

## The funding of air navigation services:

### After 50 years, is the joint pan-European system of route charges still fit for purpose?

**Safe and efficient aviation operations are nowadays taken for granted when flying. When you sit on an aircraft, you may worry about missing a connecting flight - but almost certainly not about whether air traffic control will be available to guide your flight safely through the airspace. This is due to the undertaking of States to provide air navigation services and facilities. But how do we ensure that these are properly funded, and who bears the costs of these services?**

In the late 1960s, the overarching goal was to have airlines paying for the services they receive. At the time, flying was not, as it is today, a commodity; moreover, it was typically associated with something for the 'happy few'. Therefore, it appeared logical to ultimately (via the ticket price) have the clients of the airlines pay for services rendered through the payment of charges.

The EUROCONTROL Member States, acknowledging the benefits of cooperation in respect of the establishment and collection of such charges for en route air navigation services and facilities, agreed to adopt a common policy and entrusted EUROCONTROL with the billing and collection thereof, through its Central Route Charges Office (CRCO). This joint system, referred to as the Route Charges System, has been ensuring since its implementation in 1971 the continuous funding of en route air navigation services, supporting the development of ATM infrastructure which has allowed the exponential growth of air transport.

As the Route Charges System turns 50 this November, weathering half a century of developments at the institutional, operational and regulatory levels as well as a number of crises, it seems opportune to look **whether it is fit for the future for an aviation industry that has recognised the need to go green and is recovering from the COVID crisis - and in particular the pressure this crisis has placed on the Route Charges System.**

This Think Paper looks at the Route Charges System, its origins and key features, and then focuses on challenges for the future, not only for the Route Charges System but as well for the funding of air navigation charges, looking in particular for answers to the following questions:

- Does the common policy governing the Route Charges System still offer a reliable and transparent funding of air navigation infrastructure and services to ensure uninterrupted and safe air transport?
- Should the funding of air navigation services continue to be borne by passengers only, or should taxpayers also have a role?
- Are charges a tool to trigger an optimal use of scarce resources?
- Should charges be deployed to support environmental targets?

#### MAIN FINDINGS

- For 50 years, the Route Charges System has shown its flexibility to successfully adapt to an evolving air navigation services landscape.
- Efforts should continue to focus on cost-effective provision of air navigation services – **pre-pandemic, actual and nominal costs remained steady for 11 years prior to the pandemic in a period when traffic has risen by 30%.**
- The prolonged COVID pandemic has **triggered questions about the user pays principle**, in particular in view of the overall role in aviation in a crisis as deep as this one. If in 2020 airlines flew around 50% of their expected flights, they could through the spreading of unpaid 2020 costs end up paying for close to 100% of their planned flights.
- When traffic returns, the European network will also once again be **confronted with the pre-pandemic challenges of capacity and delays and environmental considerations.** Charging policies that can help tackle these challenges should be considered when possible.
- The main challenge for the Route Charges System is to keep a common policy while evolving and accommodating traffic, capacity and environmental challenges.
- Single European Sky options such as a **single unit rate** and/or **modulation of charges** should be considered.

## The origins of the EUROCONTROL Route Charges System

The first ICAO Conference held in 1958 on "Route Facilities Charges in International Air Transportation" concluded that user charges would be inevitable. European States led the way at the 1967 ICAO Conference on "Charges for Airport and Route Air Navigation Facilities"; proposing that charging systems should be based on flight distance and aircraft weight.

With this approach validated, seven Member States signed bilateral agreements with EUROCONTROL and the EUROCONTROL multilateral route charges system was effectively set up, beginning operations in 1971. These arrangements were formalised with the signature of a Multilateral Agreement relating to Route Charges in 1981, at the same time as the amendment of the EUROCONTROL Convention. The Multilateral Agreement entered into effect on 1 January 1986 for ten Member States; today the 41 Member States of EUROCONTROL are all Contracting States to the Multilateral Agreement. <sup>1</sup>

Europe thereby became the **first region in the world to have a joint, simple and cost-effective system for route charges**. A system which has evolved and endured as a result of the close cooperation between the CRCO and States, air navigation service providers (ANSPs) and airspace users' representatives.

## Understanding the fundamentals of the Route Charges System

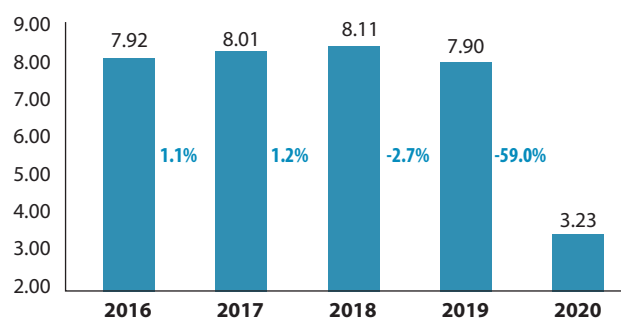
The foundation of the Route Charges System lies in the decision of the States to adopt a common policy with respect to route charges with two key features. First, with respect to the establishment of the charges, which, in accordance with ICAO Policies, are based on principles of cost-relatedness, transparency and non-discrimination.

Second, through the joint billing and collection of charges. Whether airlines overfly one or ten States, make 50 or 10,000 flights per month, they will receive one bill per month covering the charges for the en route air navigation services they have received in the airspace of the EUROCONTROL Member States. <sup>2</sup>

Based on a formula which takes into account the weight of

the aircraft, the length of the flight and the local unit rate (based on the costs of providing the services), the route charges billed by EUROCONTROL to the airlines represented around EUR 8 billion per year for the period 2016-2019<sup>3</sup>, before dropping dramatically as traffic collapsed in 2020, as Figure 1 shows.

**FIGURE 1: ROUTE CHARGES BILLED, 2016-2020, IN BILLION EURO, & YEAR-ON-YEAR % CHANGE**



Supported by enforcement measures made available by States and ANSPs, including detention of aircraft and the denial of air navigation services (ANS) at the request of EUROCONTROL, the **average long-term recovery rate for the route charges billed for the period 2016-2020 amounts to 99.7%**.

The essential role of the Route Charges System in ensuring the continuous funding of services has been recognised throughout the years. **The effectiveness of the system is key, as the route charges billed represent around 96% of the revenues required for ANSPs<sup>4</sup> to cover the cost of providing en route air navigation services.**

## An evolving system

The Route Charges System has demonstrated its reliability and capacity to adapt to regulatory and technical changes since its establishment in 1971. This includes moving throughout the years from dollars to ECU to euro, as well as some more fundamental changes.

Initially based on the historical costs of service provision, costs used for charging moved to forecast cost in 1983, introducing the notion of under and over recovery of costs. Further to the establishment of the Single European Sky in 2004, with its increased emphasis on transparency and economic regulation, the determined costs method was introduced and made available to all EUROCONTROL States, in addition to the existing full cost recovery method.

*"Europe became the first region in the world to have a joint, simple and cost-effective system for route charges that has demonstrated its reliability and capacity to adapt to regulatory and technical changes since its establishment"*

Throughout the years, the availability of data also made possible changes to key elements of billing such as flight distance. The calculation of the distance accordingly evolved from the ‘most frequently used route’ to the ‘route per State overflowed’ to, in January 2020, the ‘actual flown route’.

Looking back, the joint System established by the States has **successfully navigated the many regulatory and technical challenges it has faced.**

Reaching the 50 years milestone was always going to be a good time to look at the achievements of the Route Charges System and acknowledge the future challenges of capacity and sustainability facing the pan-European sky.

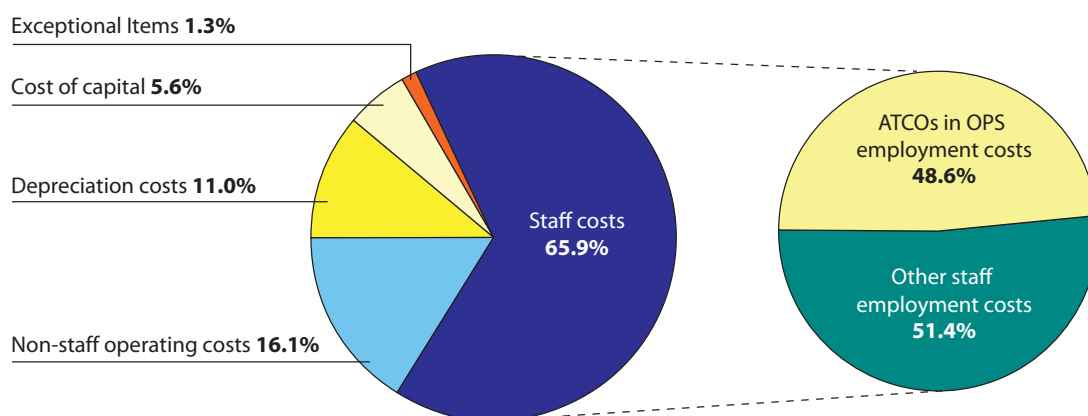
First, however, **the unexpected and sudden reduction of traffic resulting from the COVID crisis confronted the system with its biggest challenge so far with respect to the cost recovery policy of the States. How did it fare and is it time to shake up the fundamentals?**

### It’s all about cost and traffic

States built the Route Charges System on the principle of cost-relatedness.

For that purpose, the costs of service provision are subject to detailed regulatory frameworks, including a performance scheme for States subject to EU law. Figure 2 below shows that some 83% of the costs constitute operating costs, these shares being quite stable over time.<sup>5</sup>

**FIGURE 2: BREAKDOWN OF ANSP COSTS**



Source: ACE Report 2021

Not only have the shares of what constitutes these costs have remained stable, but the actual costs (in nominal terms) have remained stable as well, essentially staying the same for the last 11 years even though traffic has continued to grow by close to 30% around that same period.<sup>6</sup>

It is easy to see how **the sudden reduction in traffic has had a major impact on the funding of the pan-European ATM system. The continuous flow of funding, normally ensured via the Route Charges System, was put under pressure as the costs remained but the number of flights, and therefore the cash flow to the States and their ANSPs, drastically dropped. While an increase in traffic was clearly not an issue as the data showed, the unplanned level of low traffic of this magnitude was a test of the current funding mechanism.**

### Managing the shortfall

The first priority was to ensure the **continuity of operations** despite the shortfall in charges. A number of actions were taken at national and EUROCONTROL level. Mainly this included **cost-containment, mitigation measures and outside funding. EUROCONTROL secured a loan to support States and their ANSPs for that purpose.**

It quickly became apparent that for States subject to determined costs, regulatory adjustments would be required to spread the revenue shortfalls of 2020 and 2021 over the course of the next few years, failing which, unit rates would have seen a huge spike in 2023, making it even more difficult for airlines to recover from the COVID crisis. Nevertheless, **the revenue shortfalls will mostly still be shouldered by the airlines, which will face higher route charges for the coming years.**

*“Revenue shortfalls triggered by COVID will mostly be shouldered by airlines, which face higher route charges in coming years - so does the performance scheme still deliver the right results?”*

Figure 3 shows the decrease in route charges billed per State from 2019 to 2020. For 2021, based on current traffic scenarios and assumptions for the last few months of the year, the total amount of route charges billed should reach EUR 4 billion.

**FIGURE 3:** ROUTE CHARGES BILLED PER STATE PER YEAR IN 2019 AND 2020

	2019 in million €	2020 in million €	2020 as a % of 2019
FRANCE	1,317.2	493.2	-63%
GERMANY	961.4	429.7	-55%
SPAIN	796.3	257.8	-68%
ITALY	774.1	255.5	-67%
UNITED KINGDOM	736.6	314.3	-57%
TURKEY	397.3	188.5	-53%
AUSTRIA	225.9	89.4	-60%
POLAND	201.9	94.3	-53%
SWEDEN	191.5	80.6	-58%
NETHERLANDS	190.6	97.5	-49%
GREECE	181.1	86.3	-52%
BELGIUM/LUXEMBOURG	176.4	97.3	-45%
SWITZERLAND	168.7	59.8	-65%
PORTUGAL	152.7	76.9	-50%
ROMANIA	151.5	83.1	-45%
IRELAND	130.0	48.0	-63%
BULGARIA	125.7	49.8	-60%
CZECH REPUBLIC	116.5	49.2	-58%
NORWAY	104.1	58.1	-44%
DENMARK	101.1	40.7	-60%
HUNGARY	94.8	37.1	-61%
CROATIA	92.9	38.4	-59%
SERBIA/MONTEN./KFOR	79.1	36.4	-54%
CYPRUS	65.4	16.7	-75%
SLOVAK REPUBLIC	63.7	21.2	-67%
FINLAND	50.4	20.1	-60%
BOSNIA/HERZEGOVINA	42.6	18.5	-57%
SLOVENIA	37.3	13.6	-63%
LITHUANIA	26.4	12.1	-54%
ESTONIA	26.4	13.2	-50%
LATVIA	25.8	11.9	-54%
ALBANIA	25.2	11.4	-55%
MALTA	22.3	10.0	-55%
NORTH MACEDONIA	17.9	7.8	-56%
GEORGIA	14.5	11.2	-23%
ARMENIA	6.1	1.8	-71%
MOLDOVA	5.1	2.2	-56%
<b>Total</b>	<b>7,896</b>	<b>3,234</b>	<b>-59%</b>

*“Total route charges billed in 2021 are expected to reach EUR 4 billion - around half of 2019”*

Taking into account that the charges billed on behalf of the States correspond to the revenues of the ANSPs, the expected revenue losses since March 2020 for the years 2020 and 2021, based on traffic assumptions for the last 3 months of the year, should total close to EUR 8.6 billion, as Figure 4 shows.

**FIGURE 4:** ANSP REVENUE LOSSES IN € SINCE PANDEMIC START

	Losses vs 2019 since March 2020
Mar-20	-227,629,945
Apr-20	-572,788,937
May-20	-603,905,597
Jun-20	-626,103,556
Jul-20	-548,889,078
Aug-20	-470,521,864
Sep-20	-458,036,590
Oct-20	-440,786,059
Nov-20	-366,373,075
Dec-20	-359,398,088
Jan-21	-355,971,357
Feb-21	-345,431,480
Mar-21	-394,940,832
Apr-21	-440,742,275
May-21	-465,154,280
Jun-21	-426,694,070
Jul-21	-332,342,929
Aug-21	-277,457,378
Sep-21	-254,253,568
Oct-21*	-239,113,507
Nov-21*	-188,522,139
Dec-21*	-193,301,902
<b>Total</b>	<b>-8,588,358,506</b>

\* Estimated figures

Based on the current system of over and under recovery of charges, and a considering a number of exceptional measures that were adopted to spread the recovery of the 2020-2021 shortfall, this means that States and ANSPs could in principle recover the vast totality of the EUR 8.6 billion of the costs of air navigation services that were not billed over the course of 2020-2021.

Concretely, this means **if in 2020 airlines flew around 50% of their expected number of flights, they could through the spreading of the unpaid costs of 2020 end up paying for close to 100% of their planned flights.**

So while the system held up as it faced its most challenging crisis and once again adapted, this **underlines the tension between the need for continuous operation of a public service and the user pays principle**, which is at the heart of the current common policy for route charges.

## Who should pick up the bill?

In times such as the current crisis, the charges for the ATM system reflect the availability of services to airlines, and not actual service provision. Consequently, as explained above, **in the coming years airlines will be exposed to costs for flights they never flew.**

This begs a **more fundamental question:** given that States are obliged to provide air navigation services to ensure safety in their sovereign airspace and consequently are equally obliged to ensure the continuous availability of these services, **would it not be more appropriate that in the case of a significant drop in the number of flights (and therefore revenue for the ANSPs), the gap would in these unprecedented circumstances be better picked up by taxpayers instead of the airlines?**

Currently, flying has become a commodity and a large part of the population in many countries boards an aircraft or buys goods that have been in the cargo hold of an aircraft. Thus, one could argue that shouldering the availability costs of the ATM system in the case of such a crisis is justifiable – and already possible within the current regulatory framework, as already used by a few States to alleviate the exposure of airlines to the revenue shortfalls of the ANSPs discussed above.

This also calls for **consideration of the different mechanisms that could be entertained in association with the Route Charges System to have available emergency funds – through for example the establishment of a joint fund financed by States, or by having available a stand-by credit facility that could be activated at short notice.** If at first glance these mechanisms could appear as solutions capable of alleviating unexpected funding issues at network level, there are however underlying complexities that should not be underestimated.

Parallel to the fundamental question of the funding of the services is the actual cost of service provision. The costs of

*“With ATM system charges based on availability of the service to airlines, and not on actual service provision, airlines will in effect be expected to pay for flights they never flew: is it time for a fundamental rethink?”*

service provision, although having stabilised as detailed above, remain very much at the forefront of any discussion relating to charges. **A number of SESAR solutions should bring clear benefits via new technology and consolidation;** reducing the availability costs, as well as increasing the efficiency and resilience of air navigation services, should be the objective of all stakeholders.

## Looking ahead

In addition to the crisis-induced and more fundamental discussion on the funding of air navigation services, **one should not lose sight of the challenges that the European network will once again face when traffic recovers to pre-pandemic levels: capacity and delays.** ANSPs will need to be ready to provide the required capacity. This will call for a balance between lowering costs to mitigate the revenue shortfalls, and making the necessary investments and having in place the skilled staff required for the recovery of traffic.

On top of this, certain ANSPs may have to consider the impact of the unit rate in the airspace they manage. Related to the issue of capacity and delays is the cost of a flight and its impact on the planning and operations of airlines.

Charges have been hailed as a determining factor in the planning and capacity of airlines, as well as having an impact on environmental performance – but do they really have that power?

## Charges and capacity

“The charging regime for ATM services needs to promote efficient use of the airspace on a network basis, which would lead to improved environmental performance (for example by avoiding that airspace users choose longer routes because the route charges are lower).”<sup>7</sup>

This statement from the April 2019 Wise Persons Group Report set the stage for a review of the charging scheme which could support the efficiency of the network.

On 1st January 2020, changes were introduced in the charging formula to define the distance factor used to

calculate route charges, based on the actual route flown as recorded by the EUROCONTROL Network Manager instead of the planned route. One of the identified benefits of this change was to disincentive the use of ‘route charges optimised’ flight plans and thus reduce the mismatch between planned and actual trajectories. While this eliminated cases of ‘route charges optimised’ flight plans and established a distance factor that can ensure that air navigation service providers get revenues for the flights they actually have controlled, it did not seem to have removed the possible consideration of route charges in the flight planning operations<sup>8</sup>.

**Can, and should, more be achieved within the framework of the Route Charges System to eliminate financial considerations in flight operations?**

## Can charges impact environmental performance?

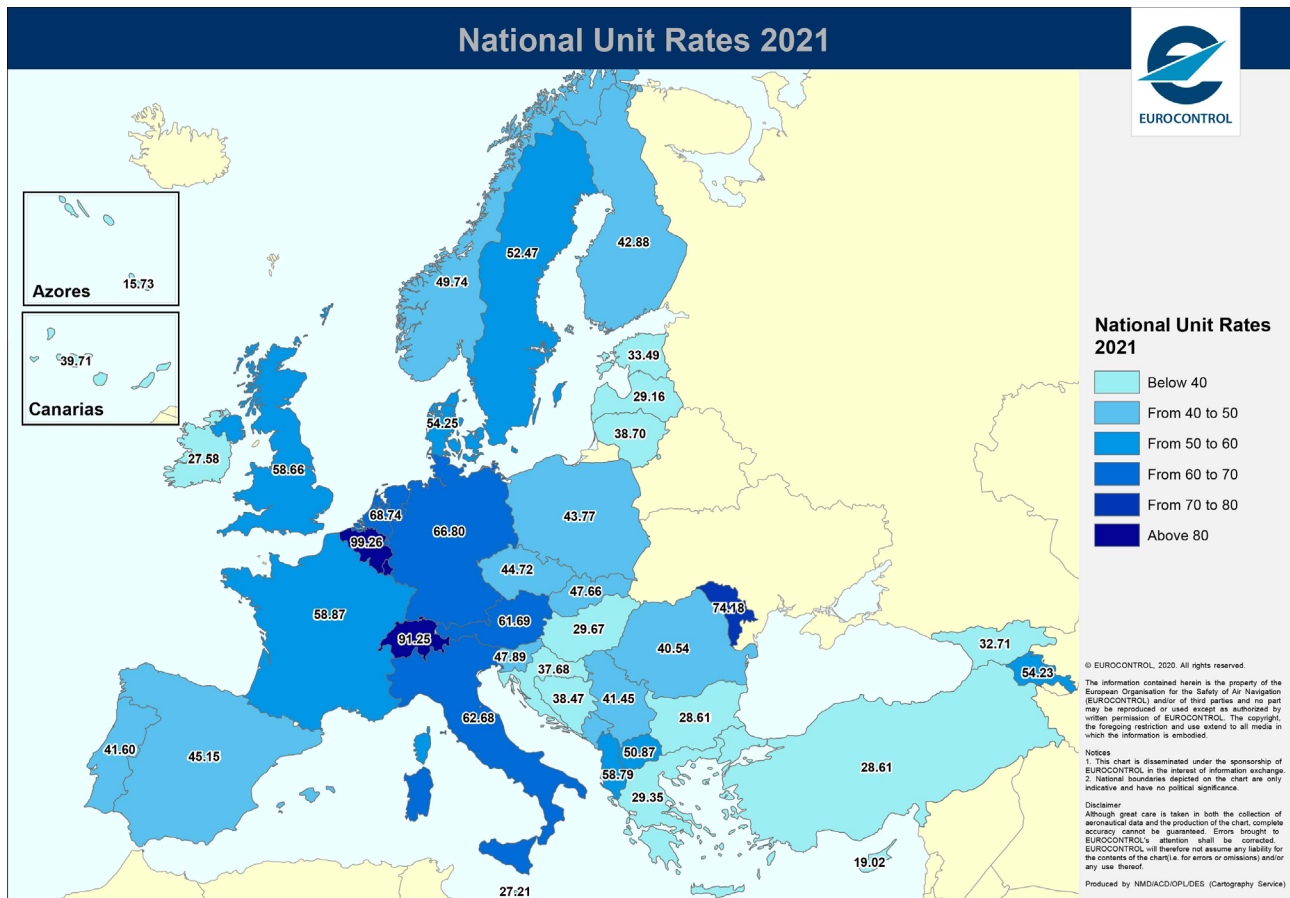
Flying the perfect green flight, as EUROCONTROL Think Paper #10 concludes, is a complex exercise; a lot can however be done now to make flights greener at every stage of a journey, and by every actor involved. As the en route flight phase has the greatest impact on fuel consumption/CO<sub>2</sub>, a number of measures were identified to make that part of the flight greener.

And while such factors may have limited impact as they are just some of many considered by airlines, financial considerations can lead airlines to deviate from the shortest constrained route when a less direct route is cheaper to fly due to cheaper airspace route charges<sup>9</sup>. Figure 5 shows on the next page, the 2021 unit rates, clearly showing the considerable variation across States.

These **financially driven considerations by airspace users are due to, at times, considerable differences in the unit rates established by States.** These differences, together with a number of other elements like cost of fuel, arrival punctuality and aircraft load, are considered by the flight planners at the airline when they decide on the route to be flown, and **could lead to a longer than necessary and therefore environmentally more damaging route.**

*“Financial considerations can lead airlines to deviate from the shortest constrained route when a less direct route is cheaper to fly - a key sustainability challenge. Could differential pricing be a solution?”*

FIGURE 5: 2021 UNIT RATES ACROSS THE EUROPEAN NETWORK



## Mitigating capacity and environmental performance impact

One mitigating option would be to establish a common unit rate to eliminate such considerations from operations.<sup>10</sup>

While this may look like an obvious solution, it would not be devoid of challenges and complexities, and calls for further consideration as to how it could be implemented in a way that delivers benefits, considering the limited environmental impact of ‘route charges shopping’. The first step towards this development is set out in the **proposed recast Single European Sky (SES) package, where the possibility for the European Commission to establish a common unit rate for en route air navigation services across the Single European Sky is foreseen.** Nonetheless, ensuring at least a similar transparency of the

cost charges to the airlines will be a challenge, as will be the unavoidable revenue sharing.

Another way to support the Green Agenda under discussion is the modulation of charges, a tool already available for more than a decade. The use of **modulation of charges to support the deployment of technology supporting environmental performance or for aircraft using sustainable aviation fuels has been raised.** The possible use of modulation for environmental purposes is still subject to discussion as it should also be considered in light of ICAO’s policies for charging.

The purpose of route charges - i.e. to recover the costs of air navigation services - should not be lost in the pursuit of strict sustainability objectives, but it should support these if and when possible.

*“Time to look at the Route Charges System again from the foundations upwards”*

## CONCLUSIONS

For 50 years, the Route Charges System has shown its flexibility to successfully adapt to an evolving air navigation services landscape. The CRCO, States, ANSPs, airlines have all played a role in the deployment and operation of a pan-European system that has supported the funding of safe air navigation services in a transparent and reliable manner.

The prolonged crisis resulting from the COVID pandemic has shown however the vulnerability of a charging policy based on availability of services to airlines and traffic forecasts, and not on actual service provision. This means that airlines will end up paying for flights they never flew. While this may be a once in a lifetime event, this has triggered questions on the user pays principle, in particular in view of the overall role of aviation in crises such as this one.

When traffic returns, the European network risks once more being confronted with the pre-pandemic challenges of capacity and delays, and ANSPs will need to balance between providing the required capacity, lowering costs to mitigate revenue shortfalls, and making the necessary investments in staff and infrastructure. And these challenges will also need to balance environmental considerations as European aviation strives to achieve its sustainability goals.

None of these challenges however are insurmountable for the Route Charges System. Its main test will be to strive to keep a common policy that can evolve and accommodate traffic, capacity and environmental challenges; Single European Sky options such as a single unit rate and/or modulation of charges may well merit further consideration.

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## References

1. For more on the history and evolution of the Route Charges System: François Huet, Chapter 16, "The Regulation of Air Navigation Charges", Achieving the Single Sky, published by Kluwer Law International, the Netherlands, 2011.
2. All EUROCONTROL Member States are Contracting States to the Multilateral Agreement relating to route charges. Ukraine will technically integrate the Route Charges System as of November 2021.
3. EUROCONTROL also bills and collects terminal charges on behalf of 17 States on the basis of bilateral agreements. Overall charges for terminal services across all EUROCONTROL Member States are around EUR 2 billion per year (pre-COVID).
4. Based on ACE Report Preliminary data 2019 – December 2020 (data for ANS).
5. ACE ATM Cost-Effectiveness (ACE) 2019 Benchmarking Report with Special Focus on COVID-19 Impacts in 2020 ATM Cost-Effectiveness (ACE) 2019 Benchmarking Report with Special Focus on COVID-19 Impacts, Prepared by the Performance Review Unit (PRU) with the ACE Working Group, May 2021
6. Based on the data of 25 States over the last 22 years providing 'en route' ATM. These are all of the States that were in the route charges system in 1998 and subject to the Single European Sky legislation in 2019. They accounted in 2019 for 88% of costs in the EUROCONTROL area and 80% of the traffic. See EUROCONTROL Data Snapshot, 23 March 2021.
7. Report of the Wise Persons Group on the Future of the Single European Sky, April 2019.
8. A complete assessment of the impact of the move from M2 to M3 has not been completed as a result of the COVID crisis.
9. See EUROCONTROL Think Paper #10, Figure 7, for more details.
10. Also advocated in the Report of the Wise Persons Group on the Future of the Single European Sky, April 2019, Recommendation 9 for a "Common Route Charge".



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