



ATM Financing

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Air Traffic Management (ATM) is a set of services which every state must provide for the safe and efficient operation of air traffic. Today, it is almost entirely financed by user fees according to the 'user pays' principle. Until today, the 'user' has always been assumed to be the airspace user, normally an airline. This system is now coming under pressure. The current Single European Sky (SES) regulation is built on the assumption that air traffic in Europe continually increases. Therefore, the financing of ATM is secured by increasing revenue due to higher traffic volumes. Technological progress and efficiency gains should lead to a reduced cost and a lower environmental footprint of aviation while increasing safety and capacity. Two crises – the financial and banking crisis of 2008 and more recently the COVID-19 pandemic – show that the assumptions behind this regulatory framework are wrong. Additionally, there is the question of who the actual 'users' are. Does ATM only serve paying airlines or are there some services which are provided in the public interest? This issue of Network Industries Quarterly explores this last question by way of three original contributions.

The first contribution by Matthias Finger, from the European University Institute, discusses possible arguments that could be used when defining ATM in the public interest, notably when comparing ATM with rail and electricity infrastructure.

In the second contribution, Alex Bristol, Myriam Käser and Marita Lintener, from Skyguide, observe the 'dual soul' of Air Navigation Service Providers, providing both services to commercial airlines while simultaneously responding to domestic (national) objectives. Consequently, they explore core services of general interest (CSGI) as an option for financing portions of ATM activities.

In the third contribution, Kalman Seregelyes, from Hungarocontrol, asks whether the current EU performance scheme for air navigation services is still fit for purpose and argues in favour of a new traffic risk sharing scheme which could be better suited for traffic fluctuations such as were experienced during the COVID-19 pandemic.

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ATM as a Public Service?

Matthias Finger

COVID-19 was very difficult for ATM and for aviation more generally. Traffic volumes almost collapsed. For ATM this raised the question, among others, of whether ATM, or at least the availability of ATM, should be considered a public service. In this article, I discuss whether and the extent to which ATM can be considered a public service and what implications this would have, especially regarding financing it.

In order to do this I proceed in five steps. First I discuss the nature of ATM activities from the perspective of infrastructure governance, also in comparison to other network industries, particularly rail and electricity. Having defined the nature of ATM activities, in a second step I derive the implications for public services in line with EU considerations and terminology. In a third step I come back to ATM and define how at least some ATM activities can be defined in public service terms. Finally, I turn to what all this could mean for ways forward in terms of financing public service-type ATM activities.

My aim in this article is conceptual in nature, as I would like to provide an intellectually sound conceptualisation of ATM activities in line with state-of-the-art thinking about infrastructure governance. I finish by arguing that ATM or portions of it could be considered a public service in the broad sense, but I also argue that this does not automatically require public financing of ATM. Nevertheless, I aspire to lay the ground for a sound political debate should politicians want to financially support ATM.

ATM as infrastructure

The aviation sector is different from all other infrastructure or network industry sectors, inasmuch as it is the only network industry that historically has always been unbundled. Nevertheless, it works as a single network industry or system, as none of the three elements in the aviation sector – air transport, airports and ATM – make sense without the other two. Telecom, for example, was and still is vertically integrated: a telecom operator consists of both the infrastructure (copper cables, fibre optic cables and cellphone towers) and the telecommunication services to end-users. The same is the case of railways, electricity and gas, even though most of these sectors and the respective

vertically integrated operators have been unbundled in the course of liberalisation since the 1990s.

This unbundling led to a (more or less) clear separation into two types of operations, namely operation of the infrastructure on the one hand and the provision of services on the other. Electricity, for example, has been unbundled into the transport and distribution of electricity via the grid on the one hand and the production and provision of electricity as a commodity on the other. The first of these is the infrastructure per se, whereas the second is the provision of electricity as a service to commercial and retail customers. Whereas transport and distribution is a (natural) monopoly, the provision of electricity is competitive in nature, i.e. a market.

More easily comparable with aviation is the railway sector, which in many countries has been unbundled into the infrastructure on the one hand and transport services on the other. Infrastructure in the railway sector is tracks, signalling and railway stations, whereas transport services are freight and passenger services, which in turn can be subdivided into high-speed, long-distance, mass transit, etc. services. While infrastructure is a (natural) monopoly, transport services can, in principle, be provided competitively. Indeed, in the EU most railway services have been liberalised.

What can aviation learn from electricity and rail? Even though aviation did not have to be unbundled, the underlying structure is the same. There is, on the one hand, the infrastructure, i.e. ANSPs and airports, both being more or less natural monopolies. And there is, on the other hand, air transport as a service provided by competing air transport services providers, in other words airlines. ANSPs, just like rail infrastructure and electricity grid operators are typically publicly owned.

In other words, ATM – as operated by ANSPs – is infrastructure and comparable as such to railway infrastructure (tracks in the sky), an electricity grid (en-route being comparable to the high-voltage grid, whereas approach and take-off can be compared to the electricity distribution grid), a gas grid and telecom infrastructure. As such, ATM is typically a publicly owned (natural and nation-

al) monopoly. Nevertheless, this does not say much about the public service nature of ATM, railway tracks or the electricity grid for that matter. It simply means that it is a monopoly in need of (monopoly-) regulation and a necessary condition for services to be provided over this infrastructure, thus requiring in addition that access to this infrastructure be regulated.

What is infrastructure in terms of public service?

Before liberalisation, vertically integrated infrastructure operators were typically called ‘public services’ or ‘public service operators.’ The national railway company was therefore considered to be a public service operator, meaning that more or less everything it did was equated to a public service. This terminology was, however, never applied to ATM and ANSPs, the reason being that the aviation sector has been, as stated above, unbundled since its very beginnings.

After liberalisation this simplistic approach became untenable as the monopolistic and vertically integrated public service providers became unbundled. The concept of public service had to be revised and become more sophisticated. Consequently, new terminology was developed by the European Commission. This new terminology had in any case also become necessary because the concept of public service was too closely associated with the French and more generally Latin view of the role of the state in the economy, and was therefore not really acceptable to the much more liberal British, German, Scandinavian and Eastern European approaches.

As a consequence, integrated and monopolistic public service provider, such as vertically integrated railway operators, were separated into monopolistic infrastructure operators (operating the tracks) and rail transport operators offering services to customers. In terms of public services, the infrastructure is now a provider of ‘services in the general economic interest,’ whereas the transport operator may or may not be offering so-called ‘universal services,’ i.e. services that fall under a public service obligation. Such services will typically be subsidised by public authorities if they cannot be financed entirely by user fees. In short, the monopolistic infrastructure, on the basis of which both commercial and universal (e.g. public service obligation) services are offered, is considered to be in the general (economic) interest. As such, it provides companies – public and private – with a service, which in turn make use of it in order to deliver their services to customers. Typical infrastructure in the general interest is therefore operated by

railway infrastructure managers (so-called IMs), transmission and distribution systems operators (so-called TSOs or DSOs) in the case of electricity, and in our case ATM services providers (so-called ANSPs).

ANSPs as providers of services in the general (economic) interest

What constitutes an infrastructure service in the general interest is relatively stable over time, yet depends on the state of technology. Let me revert to the telecommunications sector in order to illustrate my point. Before the emergence of cell phone technology, the infrastructure services provided by telecom operators pertained mainly to transport of and access to voice calls over copper cables from callers to receivers. This is typically what defines an infrastructure service in the general interest: there is a natural monopoly of the infrastructure which ‘transports’ calls in the case of Telecom operators, letters and parcels in the case of postal operators, electrons in the case of TSOs and DSOs, trains in the case of railways and aeroplanes in the case of ANSPs. The key characteristics are both transport over and access to the infrastructure. After liberalisation, non-discriminatory access becomes a key feature so that all service providers – i.e. all airline companies, all companies that sell electrons, etc. – can use the infrastructure in a non-discriminatory manner in order to serve their final customers. It is only after liberalisation of the respective sector that the unbundled infrastructure is operated in the general interest.

In the case of telecommunications, a qualitative technological development took place at the end of the 1990s leading to rapid growth in wireless telephony. As a result, cell phone telephony became, to a certain extent, an infrastructure competitor to copper cables. However, wireless telephony was no longer a typical natural monopoly as the technology became affordable to new entrants and could be developed competitively, development only being limited by availability of spectrum. Instead of one single monopolistic copper cable telecom infrastructure service provider, typically three to four mobile telephony service providers were operating in the wireless telephony market. Consequently, the cell phone towers on which they relied to provide their services lost their monopoly status and are no longer considered infrastructure in the general interest. Access to cell phone towers is no longer regulated and wireless telephony operators are free to enter into agreements to share or not share cell phone towers with their competitors.

This same evolution has so far not (yet) happened in any of the other network industries. Electricity grids and railway tracks are today not yet substitutable by alternative technologies and their operators retain their characteristics as providers of infrastructure services in the general interest. This is also the case of ANSPs, even though there are significant technological developments underway, such as in virtual centres and remote towers, threatening their monopolies and general interest infrastructure status.

Financing ATM as general interest infrastructure

It is again useful to compare ATM with the financing of other network infrastructure. For a start, it is useful to distinguish between investment on the one hand and maintenance and operations on the other. Ideally, development, maintenance and operation of the infrastructure are paid for by the users of the infrastructure, i.e. retailers (and consumers) of electricity by way of network charges and train operating companies (TOCs) by way of track access charges, just as airlines (and their passengers) pay for the use of airspace provided by ANSPs. The example of railways, however, is particularly interesting. In most railway countries, the development of the railway infrastructure (i.e. the investment) is either partially or entirely paid for by the government. This is also valid for new infrastructure such as in the case of district heating developments. In addition, and in the case of railways, also maintenance and sometimes even operation of the rail infrastructure are never entirely covered by the track access charges and therefore are partially subsidised. In other words, the government typically finances a substantial portion of the rail infrastructure because it is considered to be in the general economic interest.

What does all this mean for financing ATM as an infrastructure service in the general economic interest? Least controversial is certainly the idea that some of the services that ANSPs provide are services to the state, for which the state as a 'bulk user' should logically pay independently of whether it owns the ANSP or not. The most obvious such services in the general interest are military and search and rescue flights. However, there may be other services that the state may want to order from the ANSP and be ready to pay for, such as reserved airspace for reasons of security, for example. The undeniable advantage of this approach to infrastructure services in the general interest is that it will not preclude any restructuring of the European airspace and neither will it preclude changes in the ownership and control of ANSPs. The state simply has to define the infrastructure services it wants from the ANSP serving

its national territory and pay for their provision following transparent charging criteria.

More controversial is the idea that a portion of what the ANSP does – its core activities so to

speak – is the equivalent of a 'basic infrastructure service' in the general economic interest, and as such needs to be financed with taxpayers' money rather than with fees paid by users, a proposal that has recently been tabled by the German aviation industry. The danger in this way of defining ATM services in the general interest lies in the fact that it might further cement the fragmentation of airspace in the EU and therefore probably make restructuring European airspace even more difficult, especially if the current charging scheme remains untouched. In order to prevent this happening, such basic infrastructure services would have to be harmonised across Europe.

Does European Regulation Reflect The Role of Air Navigation Service Providers Today?

Alex Bristol*, Myriam Käser**, Marita Lintener***

In order to achieve the aims of the Single European Sky initiative, a change in regulation is necessary to incentivise Air Navigation Service Providers and their states to move to more modern technology and operational compatibility.

Introduction

The funding of infrastructure in a networked industry is a well-researched area, and Europe has seen broad similarities in the way sectors such as electricity, water and railways are regulated and managed. One aspect of national infrastructure which has so far been the object of less clarity of thought and purpose is air traffic management (ATM).

Under the Chicago Convention, which remains the basis for global aviation legislation, provision of air traffic management is a duty of the state. Article 28 of the International Civil Aviation Organisation (ICAO) Convention requires that “Each contracting State undertakes, so far as it may find practicable, to [...] 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. [...] (ICAO Convention).

As a consequence, almost every state in Europe has its own air navigation service provider (ANSP), which fulfils the requirements of this convention. It should be noted that there is also one ANSP, the Maastricht Upper Area Centre, which serves four different states in the upper airspace.

The Single European Sky

The Single European Sky (SES) was an idea created at the end of the last century to tackle flight delays and to unlock market dynamics and higher efficiency in ATM (Crespo, D. and Mendes de Leon, P (2011), Achieving the Single European Sky, Chapter 1 “The Single European

Sky”). In SES a performance and charging scheme was implemented and performance targets were set by the EC to compensate for the fact that there is no market in the ATM sector.

Taking stock in 2023, we see successful cooperation between stakeholders, for instance in research, development and deployment of new technology and unprecedented engagement by the EC to fund harmonised deployment of new technologies. The safety track record is excellent despite the enormous growth in numbers of flights and the increase in the complexity of airspace.

Other aims of the Single European Sky, however, have not been achieved:

- The cost of ATM is rising, while more investment is necessary in digitalisation, green transformation, cyber security and new technologies.
- The trade-off between cost efficiency and capacity provision is a major issue which is not sufficiently considered in the current performance scheme.
- The network is confronted with continual disruptions and flight delays.
- The necessary further development of the framework regulation is stuck between institutions, blocking innovation-friendly performance regulation.

The European charging scheme

The European charging scheme is based on the 1950s idea that the cost of ATM should be covered by the biggest aircraft (which have the most passengers and, according to theory at the time, the best ability to pay). Unfortunately, in this model there is no connection between cost drivers (primarily intervention by air traffic controllers to safely

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manage multiple interactions in a complex and busy airspace) and revenue generation (most revenue is generated by long-distance overflights by heavy aircraft).

Barry Humphreys writes, “No matter how justified the original charging principles may have been in the immediate post-Second World War period, they clearly fail to reflect the reality of airline operations today.” (The Regulation of Air Transport, p195, Barry Humphreys, Routledge, 2023). This is particularly true since the advent of low-fare airlines, which often create ATM costs not covered by the ANSP revenues generated. This is largely due to the routes flown, which are often not along the major air traffic routes traditionally linking the key hubs in Europe, and the fact that low-fare carriers fly medium-sized aircraft which – according to today’s charging scheme – return less money to the ANSP than a heavy aircraft, despite the fact that the effort to manage each aircraft is the same.

Eurocontrol’s Think Paper #18 (Eurocontrol One size fits all – A common unit rate for Europe?, September 2022) points out that the current charging principles are over 50 years old and could benefit from a re-think, and emphasises the potential environmental benefits to be gained from a different charging scheme. When designing the European performance scheme, it was already anticipated that it would require regular reviews (Crespo, D. and Mendes de Leon, P (2011), Achieving the Single European Sky, Chapter 16 “The regulation of air navigation charges”). In addition, in 2019 a Wise Persons Group report suggested reconsidering the use of the performance and charging scheme to support digitalisation and a common route charge to support a seamless (upper) airspace system (Wise Persons Group report (2019). On the future of the Single European Sky).

The user pays principle

The ‘user pays principle’ is a fundamental element of European networked systems and applies equally to ATM. We contend that the definition of ‘user’ in ATM has not been thought through to its logical conclusion. The most obvious users of the services of an ANSP are commercial airlines, but the military, blue light organisations, business aviation, general aviation and – increasingly – uncrewed air vehicles use these services. In addition, as COVID demonstrated, when the airlines are not flying, ATM is still required by the state. There are two logical conclusions to be drawn from this.

1. Some of the functions of an ANSP have more of a public service character than a pure service supplier character; and
2. The ‘user pays principle’ was stretched to breaking point during the COVID pandemic, as airlines were required to pay for services they did *not* use during that period.²

The character of an ANSP

As Barry Humphreys asserts, “By any normal definition, en-route ATC is a natural monopoly, though occasionally the possibility exists for some competitive pressure at the margin” (Barry Humphreys, *The Regulation of Air Transport*, Routledge, 2023).

Matthias Finger believes that “The (infrastructure-based) provision of services [...] should in principle be delivered by the market and paid for by the end user. The market does not always do this, however, and the end users are often citizens who neither can, nor want to, pay so that even with infrastructure-based services sometimes a public service is necessary, which must be politically defined and subsidised from the public purse” (*Infrastruktur Schweiz – Ein Erfolgsmodell in Gefahr*, Matthias Finger, NZZ Libro 2023; our translation).

This suggests that in a monopoly situation, such as that of ANSPs generally, it may be necessary and appropriate to consider the state responsible for some of the infrastructure provided. It should be noted that European Union members have access to a significant amount of taxpayers’ money for investment, e.g. through CEF/CINEA funding.

The proportion of ANSP costs which are fixed is very high (typically 90% or more), which explains why ANSPs were not able to significantly reduce their costs during COVID. This means that an ANSP is financially only minimally able to respond to a significant crisis. There is technology – namely virtualisation – on the horizon which will allow much more flexibility and scalability, but ANSPs are only starting out on this innovation path (EUI Policy Brief (2023). *Financing Air Traffic Management. Is there a need for a new approach?*).

Progress towards such virtualised technologies is very slow, however, not least because the European performance

² The total costs of ANSPs in the years 2020 and 2021 which were not covered by airspace users are being retroactively paid by airspace users over the years 2023-2029. By the end of 2029, airspace users will have covered all the costs of services used and not used in the years 2020 and 2021.

scheme does not incentivise such technological transformation and other measures to make ATM more efficient. The current scheme, for instance, incentivises the creation of equipment assets and penalises buying services, leading to expensive European ATM with duplications of systems. Skyguide believes that it is very important for regulation in the next 5-year period to focus on setting the right incentives and encouraging ANSPs to accelerate innovations which will take us to a virtualised ATM system (Skyguide (2022); RP4 Strawman paper).

ANSPs still identify very strongly with the equipment they possess rather than the services which they provide, and this is exacerbated by the fact that ANSPs often base their company value on their regulatory asset base. This leads them to try to maximise this asset base, on which in the current performance and charging scheme they get a return (on a weighted average cost of capital basis). This makes it less likely that an ANSP will choose to buy in services rather than buy yet more assets that it might not strictly need.

Regulation needs to alter the incentivisation to make it equally interesting for an ANSP to buy services in line with the air data service provider (ADSP) concept as outlined in the Airspace Architecture Study (SESAR Joint Undertaking (2019): *A proposal for the future architecture of the European airspace*, known as 'Airspace Architecture Study').

The dual nature of ANSPs

ANSPs have a 'dual soul'. On the one hand, they are part of an international network coordinated by the network manager to deliver a service to commercial airlines. On the other hand, they fulfil additional, partly not harmonised or even conflicting, local mandates and have to meet national requirements (EUI Policy Brief (2023). *Financing Air Traffic Management. Is there a need for a new approach?*).

COVID further highlighted that ATM is a piece of critical national infrastructure that must be open 24/7/365 to serve national interests (cargo, connectivity, state aircraft, etc.) but which according to the current regulations is fully paid for by commercial airlines.

Core Services of General Interest

Building on understanding of the character of ANSPs, the concept of so-called core services of general interest (CSGI) was recently introduced (BDL (2022) *Reforming the funding of air traffic control*; EUI Policy Brief (2023) *Financing Air Traffic Management*; Transport & Mobility Leuven (2023) *ATM Financing Study*). This distinguishes between the minimal ATM infra-

structure that a state requires (the state as the user) and the additional ATM service delivered to airlines (airlines as users). This distinction between infrastructure and service is well known and applied in other (network) industries. As part of the possible solution to the imponderable of funding a public service entity versus a capacity delivery entity, CSGI has been elaborated for ATM.

The state can agree with the ANSP on provision of a certain amount of infrastructure and services (core services) in the general (public) interest and the state would guarantee payment for this. This would be through a pure cost recovery mechanism (i.e. zero profit) and the core services of general interest would be agreed for each state according to a set of guidelines and criteria approved across Europe to ensure a consistent approach.

This possible solution is not in contradiction with the overall Single European Sky policy as it does not increase the role of the state but acknowledges that the state and the general public are users. Application of this philosophy to the ATM industry should create a sustainable way forward that prevents ATM from lurching from crisis to crisis.

Conclusion

In order to achieve the aims of the Single European Sky, future regulation needs to reflect the situation today in Europe. Charging for air traffic management should create a closer link between cost drivers and revenue generators, and complexity (which is the key cost driver today) must be taken into account.

The current system is not long-term sustainable, and COVID put a sharp focus on this. Of course, every state wishes to have its own ANSP and of course no state wishes to pay for something it has not previously had to pay for. In the end, however, it is our belief that a state wishing to continue to have its own ANSP will have to make some investment in the national infrastructure. ANSPs have a part which is of a public service nature and a part which is pure service provision. The state is therefore the 'user' of some of the output of an ANSP.

Future European regulation needs to incentivise modernisation, rationalisation, harmonisation, simplification and automation, and in this way the combined requirements of SES, states and airspace users might be satisfied.

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Re(de)fining the Performance Scheme

Kálmán Seregélyes*

After the Covid-19 pandemic, discussion started on whether the EU performance scheme for air navigation services was still fit for purpose, particularly in times of crisis. This article suggests that traffic risk sharing is a major element in the current framework, substantial modification of which could increase the robustness of the scheme in both normal and difficult times.

Introduction

As a starting point, an overview of the major elements in the current EU regulation on financing air navigation services (ANSs) will provide the context for some proposed changes.

The EU regulatory framework is a performance scheme (PS) introduced by implementing regulation (EU) 2019/317. The system is principally built on the underlying provisions of the Chicago Convention, which obliges its signatories to provide ANSs in their airspace and to operate the infrastructure necessary to ensure safe air transport, and it also gives states the right to recover the costs associated with the provision of ANSs from users of their airspace. Under the current PS, this principle is applied in such a way that all *planned* costs (for a period of 5 years – the reference period) are recovered *if* 100% of the predicted traffic materialises. Deviation from the plan is generally seen as a business risk to be borne by both air navigation service providers (ANSPs) and airspace users (AUs).

Two main components of risk in this system can be distinguished: cost risk and traffic risk. While cost risk is basically borne by the ANSPs, traffic risk is shared between the AUs and the ANSPs. In the case of traffic risk, the PS employs a stepwise scheme: for differences compared to the plan in the range of $0\pm 2\%$, the ANSP bears all the risk, between 2% and 10% the additional difference is shared between the ANSPs and the AUs in the ratio of 30-70% and for deviations larger than 10% the additional part is fully borne by the AUs. As a result, the maximum exposure of ANSPs to traffic is limited to 4.4% of their revenue. Settlement of the financial results from the risk sharing scheme is done on an $n+2$ basis, i.e. differences in year n are financially settled with AUs by modifying

the unit rate in year $n+2$, so, for example, traffic less than anticipated leads to a revenue loss in year n , for which the unit rate in year $n+2$ is increased to cover the loss of the ANSP.

In my previous opinion piece (Seregélyes 2023), I gave a partial evaluation of the appropriateness of the PS to the challenges posed by the COVID-19 pandemic, and some proposals were raised for consideration to reshape the future Air Traffic Management (ATM) financing scheme. In the opinion piece and also during the 19th Florence Air Forum on Financing Air Traffic Management, the core of the discussion focused on the possible forms and extent of public financing of ANS provision by modifying the current PS as a response to the challenges faced during the pandemic.

This article follows a similar line. It aims to propose adjustments with the possible involvement of the public in order to make the system more robust, resilient and cost efficient while allowing stakeholders to focus on things they are most capable of managing. This article follows a similar line. It aims to propose adjustments with the possible involvement of the public in order to make the system more robust, resilient and cost efficient while allowing stakeholders to focus on things they are most capable of managing.

Consequences of the crisis

Although the EU-wide ATM system functioned well during the COVID-19 crisis and the aviation system remained operational, many stakeholders faced overwhelming financial challenges. Such a sudden (and prolonged) drop in revenue had previously been unimaginable for AUs and ANSPs. Everybody had two options: to cut costs and/or to seek additional funding. However, the magnitude of the crisis made it clear that cutting costs alone was unlikely to keep anyone afloat (except perhaps the

* The views expressed in this paper are those of the authors and do not represent the position of any external organisation

few who had enough reserves from the past). There was of course variation among stakeholders as to the magnitude of possible cost reductions, but in general it was not possible to come up with a level of cost reduction commensurate with the drop in revenue. There was no difference between ANSPs and AUs in this respect.

However, there was a big difference between AUs and ANSPs in terms of the future impact of the sudden drop in traffic. According to the PS, the exposure of ANSPs to traffic risk is generally limited to 4.4%, with the rest being borne by AUs. In fact, this time the situation of the AUs was even worse since approval of the performance plans for the reference period (2020-2024) – which was due just when the pandemic hit Europe – was suspended. Therefore, the planned level of traffic was not set as the basis for traffic risk sharing (TRS). This finally led to a situation in which practically all the change in traffic during 2020-2021 had to be borne by the AUs. Although this did not save the ANSPs from facing liquidity issues, at least they could count on the future recovery of their revenue losses.

In the end, the main concern for the ANSPs was how to secure financing to survive the years until the loss of revenue would be paid by the AUs. The main obstacle in this process was the uncertainty over the amount and timing of future reimbursements due to the lack of underlying business parameters, the absence of approved performance plans and the months it took to gain certainty by adapting the EU regulatory framework to the crisis.

On the other hand, one of the main concerns for the AUs was/is that in the coming years they have to pay billions of euros to reimburse the total loss of revenue of the ANSPs during COVID-19, while the underlying triggering events were completely out of their control.

These results led many stakeholders in the industry to conclude that the whole system of ATM financing was ripe for change, and that the way forward was to get a third party, namely states, to (partially) bear the cost of ANS provision. Today, there are many ideas floating around as to why and how the public budget should play a greater role in ANS financing. The approach presented in the following sections is, however, different in two respects. First, the basis of the proposal is to change the actual TRS scheme, and, second, I suggest that in some cases the public interest should be represented not by national governments but by the EU.

The root of the problem

The COVID-19 pandemic clearly revealed one of the weakest points of the PS: the traffic risk sharing arrangement. One of the basic principles of risk sharing schemes is that a system can operate at minimum cost if risks are distributed among stakeholders according to their ability to mitigate them. In other words, risk should be borne by the party most capable of handling it. It is my firm opinion that under the current PS this is not the case.

a) As evidence, it may be sufficient to point out that for the smallest change compared to the planned traffic level ($0 \pm 2\%$, the so-called dead band), the ANSPs have to bear all the consequences. Knowing how an ANSP operates (with an overly large portion of fixed costs and capacity planning with seasonal variations), it is clear that for such small changes in traffic there will not be any corresponding cost changes, resulting in a financial gamble: with luck, traffic will be more than planned, while in the opposite case ANSPs will face losses. Furthermore, it also has to be borne in mind that ANSPs are practically not capable of influencing the level of traffic served. While it is often thought that national unit rates may lead to traffic distortions, at the system level (unlike some local cases) they do not have a significant effect on overflying traffic.

Certainly, as traffic deviation from the plan may grow, corresponding cost increases may arise (overtime, additional recruiting etc.). Usually, such extra burdens are significantly lower than is considered in the PS. The implicit assumption in the PS is that the overall cost elasticity to traffic for an ANSP is 1.0 for the dead band, which then decreases to 0.44 at $\pm 10\%$ and it will further decrease as traffic deviation grows.

All in all, traffic risk for ANSPs as defined in the PS is a risk they are obviously not able to mitigate at the lowest price. The result is that ANSPs ask for a premium to run this risk (an increased cost of capital) and AUs have to bear this cost.

b) Regarding AUs, one might argue that they already bear the demand risk, so it is natural to include them in the risk sharing scheme. In fact, under the PS TRS is not the same risk that they run as part of their business. Under the PS the risk is actually linked to the reliability of traffic forecasts. Therefore, on the one hand, it is not linked to the individual performance of airlines (as each airline has the ability to influence demand) but to the evolution of the aviation sector in

general, and, on the other hand, it is linked to a traffic forecast which they have no influence on at all.

Consequently, as it is currently designed TRS puts an additional risk on the shoulders of the main stakeholders and increases the cost of the system. Furthermore, the continual settlement of carry-overs from TRS increases the volatility of the unit rate evolution of ANSPs and undermines the predictability of long-term plans for AUs.

The inadequacy of the TRS became even more transparent during the crisis and it exacerbated the negative consequences due to major changes in traffic.

A possible new approach with a new 'public'

To provide a solution to the problems discussed, I propose redesigning TRS based on the following pillars.

1) The traffic risk borne by ANSPs should be in line with their cost elasticity to traffic.

First of all, a new TRS ratio has to be set after thoroughly analysing the nature of the evolution of costs compared to traffic.

As was previously pointed out, the current scheme is practically independent of this ratio, which is critical from the point of view of the ability of ANSPs to mitigate risk. I foresee two consequences. The adjusted traffic risk run by ANSPs will be more linear (unlike the current stepwise regime, e.g. it could be a standard 0.1% for every percentage point change in traffic), with an increasing 'tail' for larger traffic changes (e.g. above $\pm 10\%$ it could rise to 0.2-0.3%), and the ratio will be significantly lower than at present, especially for smaller deviations (as opposed to 1.0 in the dead band). This would be in line with the ANSPs' cost elasticity to traffic, in which only a small part of the cost evolves in line with traffic (e.g. overtime, traffic-related payments, or in the case of larger deviations recruiting and training).

2) The financial consequences of traffic variation should be settled by means of a centrally managed supranational fund covering all the regulated ANSPs/countries.

Unlike the current scheme, AUs would not be subject to TRS, but a separate entity, an EU fund, would be established to manage the financial effects of deviations from planned traffic levels.

The reason for establishing an EU Fund stems from the conviction that the proper functioning of aviation, including the ATM system, and especially the interconnectivity of states, is in the interest of larger economic areas such as the EU rather than individual countries. At the national level, particularly in times of crisis, states tend to focus on local interests. The different approach to addressing aviation issues during the COVID-19 crisis is an obvious example of such behaviour. Since the aim is to find a Europe-wide solution, it is appropriate to rely on a stakeholder with a clear interest in Europe/industry-wide consequences. Therefore, public interest in the case of serving en-route flights is represented by the EU, not by national governments.

The EU fund would receive all the over-recoveries from TRS, i.e. the part of additional revenue which stems from traffic above planned levels and which exceeds the cost to traffic ratio (set according to point 1). On the other hand, the fund would also have the responsibility to transfer money to ANSPs with less traffic than planned.

In this arrangement, the fund would actually take the traffic risk for the whole EU and it would redistribute the financial effects triggered by traffic in individual countries.

3) Besides having inflows and outflows because of traffic deviations, the EU fund should be able to acquire financial facilities on its own.

The fund's cash flow would basically be linked to the reliability of traffic forecasts for the EU area. This in itself is already a risk mitigation measure, since traffic forecasts for larger areas are more accurate than for individual countries. In this scheme periods better than planned would result in extra revenue, which can be accumulated in the fund for later years. Nevertheless, to be prepared for recessions or even times of crisis (when there is system-wide no excess revenue from better than planned traffic), the fund should possess further financial facilities such as:

- loan facilities with supranational banks (eg. EIB);
- issuing bonds or other financial instruments;

- providing guarantees for state/ANSP loans to finance traffic-related cash needs;
- eventually, direct EU subsidies etc.

Direct involvement of the EU budget is not a prerequisite, but the fund should at least be backed by the EU to secure cheap financing.

The benefits of the proposed scheme

The advantages of the proposed new scheme:

AUs

- would pay a more easily calculable unit rate;
- as a counter-cyclical tool, in times of recession/crisis the fund would help to avoid any immediate unit rate increase due to less traffic than anticipated;
- would pay less for the cost of ANSP capital so the whole service would be cheaper.

ANSPs

- would only bear the part of the traffic risk which they can control, in other words they would get paid for the available capacity they are asked to provide;
- less cumbersome discussions on traffic forecasting;
- settlement through the fund could be faster (first months of year n+1) than in the current scheme (n+2), leading to shorter liquidity cycles and better solvency;
- due to the fund and the increased certainty, financing will be cheaper and more accessible.

The EU (public) level

- by creating a risk pool and diversifying traffic risk, the cost of the whole system would decrease, leading to cheaper ATM financing and thus supporting aviation and the whole economy;
- stakeholders may focus more on providing capacity based on a harmonised European traffic estimate;

c) there is no inevitable need for direct financial involvement and therefore implementation is feasible even in times of budgetary constraints;

d) by eliminating certain regulatory obstacles (such as the dead band), the proposed scheme can foster international co-operation (especially cross-border activities);

e) the proposed changes would not prevent anybody searching for new innovative solutions in which capacity could be provided in a more flexible way.

Conclusion

Although from an operational point of view the performance scheme has proven to be robust, the Covid-19 pandemic revealed the shortcomings of the current system and pointed to a need to adjust the regulatory system in force. This gives us a chance to question, re-assess and redesign even the oldest principles built into the scheme. The traffic risk sharing scheme is a field in which changing the original regulation could lead to a win-win situation for all the stakeholders involved.

Reference

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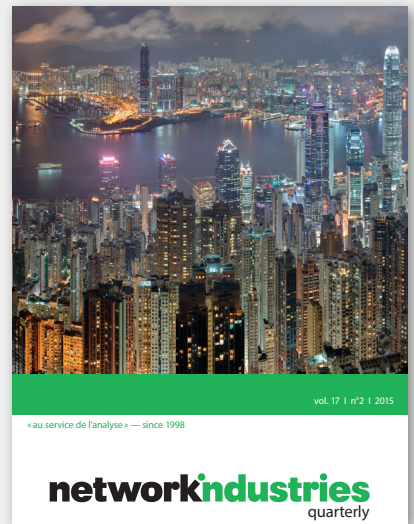
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PAST ISSUE

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Mobility Data Spaces

Transforming Europe into a climate neutral economy by 2050 in line with the European Green Deal places a particular responsibility on the transport sector, which accounts for a quarter of the Union's total greenhouse gas (GHG) emissions. Specifically, transport will have to collectively reduce its GHG emissions by 90% by mid-century compared to 1990 levels.