix H on environmental charges and taxes.

There is however no provision in ICAO Doc 9082 with respect to air navigation charges dealing directly with the funding and financing of developments related to evolving environmental requirements through charges.

*The Manual on Air Navigation Services Economics (Doc 9161), while not addressing environmental requirements, does provide the possibility of modifying charges “consistent with the form of economic oversight adopted, States should assess, on a case-by-case basis and according to local or national circumstances, the positive and negative effects of modifying air navigation services charges to address specific situations. For example, an ANSP may want to modify its current charging approach to improve the economic efficiency associated with service provision through the use of pricing based on peak-period or congestion. In other cases, an ANSP may want to encourage the use of certain technologies or attract new air services by offering temporary rebates or discounts to a particular aircraft operator. Regardless of intent, States should ensure that the purpose and creation of, and criteria for modifications to air navigation services charges are consistent with the four key charging principles expressed in Doc 9082”.*

### **The regional perspective - European level**

As mentioned above, Europe has established a common route charges system, with charges being established, billed and collected on a regional level by one entity, EUROCONTROL. The calculation of the costs that can be charged to airspace users is based on two main documents: the *Principles for establishing the cost-base for en route charges and the calculation of the unit rates*<sup>9</sup> (EUROCONTROL Member States) and the *Commission Implementing Regulation (EU) 2019/317 of 11 February 2019 laying down a performance and charging scheme in the single European sky* (for States subject to the EU legislative framework).<sup>10</sup>

Both sets of regulations, binding on the States, introduce the possibility to modulate (or “modify” air navigation charges as referred in ICAO Doc.9161) air navigation charges for airspace users to reduce the environmental impact of flying, as well as to accelerate the deployment of new ATM capabilities, provided this is done on a non-discriminatory and transparent basis.<sup>11</sup> With respect to the possibility to incentivise through modulation the reduction in the environmental impact of flying, there is the requirement as well that the modulation does not result in any overall change in annual revenue for the air navigation service provider compared to the situation where charges would not have been modulated.

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<sup>9</sup> The EUROCONTROL Principles for establishing the cost-base for en route charges and the calculation of the unit rate are binding on the Contracting States.,

<sup>10</sup> The Principles and Regulation 2019/317 are consistent.

<sup>11</sup> Article 32 of Regulation 2019/317.

#### 4. Discussion on the opportunity of using air navigation charges for environmental purposes

While the possibility of an environmental levy in relation to airport charges has been introduced at the global level through the guidance in ICAO Doc 9082 as mentioned above, there are open questions about such developments for air navigation charges.

The following (non-exhaustive) points are under discussion in order to assist aviation meet its targets, as every measure that could reduce the environmental impact of flying should be considered:

- Modulation to reduce the environmental impact of flying: this has been introduced in Europe in legally binding documents. The guidance in ICAO Doc 9082 foresees the possibility of modifying air navigation charges, also referring to the four charging principles (including cost relatedness). In Europe, while modulation has been used for environmental purposes for terminal navigation charges,<sup>12</sup> it has not been used for route charges. Discussions are underway to make modulation mandatory at EU level, also with respect to sustainable aviation fuel (SAF) (see *Guide for Topic 1 – The Challenges of Decarbonisation* – for more information on SAF.) The funding of SAF has given rise in particular to a lot of discussions in all parts of the world in view of high level of investments required for its production and deployment. Numerous initiatives are active to support the financing of SAF.<sup>13</sup>
- The use of air navigation charges to support the development of electric, hybrid-electric, and hydrogen aircraft: These aircraft are part of the decarbonisation of aviation strategy, accelerating the transition to zero CO<sub>2</sub> emissions aircraft, impacting the regional as well short/medium haul market. Several electric aircraft projects are in development, with some smaller electric planes already in operation. Similarly, 2023 saw the testing and demonstrating of some of the world's first hydrogen fuel-cell aircraft. This decade should produce commuters, short-haul, turboprop airliners up to roughly 50 to 60 passengers. The recently published Concept of Operations for the Introduction of Electric, Hybrid-electric and Hydrogen-powered Zero Emission Aircraft provides a detailed view of the challenges and opportunities that will arise from the integration of these new type of aircraft in the aviation system<sup>14</sup>.

As mentioned in the introduction, air navigation charges are calculated in a considerable number of States<sup>15</sup> using the weight of the aircraft. Electric, hybrid-electric, and hydrogen aircraft would be significantly heavier than kerosen fuelled aircraft as:

- Electric aircraft require heavy battery systems to store and deliver the required energy due to currently available energy density. In addition, a depleted battery weighs the same as a charged battery, potentially leading to the need to strengthen the landing gear.
- While hydrogen is a lightweight fuel with high energy density that presents a higher energy-to-weight ratio than kerosene, it has a low volumetric density requiring four to

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<sup>12</sup> One example: <https://press.skeyes.be/amendment-to-skeyes-management-contract>; thi

<sup>13</sup> See in particular the World Economic Forum 'Clean Skies for Tomorrow' initiative: <https://www.weforum.org/publications/clean-skies-for-tomorrow-sustainable-aviation-fuel-policy-toolkit/>

<sup>14</sup> Concept of Operations for the Introduction of Electric, Hybrid-electric and Hydrogen-powered Zero Emission Aircraft, Alliance for Zero-Emission Aviation, 23 January 2024

<sup>15</sup> In all 41 EUROCONTROL Member States; See also NAV Canada, Customer Guide to Charges, January 1, 2024.

five times the volume of conventional fuel to carry the same energy. This results in the need for heavier storage tanks as well as cryogenic systems (below -253 degrees Celsius).

Considering the maximum take-off weight (MTOW) used in the calculation of air navigation charges, this would result in higher charges for the same payload and would bring into consideration the principle of revenue/productive capacity of the aircraft which is stated in ICAO Doc 9082, when referring to the aircraft weight : “*This weight scale should take into account, less than proportionately, the relative productive capacities of the different aircraft types concerned.*”<sup>16</sup>

The possibility to introduce exemptions to neutralise the higher charges resulting from the weight difference for these environmentally friendly aircraft ultimately carrying the same number of passengers/cargo, or to amend the charging formula (based on the weight of the aircraft) to factor this difference, have also been raised and are advocated by those developing these new technologies.

These discussions are of the utmost relevance for the airspace users billed for the use of air navigation services. IATA, the International Aviation Transport Association, has made its position clear regarding charges: “*The introduction of new airport or airspace user charges, or the modulation of existing charges, to address aviation’s CO2 emissions, undermines the progress achieved to establish a coherent and effective policy framework to address aviation’s impact on climate change. The emergence of a patchwork of charges purporting to address climate change will obstruct the multilateral cooperation required for global progress and may impede sustained climate actions through more appropriate mechanisms.*”<sup>17</sup>

As ultimately, in most charging systems, the aim of the charges is to recover the overall costs of air navigations services provision, some of the measures discussed above that could reduce the costs for some users would result in an increased for others. A measure such as an exemption from charges could result in cost for States<sup>18</sup>. The policy objectives to be met when introducing such measures should consider their impact on the different parts of the aviation value chain.

## **5.. Non-exhaustive list of potential questions to be addressed by the delegates**

- What is the position of your State with respect to the ICAO charging policies and the possibility to introduce evolving environmental developments?

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<sup>16</sup> ICAO Doc 9082, Section III-4, paragraph 8

<sup>17</sup>See IATA, Fact Sheet Aviation Charges, Fees and Taxes, <https://www.iata.org/en/iata-repository/pressroom/fact-sheets/fact-sheet--aviation-charges-fees-taxes/> and IATA position paper on aviation charges and climate change, 2020. <https://www.iata.org/iata-positionpaper-climatechangecharges-nov2020.pdf>

<sup>18</sup> Under the EU and EUROCONTROL regulatory framework, States must cover the costs for the services that air navigation service providers have provided to flights exempted from en route charges.

- Would your State support developments of guidance at ICAO level or of any other instrument at ICAO level with respect the use of charges to reduce the environmental impact of flying?
- Has your State introduced mechanisms at the national level using charges to support the reduction of the environmental impact of flying?
- Should these issues be addressed by the ICAO Committee on Environmental Protection (CAEP) or by the ICAO Air Navigation Services Economics Panel (ANSEP)?
- Should policies and incentives for SAF include the possibility to modify charges to support the production and deployment of SAF? Should those be addressed at the global level?
- Should measures be implemented through air navigation charges to support the development of electric, hybrid-electric and hydrogen aircraft? Should exemptions be considered in an initial phase to incentive the entry on the market of zero CO2 emission aircraft? Should the charging formula and the weight factor be reviewed to at least neutralise the higher weight of such aircraft? Who should bear the costs of these measures?
- Should those measures be addressed by the next Assembly and eventually be reflected in ICAO's charging policies?
- How is your State reconciling the position of the airspace users and economics measures such as charges that could support the achievements of the long-term global aspirational goal (LTAG) of net-zero carbon emissions by 2050?

## 5. Selected bibliography

- Convention on International Civil Aviation, Chicago 7 December 1944, 15 UNTS 295.
- *ICAO Doc 9082 ICAO's Policies on Charges for Airports and Air Navigation Services*
- *ICAO Doc 9161, Manual on Air Navigation Services Economics.*
- EUROCONTROL Think Paper 14, The Funding of Air Navigation Services <https://www.eurocontrol.int/publication/eurocontrol-think-paper-14-future-air-navigation-services>