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SINGLE EUROPEAN SKY III MISSION POSSIBLE?

WHITEPAPER

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Executive Summary

The Single European Sky (SES) concept was initially introduced by the European Commission in 1999 to tackle the inefficiencies of the European Air Traffic Management (ATM) system and to ensure it could meet future demand for air travel effectively. However, despite the introduction of two regulatory frameworks and implementation initiatives, SES I in 2004 and SES II in 2009, we are still a long way away from the full implementation of the SES.

This paper presents IFATCA's views on the reasons behind that delay and gives five recommendations to achieve an interoperable, standardised and efficient SES and ATM system, without compromising safety. The main reasons behind the failure to implement the SES are the lack of an agreed long-term vision and strategy about the SES, an inefficient legal framework which reinforces the idea of short-term performance targets, the lack of political will amongst Member States to break free from national boundaries and the absence of technological and procedural standards to ensure Europe-wide interoperability.

IFATCA proposes the following five recommendations to address the above root causes of the SES delay:

1) Create a simplified regulatory framework which increases investment in key capacity-increasing areas and which includes a flexible pricing structure based on the law of supply and demand.
2) Modernise the airspace structure, the operational procedures and the separation standards of the European ATM system to increase its capacity without compromising safety.
3) Move away from highly customised and non-interoperable technological solutions and define international standards enabling the creation and use of COTS ATM systems and products.
4) Incorporate the airports to the Network Manager so the management and optimisation of the network is based on a true gate-to-gate approach.
5) Make the Joint Human-Machine System concept the foundation of the future European ATM system.

IFATCA is committed to and has been supporting the SES since its inception. We strongly believe that the SES is possible. However, the onus is on all the stakeholders to collaborate, leave vested interests aside and find a way forward, which avoids the mistakes of the past and addresses the current problems of the ATM system. Only then will the SES become a reality.

IFATCA is the worldwide organisation representing more than 50,000 air traffic controller in more than 125 countries. IFATCA's goals are of professional nature, among which are the promotion of safety, efficiency and regularity in international air navigation and the protection and safeguarding of the interests of the air traffic control profession.

1. Introduction

Everywhere you look, you cannot help but notice the doom and gloom about the recent performance of the European Air Traffic Management (ATM) system and its prospects for the next few years. While 2018 saw Europe's air traffic increase by 3.8%, making it the busiest year on record with more than 11 million flights, the overall delay in the network increased by 105% compared to 2017[1]. More than 60% of that delay was generated by capacity and staffing issues and the situation is not likely to improve in the near future. That has prompted our industry to discuss measures to increase capacity and improve efficiency. A number of stakeholder engagement events have taken place and a number of reports and papers have been published in the recent past asking for effective action from all stakeholders to solve the current situation[2]. Those 2018/2019 initiatives could potentially mark the beginning of the third iteration of the Single European Sky (SES). However, many of those initiatives have failed to analyse the real reasons why we got into this situation in the first place and learn from it, namely the focus on cost reduction in Reference Periods 1 and 2 (RP1 and RP2), something which is also present in RP3[3], and the lack of interest some stakeholders have in actually implementing the changes the European ATM industry requires.

Looking at the situation in summer 2019, it would be very difficult to find aviation and ATM stakeholders who would disagree with the following concerning statements:

- ✈ 'Whist improvements have been made to the national ATM systems that constitute the European system, these improvements have either not kept pace with or have been insufficient to meet demand, with the result that delays are remaining at unacceptably high levels.'
- ✈ 'A comparison of airspace organisation between the Member States shows the vast differences, leading to inconsistences and confusion, making airspace design difficult and ultimately reducing the effectiveness of air transport.'
- ✈ 'The European ATM system is characterized by a multiplicity of national centres, not optimal routes and sectors that have been designed to meet national requirements.'
- ✈ 'Europe also suffers from a chronic shortage of air traffic controllers, leading to intense work pressure and emphasis on procedures at the expense of flexibility and capacity.'

The even bigger concern is that those statements are not recent, they are extracts from the report from the high-level working group set up by the then EU Transport Commissioner, Loyola de Palacio in 2000, 19 years ago[4]. That working group report was effectively the precursor document to SES legislation and SES ATM Research (SESAR). If, based on those statements, little progress has been made in the last 19 years in tackling the real issues we are facing in the ATM industry, how can we reverse the trend going forward, especially considering that traffic is forecast to grow by 53% by 2040 compared to 2017[5]? This document outlines a number of IFATCA recommendations which, if implemented, would enable the implementation of the SES in a sustainable, efficient, flexible and resilient manner.

[1] "2018's air traffic in a nutshell"; EUROCONTROL; www.eurocontrol.int/news/2018-air-traffic; 2019.
[2] "Controllers' Views on the (European) ATM System of the Future"; GATCO; 2019.
[3] "Hoping for a miracle seems to be the strategy of the European Commission"; ATCEUC, ETF, IFAIMA, IFATCA, IFATSEA, IFISA; 2019.
[4] "Single European Sky. Report of the high level group"; European Commission, Directorate-General for Energy and Transport; 2000.
[5] "European Aviation in 2040. Challenges of Growth"; EUROCONTROL; 2018.

Section 2 discusses the original aspirations of the SES and how the lack of a clear strategy has hindered the implementation of the SES. Section 3 looks at the reasons why the SES has not been implemented yet. Section 4 describes the five IFATCA recommendations, aligned with the five pillars of the SES II, we strongly believe would make the SES III possible. Section 5 draws the main conclusions of this study. The annexes in Section 6 complement the main body of this document and include IFATCA's views on the recent report from the Wise Persons Group (WPG).

2. Single European Sky Aspirations

Although a large number of documents exist dealing with the SES, it is relatively difficult to find the aspirations of the SES in those. There is not a single document or statement from the European Commission (EC) explaining the strategy and the goals of the SES. In this section, we highlight the clearest statements in that regard we could find.

In its report on the future of the SES, the WPG used the following vision for European ATM in 2035 to start its work[6]:

'A customer-focused Single European Sky that meets future needs for aviation services and environmental goals. A safe, seamless, scalable and resilient aviation network will be delivered through digital air traffic management services for all airspace users (civil and military) and passengers.'

That statement builds on the implementation processes launched in 2004 (SES I) and 2009 (SES II). What were the plans then for the European ATM system in 2020? Jacques Barrot, Vice-President of the EC at the time, stated that the expectations/aspirations for European ATM in '2020 and beyond' were[7]:

1) A 3-fold increase in air traffic movements whilst reducing delays;
2) Improve safety performance by a factor of 10;
3) Enable a 10% reduction in the effects the aircraft have on the environment; and,
4) Provide ATM services at a cost to the airspace users which is, at least, 50% less.

All those targets were to be achieved while developing a SES based on the following five pillars[8]:

1) **Performance-based regulatory framework**: This pillar aimed to put in place a performance-driven European ATM system, through the creation of a performance scheme setting up binding performance targets in the key areas described in this section. This pillar also included the creation of a Network Manager role and the optimisation of European airspace (via the almost defunct Functional Airspace Blocks).
2) **Safety**: With the aim of harmonising safety regulation, the competence of the European Aviation Safety Agency (EASA) was extended to cover airports, ANSPs and ATM. Thus, the complete aviation safety chain would be handled by a single body with a single decision-making process, independent from technological and economic considerations.

[6] "Report of the Wise Persons Group on the Future of the Single European Sky"; Wise Persons Group; 2019.
[7] "Communication from the Commission to the Council and to the European Parliament. The Air Traffic Management Master Plan"; European Commission; 2008.
[8] "Single European Sky – Frequently Asked Questions"; European Commission; http://europa.eu/rapid/press-release_MEMO-12-774_en.htm; 2012.

3) **Technology**: SESAR is the technological arm of the SES. Its aim is to provide the technical solutions to enable the SES objectives to be achieved. The European Commission aimed to overcome the fragmentation of ATM systems and speed up technological innovation through this pillar.
4) **Airports**: this pillar aimed to integrate airport capacity and efficiency in the SES package, ensuring a gate to gate approach. The EC also established an Airport Observatory to monitor information on airport capacity and incorporate it into the NM function.
5) **Human Dimension**: the SES recognised that ATM was, is and will remain a human-centred activity.

Despite the setting of targets and the definition of pillars, the strategy remained largely unclear, as was the understanding of who the real customers of the European ATM system are. IFATCA's understanding of the strategy is that we had to reduce cost, increase capacity and safety, supported by the technological improvements brought about by SESAR and, at the same time, introduce some kind of competition in the market.

The EC and many other stakeholders talk about a customer-focused SES, but who are the customers? IFATCA is of the opinion that the ATM system serves different users of the airspace. The passenger is just one of the stakeholders in the airspace user group. Other stakeholders include: military traffic, VFR traffic, gliders, parachute flights, photo flights and drones, amongst others.

Based on the above, IFATCA urges the EC to clarify its strategy and specify who it is referring to when talking about 'customers'. Producing documents and documents about the SES for more than a decade, without clearly stating what the plan is or who the customers are that we need to provide a service to, is not the best way of trying to improve the performance of the European ATM system.

3. Why is the Single European Sky Late?

As mentioned in the introduction, the challenges the current European ATM system is facing today are very similar to the challenges we were facing at the time of the inception of the SES. Progress in some areas has been very slow and, even though the current system is not broken, some parts of the service delivery are a cause for concern. Fundamentally, there is a lack of capacity due to the unpredicted increase in traffic and the cost containment measures taken by States and ANSPs to meet the cost-efficiency targets set by the Performance Scheme. How did we end up in this situation despite a 15-yeard old SES concept?[9]

From a financial point of view, a major concern for IFATCA is that the ATM system is underfunded or, at least, those areas that would have helped increase capacity are. Right now, the capacity of the ATM system generates delays and more staff is needed. Overall staff costs are 65% of the total cost of ATM, with operational staff costs representing about half of that figure[10]. If we are talking about increasing staffing levels to improve capacity, it is difficult to understand that an additional cost reduction of 10-15% in RP3 is the right medicine to heal the current system and improve performance. That is only

[9] "The Single European Sky gridlock: a difficult 10 year reform process"; M Baumgartner and M Finger, Utilities Policy, volume 31; 2014.
[10] "ATM Cost-Effectiveness (ACE) 2016 Benchmark Report with 2017-2021 Outlook"; Performance Review Commission, EUROCONTROL; 2018.

going to perpetuate and repeat the mistakes made during RP1 and RP2. Cost reduction that does not impact on performance is possible if you have other means to improve system performance, but there is no sign of any technical system or structural change that would fundamentally change how the current system functions. Planned improvements are expected in 2025, at the earliest, so it is IFATCA's view that the current situation will not improve in RP3.

From a political point of view, the regulatory framework put in place within the SES initiative is not as efficient as envisaged. It was created with a top-down approach at European level based on a public service model governed by ICAO standards and recommendations. That limits the efficiency of European legislation due to ICAO's Chicago Convention Article 28 and the perceived risk liberalisation poses to state sovereignty. Apart from the EC and some of the airspace users, none of the other stakeholders have a real interest in changing the status quo. There is not a commonly agreed and shared vision and strategy. That makes it very difficult for the NM to coordinate with and obtain commitment from States and ANSPs to implement the changes the ATM system requires.

The inflexible legal framework generated by the SES legislation has created an environment of increased complexity and unprecedented institutional fragmentation. That has resulted in many parallel activities which have not focused on service delivery. Furthermore, investment on legacy technology and hard law operational regulation are currently hindering operational flexibility. An opportunity was lost with the revision of the performance and charging regulation to incentivise standardisation and best practices, further cementing the current gridlock with regards to a possible network-level approach to service delivery. Instead, new regulation has introduced confusion and contradictory approaches within the European system. On the one hand, States and ANSPs have to work collaboratively on almost everything to improve the system while, on the other, they have to adapt and come up with business models based on competition and market mechanisms. That inherently antagonistic proposition is very difficult to achieve in practice.

From a technological point of view, one of the major challenges since the beginning of the SES initiative is that the modernisation and changes to the system have to be performed during live operations. In addition, the technological solutions which were supposed to help airlines and ANSPs to improve the capacity of the European airspace have not delivered the expected results and some of them have been postponed from 2020 to 2035.

Technological modernisation has taken place in silos and not at a large-scale level. The ATM market is probably not as attractive as other markets for system providers and manufacturers. There are only about 30 to 40 customers under the SES, which means providers and manufacturers are reluctant to take business risks in an environment where ATM functionalities are neither clearly defined nor standardised. Commercial Off-The-Shelf (COTS) products and systems, which could provide a certain degree of harmonisation, are only slowly being introduced into the ATM world.

Overall, it is IFATCA's view that without a steady investment which allows ANSPs to increase the number of operational staff to harness the untapped capacity potential, and, at the same time, investment in relevant technological solutions, no increase in capacity can be expected and the SES vision will not be materialised. It is also important to recognise that Europe is a diverse environment and that ANSPs form a heterogeneous mix with different local needs, which need to be integrated within the wider European vision.

4. IFATCA Recommendations

This sections details IFATCA's recommendations to achieve an interoperable, standardised and efficient SES and ATM system, without compromising safety. In order to link these recommendations to the SES initiative, they are aligned with the five pillars described in Section 2.

***IFATCA Recommendation 1**: Create a simplified regulatory framework which increases investment in key capacity-increasing areas and which includes a flexible pricing structure based on the law of supply and demand.*

The simplification of the regulatory framework is paramount, given that the last 15 years of SES legislation have led to an unprecedented level of institutional fragmentation. The complexities of this legal framework coupled with the creation of new institutions resulted in wrong incentives for service delivery and in an increasingly fragmented service provision. Financial incentives within the performance scheme have led to a reduction in mid to long-term capacity, which is so urgently needed now. Furthermore, introducing competition in a fundamentally public service industry is challenging. The majority of the European ATM market requires prudent monopolistic regulation, stimulating growth and safety, instead of imposing suffocating economical regulations.

It could be argued that the key elements of the ATM system, when it comes to reducing delays and increasing capacity, have been underfunded in the past due, precisely, to that regulatory framework. Even a modest increase in investment during RP3 could improve the current situation. There is a considerable level of scepticism amongst the professionals at the coal face about the EC capacity aspirations considering the cost reduction targets in RP3. An average delay of 1.8 minutes per flight is not a coincidence, it is the logical result of a series of disastrous past decisions.

The route charging regime in Europe has shown to be a crucial element of current ATM operations but it can hinder harmonisation and standardisation. The effect of years of focus on cost-efficiency in the recent past are apparent to everyone in the ATM industry. While that has been taking place, no effort has been made to balance supply and demand in the European airspace. A new pricing mechanism is needed to allow for flexible route charges for congested and uncongested sectors. The only other viable option is for ATC to have the right to impose routeings to given aircraft under certain predefined conditions (something which is already taking place in the USA).

The law of supply and demand, whereby if demand for goods increases but supply remains constant the price of goods rises, already applied to many aspects of the aviation and ATM industries, needs to be introduced in the ANSPs' pricing mechanism to balance sector capacity and demand. A reform in that direction will also have the effect of unlocking the current fragmentation of the European ATM system.

Further work needs to be carried out with regards to indirectly measuring capacity only by the delay caused to the user of the system. The 2018 delay figures are an indicator of the reactivity of the overall system towards an ever-changing demand of the users but they do not identify the root cause of the capacity problem. They also do not take into account the cost to produce and maintain capacity. All those aspects need to be considered when defining a new pricing mechanism.

***IFATCA Recommendation 2**: Modernise the airspace structure, the operational procedures and the separation standards of the European ATM system to increase its capacity without compromising safety.*

IFATCA believes that a harmonised airspace structure, with a reduction in the classes of airspace, and a common transition level will assist in optimising the current airspace architecture. However, the main issue at the moment is the reliance on national borders to define the sector boundaries of European airspace. The creation of a seamless upper airspace as the starting point to achieving a truly SES is absolutely necessary. We need to move away from the restrictions imposed by national boundaries by developing standard airspace structures and procedures, supported by standardised infrastructure and technology.

Another key aspect is to evaluate the true benefits delivered by the Flexible Use of Airspace (FUA). Is the combined civil and military approach to airspace management achieving the theoretical aspiration that airspace must be managed as a continuum? There are multiple examples around the European airspace of segregated airspace not being used while it is creating airspace bottlenecks and capacity imbalances.

The Airspace Architecture Study (AAS) has prematurely identified flight-centric operations as one of the requirements of a more efficient airspace architecture. However, IFATCA believes that an optimised architecture should dictate more efficient working methods and not the other way around. It has not been proven to this day that flight-centric operations can increase capacity while maintaining current safety levels. Considerable human and financial resources have been put towards validating and supporting flight-centric operations. All that without guarantees that the investment will be worthwhile and without giving due consideration to far bigger problems: unnecessarily complex airspace and inefficient civil and military cooperation.

IFATCA also proposes to use the current plethora of surveillance technologies and solutions to redefine separation standards with the aim of increasing capacity, in particular in the en-route environment. For example, a new 3-nautical mile surveillance separation standard could be developed and implemented for the European region. If particular equipment cannot support that separation standard, upgrading that equipment should become a priority. Other areas where new separation standards could be defined are mentioned in Appendix 6.2.

It could be argued that we have not seen a significant increase in capacity thanks to new separation standards since the introduction of RVSM airspace in Europe in 2002. We have seen many new technologies being introduced since but there has always been a certain reluctance to revisit old procedures and separation standards.

***IFATCA Recommendation 3**: Move away from highly customised and non-interoperable technological solutions and define international standards enabling the creation and use of COTS ATM systems and products.*

The creation of standards is the biggest enabler of a digital European sky (in the same way that 3G and 4G standards have enabled mobile phone to become the ubiquitous tools they have become today). The ATM system is still suffering from the lack of a standardised data format relating to flight plans and 4-D trajectories (akin to the geographically fragmented 1G mobile standards). The creation of a standardised single 4-D trajectory flight plan should be the first building block of the digitalisation of ATM data processes.

In order to achieve cost-effective improvements in the ATM industry, it should make maximum use of readily available technology which has been developed for other industries, not specifically aviation and ATM. Any equipment or technology looking to be used within the ATM industry will always necessitate appropriate evaluation against specific requirements. It will be for the ATM industry to carefully define those requirements and decide in which cases generic COTS products can be used instead of ATM specific products. We can even go one step beyond with those ATM specific products. If our industry defined appropriate interoperable standards, those ATM products would become COTS ones in their own right. ANSPs would then benefit from the "plug and play" concept. An ANSP could obtain a subsystem from different suppliers, with slightly different features, with the certainty that any of the suppliers would provide a standard-compliant subsystem readily interoperable with the rest of that ANSP's systems.

IFATCA calls for standards to become a reality in the operational world, to radically change the ground to ground exchange of data (e.g. OLDI – although it is an old standard) as the foundation to create a seamless operational platform for the whole European sky. Standards in flight plans, 4-D trajectory management and flight data exchange will support the creation of a more efficient and flexible airspace architecture.

***IFATCA Recommendation 4**: Incorporate the airports to the Network Manager so the management and optimisation of the network is based on a true gate-to-gate approach.*

The overall efficiency of the European ATM system can only be maximised if airports and airport operations are included in any optimisation initiative so a true gate-to-gate approach is applied. Airports and their operation are one of the biggest sources of unpredictability in the ATM system and, as such, they should be included in any study about airspace architecture looking at increasing the capacity and predictability of the network. Leaving airports outside would result in a suboptimal solution where the benefits/improvements implemented in the air can have a negative effect on the ground.

For example, while we try to manage a geographically and also time-congested European airspace, we are still issuing ATFM slots which provide a 15-minute window around the Calculated Take-Off time (CTOT). However, at the other end of the flight, we want separation on the final approach to be accurate to the tenth of a mile or to a few seconds (in time-based separation scenarios) not to break wake turbulence separations while maximising runway capacity. That difference in the level precision and accuracy speaks volumes about the unbalanced and disjointed approach to solving the problem

of the unpredictability of the ATM system. The inclusion of the airports at the network level is absolutely paramount if we are to optimise the entire ATM system in a holistic fashion.

Granted, the problem of airport operations, with the number and heterogeneity of parties involved (airport operator, aircraft operator, ground handler and air traffic control amongst others), is extremely complex. However, we should not shy away from tackling that problem through Airport-Collaborative Decision Making (A-CDM). In general, CDM should be one of the foundations of an optimised airspace architecture where accurate information is exchanged between all stakeholders.

***IFATCA Recommendation 5**: Make the Joint Human-Machine System concept the foundation of the future European ATM system.*

Today's safety and efficiency levels in the European ATM system have been achieved by the human centric nature of the system. IFATCA believes that the increase in the use of technology needs to be based on the joint collaboration between the human and technology.

Digitalisation will transform ATC and ATM over the coming 10 to 20 years. IFATCA has been advocating for some time for the concept of Joint Human-Machine System, where the human operator and the automation are not analysed separately but as a joint system. That requires a paradigm change in terms of the research, development and implementation of automation. Thus, IFATCA is looking, together with other stakeholders, to explore the best solutions in that domain using its professional expertise. It is our objective to contribute to the modernisation of the ATM industry and, in particular, to the current and future SESAR work.

Increased availability of digitalisation in ATM, by means of Artificial Intelligence (AI), Big Data and Internet of Things (IoT), will bring new challenges to the interaction between the human and the system (or the machines that form part of the system). Traditional human-system integration will evolve to become a much higher integration of human and machine, avoiding the "baggage" of what was once known as automation. That new approach will not devaluate the human to justify the machine, nor will it criticise the machine to rationalise the human. Instead, it will consider the human-machine system as a functional unit to amplify both.

Whereas research exists on automation and, in particular, on the interaction between human and machine, a lot of this research remains theoretical and has concentrated on looking at the ways in which the human operator uses the machine. We are missing the opportunity to define an integration standard or a change enabler in ATM by developing the concept of Joint Human-Machine System where the human operator is actively involved from the very first design stages. Unfortunately, we have seen examples of what happens if the design of the automation is not carried out from a human operator point of view (AF 447 and maybe the Boeing 737 MAX).

Although past and current work of the Expert Group on the Human Dimension (EGHD) of the SES and the vision of the Industry Consultation Body (ICB) tackles change management with respect to the increasing use of automation, it is important that such aspect and the digitalisation of the European ATM system are tackled in a holistic way where the human and the machine are not in opposition but work jointly. This will bring, IFATCA believes, the added benefit of enhancing the capabilities and functionalities of the ATM system.

5. Conclusions

This paper reviews the circumstances which explain the non-implementation of the SES 15 years after its initial regulatory framework and presents five IFATCA recommendations which will pave the way for the implementation of a safe, efficient, flexible and resilient SES.

The reasons for the failure to implement the SES could not be clearer:

- The short-termism of the industry as a whole, failing to establish an agreed long-term vision and a coordinated strategy to implement that vision.
- A legal framework which has reinforced the idea of meeting short-term performance targets without looking at the wider picture and the effect that was having on the industry in the long-term.
- The reluctance by States and ANSPs to accept that the creation of the SES required collaboration, working together and making compromises and sacrifices for the greater good of improving the performance and efficiency of the European ATM system
- The lack of technological and procedural standards which would have ensured the interoperability of systems, a quicker time to market for new critical solutions and an easier integration of the SES. Instead, the ATM industry has suffered from years of technological and airspace fragmentation and of technology and solutions being developed in silos, failing to deliver on their promises.

The acceptance of the above reality and its seriousness is the first step towards finding a viable solution for the SES. The next step is to look at what needs to be done to reverse the situation and for all stakeholders to commit to a vision, a strategy and a specific plan of action. In that regard, IFATCA has made five recommendations which would reinforce the foundations of the five pillars of the SES while addressing the current shortcomings of the ATM system:

1) Create a simplified regulatory framework which increases investment in key capacity-increasing areas and which includes a flexible pricing structure based on the law of supply and demand.
2) Modernise the airspace structure, the operational procedures and the separation standards of the European ATM system to increase its capacity without compromising safety.
3) Move away from highly customised and non-interoperable technological solutions and define international standards enabling the creation and use of COTS ATM systems and products.
4) Incorporate the airports to the Network Manager so the management and optimisation of the network is based on a true gate-to-gate approach.
5) Make the Joint Human-Machine System concept the foundation of the future European ATM system.

Other aspects of the ATM industry would be also addressed by implementing the above IFATCA recommendations. For example, staff mobility and staff training would be helped by industry standards and a simpler and more efficient airspace structure.

While the conflicting interests of all ATM stakeholders in Europe appear to make the SES unrealisable, IFATCA strongly believes that the mission is still possible. However, the onus is on all the stakeholders to collaborate, leave vested interests aside and find a way forward, which avoids the mistakes of the past and addresses the current problems of the ATM system. Only then will the SES become a reality.

6. Annexes

6.1. IFATCA's Views on the Report of the Wise Persons Group

The report of the WPG has highlighted that it is time to act, after a 15-year political reform programme has only put in place a few of its promises. IFATCA appreciates the work of the WPG, which covers most of the aspects of the European ATM industry with its recommendations. There is a sense of urgency in the report, probably exacerbated by the increased digitalisation we have seen in other industries, to get the ATM industry structured based on a shared vision and plan agreed by all stakeholders. The WPG has set out that vision but we now need the European Commission to engage with all the stakeholders and Member States to agree on the implementation plan of the future Single European Sky.

However, IFATCA's view is that the shared vision is hampered by the contradictory nature of some of the recommendations in the report. On the one hand, the WPG talks about collaboration, seamless sky, interoperability, CDM, NM centralisation and a common en-route charge. However, it also calls for a market-driven approach to achieve improvements. The main comment from IFATCA is that as long as there is no common and standardised way of providing an ATM service (starting with a single flight plan), the market-driven approach to improve the system will not work. It has not worked in SES I and II and it will not work in any future program.

IFATCA is also concerned that the ATM system is underfunded or, at least, has not been using funds effectively during RP2. Currently, we have an ATM system whose capacity results in delays and which needs more staff. If we opt to increase staff and its costs to improve capacity, it is difficult to match those measures with the aspirations of RP3 of more cost reductions. That would only work if we have technological, structure or other changes that would fundamentally change the way the ATM system functions today.

The rest of this annex provides IFATCA's views on each one of the recommendations included in the Report of the WPG.

WPG Recommendation 1: Confirm and strengthen EUROCONTROL's Network Manager role by providing it with the necessary executive powers to manage the ATM network, including by managing European capacity and infrastructure based on standardised technology, while ensuring a clear division of responsibilities between the NM and the ANSPs.

The NM is essential for the European aviation system. There is a need, to associate not only Member States and ANSPs but to include the airports network. While the Network Manager can provide a relatively homogeneous approach to the management of ATM network in the upper airspace, there still is a somewhat heterogeneous approach to ATFM when it comes to airport operations (differences between regional and hub airports, A-CDM versus non-A-CDM airports and lack of consistency in the application of ATM and ATFM constraints by airports, amongst others).

At the same time, the Member States seem to have difficulties delegating responsibilities to the NM, which results in NM measures being considered voluntary by Member States and ANSPs. This is a significant hurdle in the implementation of this recommendation.

Finally, the Network Manager's own infrastructure is outdated and has to be improved urgently to cope with the possible future evolution of its role. Commercial Off-The-Shelf (COTS) products from the banking and energy sectors could provide the modern and secure IT infrastructure needed.

WPG Recommendation 2: Fully integrate airports into the network on the basis of linking the Network Operations Plan and Airports Operations Plan, using extensive Collaborative Decision Making.

Further to the recommendation, there is an urgent need to create a standard data exchange format able to deal with different types of operational data and which can link the different area control centres and airports.

Airport gate slots and ATFM slots need to be aligned to improve the predictability of the system and to create a level playing field for data use and exchange. Only then can the Network Manager become an effective coordinating platform.

WPG Recommendation 3: Implement a Digital European Sky based on an agreed roadmap building on the recommendations described in the Airspace Architecture Study, managed by the Infrastructure Manager, ensuring resilience of the system.

IFATCA welcomes this proposal to defragment the current political, institutional and service provision pillars of the SES. However, the Airspace Architecture Study talks about harmonisation, it does not explicitly propose the standardisation required to create that Digital European Sky. Instead, it advocates for a number of operational solutions (virtual centres, flight-centric operations) without the standardisation work required to support them. No agreed and coordinated standardisation initiatives have taken place within the European ATM industry. Even harmonisation projects, with the collaboration of a number of ANSPs, have failed to identify that standards are paramount to create an interoperable, efficient and resilient Digital European Sky.

Both the Airspace Architecture Study and the Report of the WPG fail to recommend a holistic approach for the implementation of a Digital European Sky, where airports, lower airspace and upper airspace are jointly optimised through collaborative decision making and the simplification of airspace. In addition, the role of the Infrastructure Manager needs to be clearly defined. Will it be a repository for legacy systems to be de-commissioned as new technology becomes available? Or will it be a standardisation body to provide the necessary institutional confidence so the Member States do collaborate in setting up a homogeneous infrastructure?

WPG Recommendation 4: Create a new market for ATM data service providers as recommended by the Airspace Architecture Study.

IFATCA believes this recommendation does not have sufficient clarity. The current institutional and legal framework of the Single European Sky prevents the creation of such market. Why should the European Commission be tasked with creating that market? There are examples of data service providers in the current ATM system, which does not need further regulation. The European

Commission can initiate the modification or adjustment of some policies but overregulation could potentially create additional fragmentation.

WPG Recommendation 5: Use the performance and charging scheme to support the digitalisation of air traffic services, and public funding to support deployment only where necessary from a network perspective.

What type of digitalisation and with what purpose? We have had the experience of remote towers, with research and deployment funds being used, where the technology has not contributed to tackling the lack of capacity in the ATM network. Any investment shall focus on operational needs and not lead to cementing fragmentation. In addition, ATM investments are normally infrastructure-centred investments which are long-term by nature. However, the performance scheme measure performance on a yearly or even monthly basis, creating a focus on short-term performance and investments.

Supporting the deployment might require a rationalisation of the institutions so the Network Manager can play a part as technology deployment manager. That, however, might be in contradiction with the proposed Infrastructure Manager.

WPG Recommendation 6: Facilitate the transition towards the Digital European Sky by reviewing current licensing and training requirements for ATCOs, with full involvement of staff representatives.

IFATCA believes the scope of this recommendation is very limited and it is not clear what the real aim of a licensing and training requirements review is. The Madrid declaration in 2010 already stated that the human pillar is part of the Single European Sky overall framework, securing the involvement of staff at social, technical, rulemaking and operational levels. This recommendation seems to be a step back since the involvement of staff is only sought for one specific aspect of the profession. In any case, there are institutional arrangements already in place to review any licensing or training requirements. That is something which has already been happening (new ratings and ratings endorsements or new training requirements) alongside changes introduced to the ATM system, which renders this recommendation superfluous.

WPG Recommendation 7: Simplify and strengthen economic regulation, while relying on a market-driven approach wherever possible.

While IFATCA welcomes simplification, a more tailor-made regulatory approach is needed, not to repeat the unwanted outcomes of the current performance scheme. In particular, the focus on cost reduction, somewhat disregarding capacity-enhancing measures in the past, the increased fragmentation brought about by the FIR-based performance scheme or the capital expenditure on measures which do not necessarily improve performance.

WPG Recommendation 8: Establish a strong, independent and technically competent economic regulator at European level.

IFATCA supports this forward-looking recommendation. The European Agency for Health and Safety at Work (EU-OSHA) could serve as a model of how such regulatory agency could be set up. The main challenge will be to pull the available resources from the multiple relevant institutions and organisations, i.e. EUROCONTROL, European Organisation for Civil Aviation Equipment (EUROCAE), European Aviation Safety Agency (EASA), NM, Performance Review Body (PRB), Performance Review Commission (PRC), SESAR Joint Undertaking (SJU) and others, in a way that adds value to the overall framework. It is expected by IFATCA that the economic regulator scope will be in the spirit of the ATM global concept, looking into stimulating performance of the overall system and not just the cost-efficiency key performance area. This can only be achieved if the economic regulator has the expertise and the competence to assess the overall performance of the ATM system, being aware of the interdependencies within the system.

WPG Recommendation 9: Establish a Seamless European (Upper) Airspace System including a common route charge.

IFATCA supports this recommendation and, in the Appendix 6.2, it proposes a roadmap for achieving precisely that, while reducing the amount of ATM resources used per flight and improving safety.

WPG Recommendation 10: Encourage airports to procure tower services through competitive tender or contract, where operationally feasible and positively impacting users.

This recommendation might improve the use of resources but IFATCA is still concerned that it can lead to more fragmentation and less collaboration between stakeholders.

6.2. Roadmap for the Establishment of a Seamless European (Upper) Airspace

IFATCA provided a roadmap for the establishment of a seamless European (upper) airspace as input to the Airspace Architecture Study Workshops which took place in 2018. It is reproduced here for completeness:

1) As the target ATM environment is equipped with high-reliability surveillance, determine new separation standards to be used in such environment. Develop new surveillance-based lateral separation standards (or route separation), departure standards, crossing standards and combined-displacement standards. Separate surveillance-based separation standards and wake-vortex separation standards. Apply the same standards to all ATC facilities.

2) Determine surveillance needs (including redundancy and Mode S), establish a system-wide access to shared surveillance data (initially for ANSPs, then airlines, etc). For efficiency, identify all radars surplus to requirements and decommission. Incorporate, as soon as possible, ADS-B surveillance (for extra information when available, including intent).

3) The future is management by trajectory, so review all “blocks” of airspace, especially military and high-level prohibited and restricted areas (i.e .special use airspace), for appropriateness of dimensions and for the creation of transit corridors. This review would need to be repeated regularly to ensure the suitability of airspace allocations.

4) Create direct routes for operations above Flight Level 110, building in the surveillance route separation standards from step 1 and making use of the transit corridors from step 3. Do not consider facility and sector boundaries when creating routes. Determine the strategic (preferred choice) and tactical separation methods to be used as part of route creation, including the handling of crossing routes. The routes must not be created ignoring the fact that special use airspace volumes exist. If there is frequent use of a portion of special use airspace, routes must avoid it, for example, by using transit corridors. For all other infrequently used special use airspace areas, define routes around the airspace for when the airspace is active that can be used for strategic separation. Create pre-defined weather avoidance routes that circumnavigate areas proven to be convective weather hot spots.

5) For high-density routes, define parallel offset routes that permit strategic separation of opposite direction traffic or same direction traffic with different speeds. Adopt an en-route speed restrictions of Mach 0.77-0.79 on high demand routes for short- and medium-range aircraft.

6) Define vertical requirements for routes to be used as strategic separation from other routes, especially during the climb and descent phases of flight.

7) For safety, create off-level (small vertical displacement) standards for routes.

8) Design standard departure and arrival routes for operations below FL110, considering environmental and separation (especially strategic) requirements. Consider the definition of speed requirements for the later stage of arrival routes (even for each segment, potentially using ground speed and not indicated airspeed).

9) Review facility boundaries to suit the promulgated routes. Ensure adjacent facilities can exchange airspace around the boundaries to handle weather diversions and other unexpected circumstances.

10) Review sectors within each facility to minimise vertical splits.

6.3. IFATCA Previous Contributions Regarding the Single European Sky

IFATCA has provided similar input since the inception of the SES to try and spark effective action and change in the ATM industry. The following previous contributions can be downloaded from the IFATCA website:

- "A Statement on the Future of Global Air Traffic Management by IFATCA" (2007).
- "SESAR: Mission Possible? SESAR Expectations from the Perspective of the ICAO Concept and IFATCA's Statement on the Future of Global ATM" (2007).
- "The Human Dimension: a key factor for the sustainable future of the Single European Sky and RP3" (2017).
- Press release urging the European Commission to focus on developing trust and collaboration amongst all aviation stakeholders (2018).
- Open letter to the EU Member States from the Professional Staff Organisations on the proposed legislation and performance targets for RP3 (2018).
- Open Letter to the EU Member States from the Professional Staff Organisations on the cost-reduction focus of RP3 (2019).