APRIL 2019

REPORT OF THE WISE PERSONS GROUP
ON THE FUTURE OF THE SINGLE EUROPEAN SKY

> The implementation of the recommendations will require a collective effort and buy-in from policymakers and stakeholders.

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FOREWORD

The Single European Sky has been and still is our dream. But the reality is that today's performance of our air traffic management (ATM) network does not serve airspace users or the passengers in the way it should. The impact of airspace inefficiencies for the travelling public and airspace users is not acceptable.

DG MOVE established a "Wise Persons Group" on the future of the Single European Sky (SES) to produce recommendations for the direction that European ATM should take, in order to deliver better performance and better services while taking into account the continuous growth of air traffic.

From the very beginning the Group was clear that safety, security and environmental elements have the highest priority, whatever recommendations it makes to increase the capacity and improve the efficiency, including the cost efficiency, of the ATM system. These elements must also have priority when the recommendations are implemented.

Environment in particular remains a key challenge for the aviation sector, particularly in view of its forecast growth. Improving the efficiency of the European ATM system will help reduce its environmental impacts. That said, it must be recognised that if efforts to accommodate demand are not successful and airspace congestion continues, not only would this have a detrimental effect on passengers and other stakeholders, it would also inevitably result in longer flight trajectories, and consequently higher fuel consumption and levels of CO2 emissions. In those circumstances, it cannot be excluded that additional policy instruments, beyond those recommended in this report, might have to be considered in order to manage or even ration demand. The Group's recommendations aim at avoiding such a scenario.

This report highlights the key elements that should underpin the future of the SES. The governance for the SES needs to become better, stronger and simpler. In transitioning to new arrangements, we have to ensure that we make the most of the valuable progress already achieved under the SES, and that the existing structures remain effective while new governance is being established. This will require close involvement of the operational stakeholders, both in organising the transition and in the future set-up.

The future evolution of the performance scheme must support the proposed network management centric approach, and recognise the essential need for close involvement of States in defining the performance targets. The network management centric approach should ensure the required integration between the different ANSPs in order to function as a seamless distributed network. Greater cooperation is needed: between States and ANSPs to overcome fragmentation, between civil and military actors to maximise flexible use of airspace, between industry to create standards that guarantee the interoperability of competitive solutions and services; and with all people ensuring current operations.

The indicative roadmap indicates actions that can be taken under the existing framework – some requiring a regulatory decision and some not – and those which require a change in the legal framework. Time is critical. It is the role of the Commission to process the recommendations and lead the implementation. In particular, while the Group is making recommendations on institutional aspects, it recognises that decisions on such matters will be for the Commission.

Whatever decisions will be taken for the future European ATM, the real commitment of the Member States and all the stakeholders is the key element for the better performance of European ATM. It is important that the industry is closely and fully involved in the forthcoming processes.

Without the engagement of leaders, the vision that started 15 years ago will remain a dream: the time has come to act - now and to make the SES fit for the future: integrating U-space and offering opportunities for new markets in the upper airspace to keep Europe competitive for future connectivity.

I would like to thank the stakeholders for giving their time for our hearings and the members of the Group for their excellent contribution and the working mode which made compromise possible. It was a great pleasure to chair this experienced, professional group.

The principles and recommendations set out in this report have secured a broad consensus in the Group. As the Chair, my focus has been on producing recommendations that can effect real change in order to further improve the performance of the system. The report necessarily remains at a high level and I hope it provides a clear direction for tackling the existing and future challenges, even if it may not address every detail or point raised by the members of our Group. I trust that the elements which we have not covered in detail will be fully addressed as these recommendations are taken forward, including in the European rulemaking process.

Mr Pekka HENTTU
Director-General of Civil Aviation
Finnish Transport and Communications Agency

EXECUTIVE SUMMARY

The Wise Persons Group on the future of the Single European Sky has developed a set of ten recommendations which it believes would enable additional ATM capacity in Europe to be provided in a flexible and scalable manner at a reasonable cost, delivering a more resilient ATM system, while most importantly continuing to ensure safety and security and meet environmental concerns.

The Group took as its starting point the following vision for European ATM in 2035:

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.

THE GROUP'S TEN RECOMMENDATIONS ARE:

A NETWORK-CENTRIC APPROACH

1 **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 Network Manager and ANSPs.

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

IMPLEMENTATION OF A DIGITAL EUROPEAN SKY

3 **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.

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

5 **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.

EVOLVING ROLE FOR PEOPLE DELIVERING THE ATM SERVICES

6 **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.

SIMPLIFYING THE REGULATORY FRAMEWORK

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

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

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

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

INTRODUCTION
WHY ACT NOW?

The Single European Sky (SES) initiative was launched in 2004 with the goal of improving the performance of the European ATM system in terms of safety, capacity, cost-efficiency and environment. These elements remain as valid today as they were then. It is clear that the SES has delivered improvements in all of these areas and much has been achieved. Naturally, the landscape of European aviation has also evolved considerably and new challenges are on the horizon.

It is clear that the ATM system in Europe as it operates today is approaching its capacity limits. Recent growth in air traffic is resulting in air traffic delays of a magnitude not seen for more than a decade, to the severe detriment and inconvenience of air passengers.

Fifteen years after its start, the time has therefore come to determine a future direction for the SES in a realistic, practical and beneficial way, taking into account lessons learned in the last decade.

In this context, DG MOVE invited a Wise Persons Group to come forward with collective recommendations on how to best offer additional ATM capacity in a flexible and scalable manner at a reasonable cost, and provide for a more resilient ATM system, while most importantly continuing to ensure safety and security and meet environmental concerns. In conducting its work, the Group took into account input from a wide range of sources, including the report of the European Court of Auditors on the SES.

This report is the result of its work, and the Group hopes that its recommendations provide a clear direction for moving forward.

CHALLENGES FACING EUROPEAN ATM TODAY

In developing its recommendations the Group considered the principal challenges facing European ATM. The main challenges to be overcome were identified as the following:

Growth

According to EUROCONTROL's 2018 Challenges of Growth study, by 2040, traffic in Europe is expected to grow to over 16 million flights, which is an increase of 53% compared to 2017. Based on the current capacity developments and trends in the aviation sector, and without measures to increase the capacity of the ATM system, this would lead to a situation in which 1.5 million flights cannot be accommodated. This would comprise 8% of the total demand and approximately 160 million passengers unable to fly.

Fragmentation

The fact that the European ATM system comprises a patchwork of national ATM systems operated by national ANSPs means that interoperability and network efficiency is a serious challenge.

Lack of scalable capacity

ATM capacity cannot be scaled to meet changes and fluctuations in demand. In 2018, delays grew disproportionately compared to traffic – traffic grew 14% but delays grew 273%. The main constraints are lack of flexibility in ATCO staffing levels and technology. The seasonal peaks of traffic make this issue even more complex.

Slow technology uptake

The SESAR programme has delivered new concepts and technologies but this has not translated into technology uptake at a sufficiently rapid pace, partly due to the challenge of availability of the required standards.

Ineffective regulatory framework

The SES has contributed to incremental improvements in the performance and modernisation of the European ATM sector but because it does not take sufficient account of the interdependencies has not generated the expected paradigm change in terms of performance by ANSPs and has not sufficiently reduced fragmentation of the European ATM system.

New entrants in the system

Large numbers and a wide diversity of vehicles are likely to be operating in the airspace in the future, ranging from drones at both low and high level, and other new types of aircraft. It will be a significant challenge to integrate all new entrants safely into the ATM system.

Environmental considerations

Aviation is under increasing pressure to reduce its CO2 emissions. Inefficiency in the ATM system will result in higher emissions than necessary, for example due to traffic taking sub-optimal routes or trajectories.

THE SHORT-TERM CAPACITY CRUNCH

While the focus of the Group's work has been the longer term future of the SES, there remains an urgent and pressing need to address the immediate capacity issues facing the European ATM network. The Network Manager is working with stakeholders on a set of seven urgent short term quick-win measures in order to alleviate the capacity issues at network level to minimise ATFM delays in summer 2019 and this is likely to continue in 2020. The Group fully supports this initiative and urges all stakeholders to work together towards a successful implementation of these measures.

THE VISION
WHAT WILL EUROPEAN ATM BE LIKE IN 2035?

Before developing recommendations on the future of the Single European Sky (SES), the Group developed an agreed vision of how it sees European ATM in the longer term future. It is only in the context of a clear long term vision that the path for the future can sensibly be identified.

The Group concluded that its vision for European ATM in 2035 could be encapsulated in the following vision statement:

> 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.

PRINCIPLES SUPPORTING THE RECOMMENDATIONS

Making this vision a reality will require significant changes in the current SES regulatory framework. In building a set of concrete recommendations that will transform Europe's ATM system, the Group has based its approach on a number of key elements and principles.

Safety and security remain paramount

It goes without saying that ensuring safe and secure air travel remain the priority objectives of the European air traffic system. The Group is not making any recommendations that specifically target safety. Safety remains the core objective of air traffic management, and the Group's recommendations aim at making the system more efficient without compromising in any way the system's safety performance. The system should always strive to ensure that the level of incidents and serious incidents is decreased.

In the same vein, the Group is not making any recommendations that specifically target security, which is also paramount. However, civil-military collaboration is a prerequisite across all recommendations to ensure that military aviation will continue to provide, and further improve, effective security and defence in Europe in the changing context of the ATM system, without prejudice to the safety of civil air traffic.

It is clear that the ATM system of the future will rely much more heavily on digital technologies and systems than today, with data and the services to provide and use that data at its heart. This inevitably means that data and system security become ever more important in relation to the ATM system. Ensuring cyber security and cyber resilience as the modernisation of the ATM system progresses is a matter of the utmost importance, and needs to be addressed through a security by design approach, with cyber security embedded in new technological solutions.

THE VISION
WHAT WILL EUROPEAN ATM BE LIKE IN 2035?

Environmental sustainability

Improving the environmental performance of aviation is a key objective of the SES, and environment is one of the key performance areas under the SES performance scheme. Improving the efficiency of the ATM system to enable airspace users to operate their preferred trajectories will directly contribute towards better environmental performance of the system. The Group believes it is of the utmost importance that environmental considerations are given a high priority in considering the future SES framework. Many of the Group's recommendations, while not directly targeting environment, are supporting this objective.

Network-centric approach

To cope with demand, Europe needs a more network-centric service delivery model. The ATM system must be managed as a fully integrated European network, which would improve the operational and, consequently, environmental performance of European ATM for the benefit of all stakeholders, in particular the travelling public.

Need for a system that is scalable

In order to overcome the challenges that the ATM sector faces today and in the future, the ATM system must evolve into one that provides capacity scaled to demand. There are of course two sides to this – supply and demand. The capacity of the ATM system today is closely linked to the number of available sectors and the number of air traffic controllers qualified to operate each sector. There are several rigidities in the system which limit the ability to adapt capacity at short notice to meet changes in demand. Controllers need to be trained on specific sectors, and training takes a relatively long time - even more so as the complexity of the airspace is increasing with the traffic growth. There are also limits to how many times sectors can be divided in order to increase capacity. On the demand side, scheduled airlines may plan schedules six months to one year in advance, but the actual schedules operated can change in response to market changes, sometimes at short notice, and airlines do not always operate strictly according to the flight plans that are filed. This means that there is an inherent unpredictability in the system, which itself makes it difficult for ANSPs to plan the correct level of capacity. If the capacity provided is too low, this results in delays. If capacity is too high, this results in higher costs.

Greater flexibility is therefore needed in the way in which capacity can be provided, so that the ATM system becomes more easily scalable to demand. This is what has led to the recommendations below relating to capacity management facilitating the development of capacity-on-demand services. At the same time, greater predictability in demand would also help significantly. This requires a strong and clear commitment from the airlines to provide ANSPs better and more accurate information about the flights and routes they will operate.

THE VISION
WHAT WILL EUROPEAN ATM BE LIKE IN 2035?

Optimising airspace and embracing new technology and automation

Another key element in making the ATM system more scalable is new technology. Finding a way to accelerate the implementation of new technology has been a key area of the Group's considerations. The Airspace Architecture Study (AAS) carried out by the SESAR Joint Undertaking in collaboration with the Network Manager has resulted in a report containing a number of concrete proposals and recommendations aimed at optimising Europe's airspace organisation in such a way that can facilitate the uptake of new technologies. The AAS defines an approach that will secure the scalability and resilience of capacity, increase efficiency and productivity, and promote a services-oriented approach. The Group has taken the AAS recommendations on board in developing its own recommendations.

Market-driven approach

Simplification of the SES regulatory framework has been recognised as an overarching principle for the Group. Economic regulation should be required only where market incentives are insufficient to drive performance to levels that meet the needs of users. There is a growing trend towards allowing market forces into certain aspects of ATM, such as the provision of tower control services which has shown promising results in terms of performance. This will only accelerate with the digital transformation of the ATM system, evolving towards a more service-oriented and standardised approach. The scope of activities that are subject to economic regulation in the future is therefore likely to diminish.

Simplification of institutional set-up

Simplification and clearly defined responsibilities are also required in the institutional set-up at European level. The Group is advocating a clear distinction between the delivery arm and the regulatory arm of the SES. Whatever institutional arrangements are decided by the policymakers, the Group prefers that permanent rather than temporary structures should be employed in order to ensure that sufficient resources and expertise are available to perform the regulatory or delivery functions that are required in a cost-effective manner.

RECOMMENDATIONS OF THE WISE PERSONS GROUP

The Group has developed the following set of ten recommendations.

The implementation of the recommendations will require a collective effort and buy-in from policymakers and stakeholders. Some of these recommendations can be implemented without changes to the existing legislative or regulatory framework and, where this is the case, we advocate taking action expeditiously. Other recommendations will require new legislation.

In Annex 1 we set out an indicative roadmap for how the recommendations may be implemented. The Group recommends that the European Commission take the lead and responsibility for taking these recommendations forward.

A NETWORK-CENTRIC APPROACH

1

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 ANSPs.

2

Recommendation 2:

Fully integrate airports into the network on the basis of linking the Network Operations Plan and Airport Operation Plans, using extensive Collaborative Decision Making.

Europe needs a more network-centric service delivery model. The Network Management role should therefore be enhanced to cover the following three roles:

- Airspace management
- Capacity management
- Infrastructure management

These roles are each outlined below. The aim of this strengthened network-centric approach would be to improve the operational and, consequently, environmental performance of European ATM for the benefit of all stakeholders, in particular the travelling public.

The enhanced role of the Network Manager (NM) would require an appropriate process for strengthened oversight of the NM. In the Group's view, the natural entity that should perform such oversight would be EASA. It would also be important to ensure that the NM's new functions are performed in a cost-efficient manner.

The governance of a strengthened NM would also need to be reinforced. Given that industry participation will be a key factor for the success of the new NM responsibilities, it will have to be ensured that the relevant seats and voting powers are given at NM Board (NMB) level – and at appropriate functional level where needed - to operational stakeholders (notably Airspace Users, Military, Airports and ANSPs).

Airspace Manager

The NM would be responsible for the coordination of the optimum airspace organisation for the network. As a service provider of Central Flow Management, NM balances the demand and the capacity made available across the network. The NM would direct traffic flows, with an active involvement of all stakeholders, depending on traffic demand, weather and available capacity. The NM would use an extensive Collaborative Decision Making (CDM) process involving all operational stakeholders (ANSPs, Airspace Users, and Airports) with the possibility to take executive decisions in the network's interest in cases where no consensus is possible. Such cases, in which the NM can execute mandatory network-centric decisions, will be defined by EU regulation. In any case, however, the needs and responsibilities of the military must be respected.

The ATFM system will also require modernisation. In the future, ATFM will evolve to support the management of complete traffic flow in the network context and in a collaborative manner. The flow-centric ATFM approach should look at the flight as a whole within a flow and network context rather than segmented portions of its trajectory as is the case today.

In addition, integrating airports fully in the network can be achieved by requiring ANSPs and airports (through Airport Operations Plan [AOP]) to share all capacity data with the NM and airspace users, and to participate in European air traffic flow management at strategic, pre-tactical and tactical level, ensuring a proper gate-to-gate approach to ATFM. The NM should make available for local use details of the airspace environment, such as the overall network performance situation, flight progress, capacity offered and airports' status.

Capacity Manager

The NM would define the capacity requirements to satisfy demand across the network based on its STATFOR forecasts, the established performance targets and formalised extensive consultation process with the airspace users, resulting in firmer user demand prospects than today. This would be reflected in a rolling Network Operations Plan (NOP), together with each ANSP's commitment to deliver the required capacity and airspace users' commitment to execute the planned flights. Airport capacity will also be taken into account to cover all parts of the ATM system.

The overall European capacity would therefore be established by the Capacity Manager, while the prices/charges would be established through the market or by economic regulation. In order to ensure that enough capacity is available to meet European performance targets, the NM would enter into yearly contractual arrangements with ANSPs, which would formalise their capacity commitment. Cooperation between the NM and economic regulator would be essential to ensure that European capacity and cost efficiency targets are properly translated through the individual contracts with the ANSPs.

The NM would monitor performance under these contracts. The principle is that airlines would continue to pay for the service as it is done today (i.e. via the Central Route Charge Office [CRCO]). Full payment to ANSPs would be assured provided the contracted capacity is delivered. Penalties and incentives would be foreseen in cases of under or over performance. In order to deal with a potential economic downturn and unexpected traffic variations, a risk-sharing mechanism would be required.

Infrastructure Manager

The NM would identify the ATM infrastructure needed to support the future development of the network. This would be based on the Network Strategy Plan, as approved by the NMB and European Commission, that should be adapted to include provisions related to the ATM infrastructure needs of the network. This needs to be in line with the European ATM Master Plan.

Based on this, the NM would verify, through consultation with ANSPs, that their investment plans contribute towards network delivery and the achievement of the performance targets. The NM should also play a role to support the economic regulator in identifying systems that should be removed from the regulatory cost base so to ensure the transition of the European ATM system towards a digital environment.

In order to close the gap between R&D and deployment the Infrastructure Manager would need to establish a close working relationship with the SJU, EUROCAE and EASA.

Transition from SESAR Deployment Manager to Infrastructure Manager

As it will take time to properly establish the Infrastructure Manager function in the EUROCONTROL NM, it is necessary to establish appropriate transition arrangements between the current SESAR Deployment Manager (SDM) activities and the future Infrastructure Manager. Therefore, it is of key importance that the currently planned activities

of the SDM continue to ensure that the current deployment momentum is preserved and that all stakeholders deliver. This will ensure a smooth transition between the current and future arrangements. The new Infrastructure Manager function in the NM will take on board all the positive developments achieved by the SDM; notably it should preserve the broad industrial partnership that has been created, including operational stakeholders, to ensure system-wide deployment. The current SDM is contractually committed until the end of 2020 with the partnership agreement extending to 2023, which should provide enough time to undertake a proper transition, including dissemination of accumulated lessons learned in the SESAR deployment process.

IMPLEMENTATION OF A DIGITAL EUROPEAN SKY

3

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.

New technology has a crucial role to play in helping to ensure that Europe's future ATM system is capable of meeting the growing demand for air traffic, including from new users of the airspace. The need for a digital transformation of aviation was highlighted already in 2017 by a joint European industry declaration. The AAS has illustrated that increased automation and virtualisation hold the greatest promise for effectively balancing supply and demand while ensuring scalability and higher levels of resilience of the system. It shows that the transformation towards a Digital European Sky (DES) can deliver a virtual defragmentation of Europe's ATM system irrespective of national borders or Functional Airspace Blocks (FABs). Indeed, the Group believes that the FABs should no longer be mandatory, particularly in view of the fact that other forms of industrial cooperation and partnership between ANSPs have successfully evolved. Further development of such partnerships is to be welcomed and encouraged in the future, as this will support a more network-based approach.

The AAS proposes a progressive transition strategy towards the Digital European Sky, while building on known good practices and quick wins, as well as existing initiatives such as SESAR and the ongoing implementation of the Pilot Common Project (PCP). It also contains a number of specific recommendations, including proposals to facilitate this transition through the creation of a capacity-on-demand approach, a new delivery model for ATM data through new data service providers, and targeted incentives for early movers.

The next step is to transform the AAS report and recommendations into an actionable roadmap and reflect it in the ATM Master Plan. The preparation of this roadmap is a short term action. It will also be important to ensure that the right governance is put in place to drive the transformation. However, because the Infrastructure Manager will not be operational from the start, this role should be performed by the NM and SJU. The EC will closely monitor the implementation.

RECOMMENDATIONS OF THE WISE PERSONS GROUP

In implementing a Digital European Sky the following aspects will require a particular focus:

Cyber security

The transition to a future system that relies increasingly on digital technologies and data services also raises questions about security and resilience. The cyber security aspects of ATM modernisation have started being addressed at European level, including through research and development in SESAR. It is essential that ensuring the cyber-resilience of the system remains a matter of priority moving forward. The oversight of the overall cyber-resilience of the ATM system should be with EASA.

New entrants

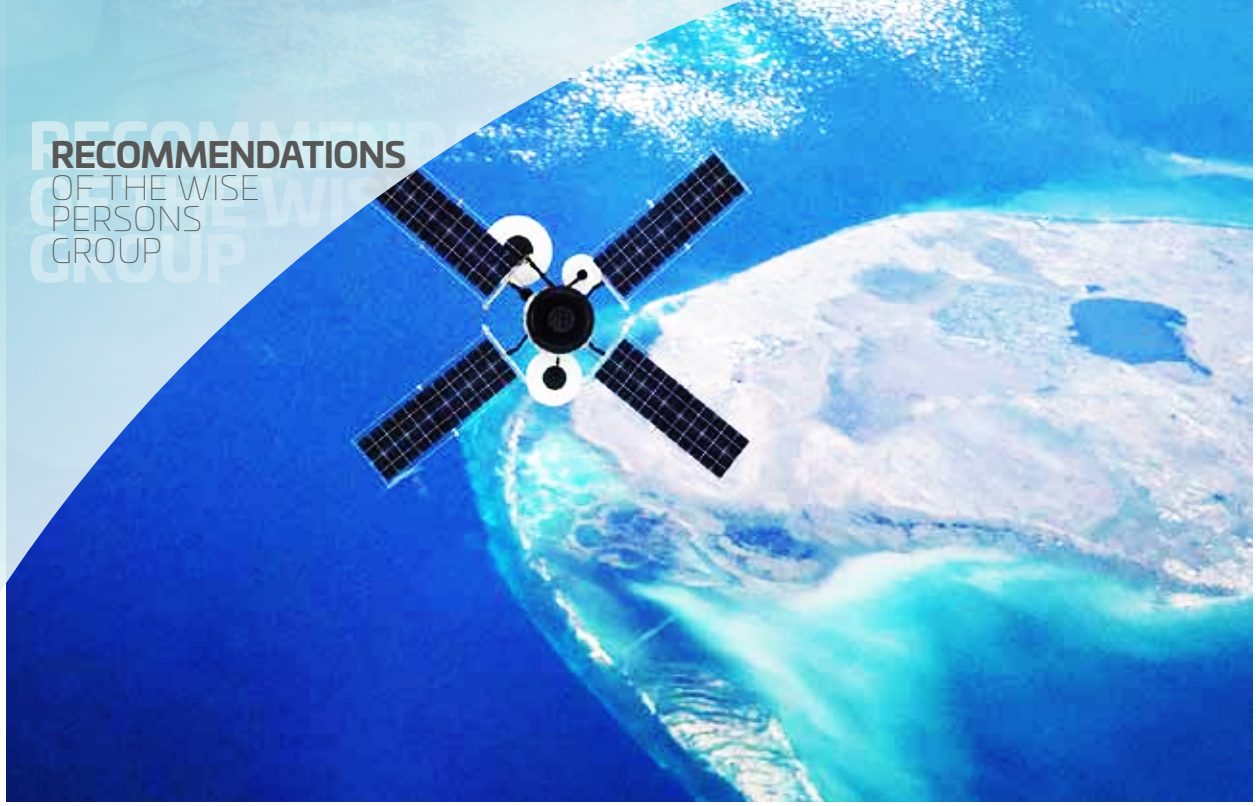
The future ATM system needs to be able to adapt to and accommodate new types of airspace users, ranging from drones at both low and high level, and other new types of aircraft. The large numbers and wide diversity of the vehicles likely to be operating in the airspace in the future implies that the system will require a significantly higher level of automation. This includes new airspace users and operations with highly connected and automated air vehicles in the higher airspace (i.e. operations above FL 600). Commercial and State space operations will also become more frequent and will create new business opportunities and societal benefits. The aim should be that the development of U-space and the evolution of "traditional" ATM result ultimately in a fully integrated and automated system.

Standardisation

In modernising Europe's ATM it is essential that there is a common set of standards to ensure interoperability, covering also operational procedures and training. These standards should be performance-based rather than technology-based.

Given that the lifecycle of technology innovation is accelerating significantly, the process by which standards are developed needs to be accelerated also. A more agile and continuous modular approach will be required in the future in order to reduce the time from development to deployment. This requires engagement of all stakeholders in the standardisation process to ensure effective coordination of activities to develop standards in a timely manner to support deployment.

This requires well-defined processes and clear responsibilities for each of the actors engaged in standardisation activities. The schedule for developing standards must be ambitious and kept regularly up-to-date. This means strong coordination between EUROCAE and other standardisation organisations (to ensure that European standards can become the ICAO ones). The role of EASA as the regulator for interoperability (i.e. issuing mandates) is very important in this regard.



RECOMMENDATIONS OF THE WISE PERSONS GROUP

Recommendation 4:

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

The Airspace Architecture Study (AAS) proposes an evolution of the European airspace architecture that leverages modern technologies to decouple the air traffic service provision in a given airspace from the local infrastructure including the supporting ATM data collection & processing. At the same time it increases progressively the level of collaboration and automation support through a data rich and cyber-secured connected ecosystem. Such an evolution opens new business opportunities through the creation of a dynamically distributed system, while fully respecting the sovereignty of Member States in relation to their airspace.

Currently, air traffic services are mainly provided by national ATS providers who are each responsible for producing part of the data required for ATS, processing and combining this data to make it available to their controllers and using that data to provide ATS for airspace users. Most of that data is currently not fully shared between ATS providers. Creating a resilient ATM system will require an evolution of this model; the collaborative management of the airspace, through remote provision of air traffic services, will only be possible if all needed ATM data is available across the network. This requires a transition towards common ATM data service provision in support of several ATS providers simultaneously. Common ATM data services mainly require computational resources, are less dependent on human actors, and therefore are easily scalable.

The existing regulatory framework does not prevent the creation of ATM Data Service Providers (ADSPs), which could operate either as joint venture partnerships of existing ANSPs or as certified external entities providing services under market conditions. A number of issues would, however, require careful consideration. This includes the organisational and certification requirements that would be required for ADSPs, taking due account of safety and security issues, as well as the possible need for clarification or regulation on the issue of access to, and ownership of, data. Given the transnational dimension of their potential market, ADSPs will need to be certified by EASA, in compliance with the SES regulatory framework.

The shift to the new service delivery models could also enable further rationalisation of the underlying infrastructure since the focus will move from investment in a local infrastructure to provision of services complying with performance requirements.

5

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.

Incentives

In principle, the Group believes that market-based incentives should be used to drive technology uptake rather than public funds. There are a number of ways in which incentives could be created or strengthened. In line with the logic of adopting a more market-oriented approach in the future, the performance and charging scheme should be adapted to provide the right price signals, favouring implementation and equipage of agreed functionalities and decommissioning of outdated technologies.

Incentives could take various forms, for example:

- For airspace users, incentives could be economic, such as modulated route charges linked to equipage, and/or operational such as application of a "best equipped best served approach".
- For ANSPs, there are a number of options for the form that incentives could take including, on the one hand, direct financial support for first movers or links to the performance and charging regime in various ways, and on the other, disincentives for last movers leading to an accelerated decommissioning of legacy infrastructure or rapidly decreasing financial incentives.

Use of public funds

Public funds should be used only where indispensable and where the market itself is not providing the necessary incentives for deployment. This could include situations where deployment has a negative business case for the individual service provider but where these are outweighed by wider network benefits. Currently the EU financial tools supporting SESAR deployment can be used only for physical infrastructure investments. It is worth highlighting that as ATM becomes increasingly services and data-based, it may be necessary to consider adaptation of these tools if they are to continue supporting the types of investments that might be needed. Having said that, the overarching principle should be to incentivise early movers and penalise underperformance.

Public funding of R&D via a partnership approach should continue in order to deliver the technical solutions required for the transition to the Digital European Sky, in particular those technical solutions that have a significant impact on capacity, in line with well-defined R&D objectives. However, it is essential that the market uptake of these solutions is accelerated through incentives for early movers.

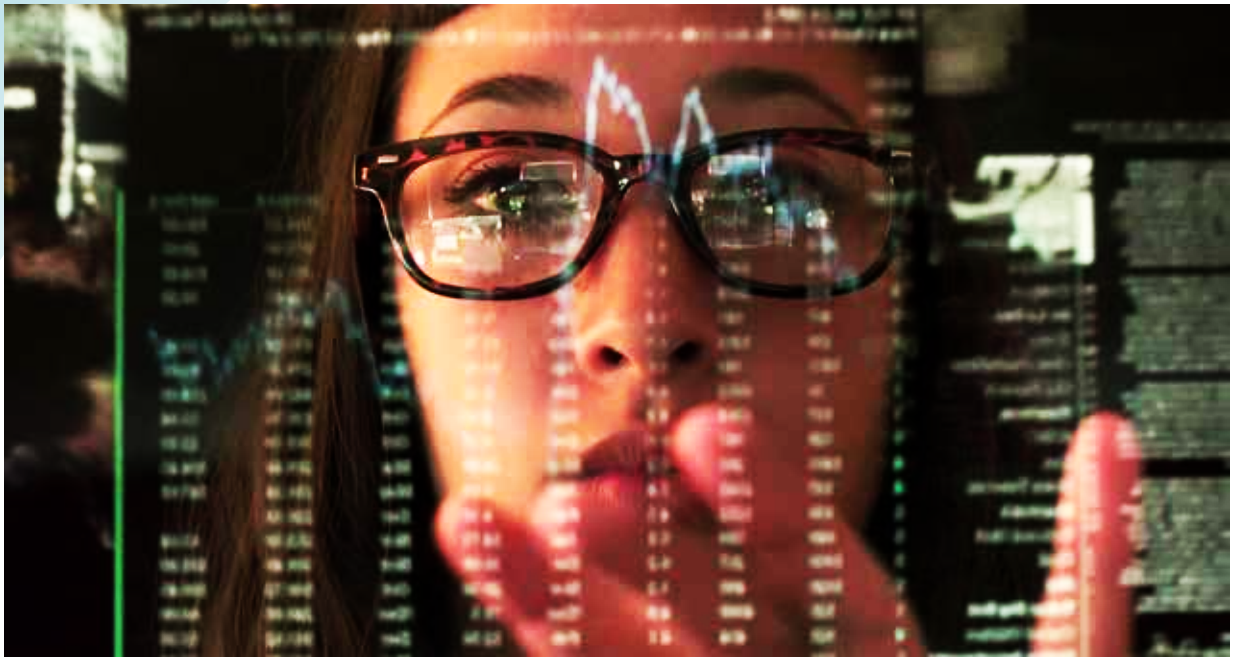
EVOLVING ROLE FOR PEOPLE DELIVERING THE ATM SERVICES

6

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.

The current requirements and rules governing the process of ATCO recruitment and training should be examined vis-a-vis future ATM needs and reflecting the envisaged transition towards a more digital ATM environment. Current training processes are sector centric, making it hard for ATCOs to provide services outside their sector when there is a need or opportunity to do so. Therefore, in the longer term, this process should be more system driven. A similar approach was followed with the evolution of pilot training and licensing. While there are significant differences between the functions of the ATCO and pilot, some principles that have been applied in the evolution



of the pilot training and licensing, such as standardization, efficiency and system approach to training, could also be considered for the evolution of ATCO training. Based on that, common European training standards should be developed in due time for all training institutions to support this approach, taking advantage of possibilities of synthetic training devices and new technologies. This will ensure the proper application of the re-defined rules for ATCOs. New licensing requirements should be established as a result of re-evaluation (performed by EASA), in order to support the use of more modular, scalable and resilient systems. The Group also emphasised the responsibility of each individual organisation to ensure appropriate ATSEP training.

Human dimension roadmap

A rapidly changing working environment for ATCOs should be accompanied by proper change management to facilitate the transition to the new digital ATM environment. This should be done in full cooperation and inclusion of staff associations and unions. The development of new technology will trigger and foster new requirements for the ATM staff involved in operations, as described in the section on Digital European Sky. The role of the ATCO should evolve into the role of ATM system manager, focused on more strategic and monitoring tasks and less on manual recurrent operations, provided that necessary systems are available. Nevertheless, the human should not be separated from technology, but rather evolve together with technology. This calls for the establishment of a human dimension roadmap as part of the Digital European Sky evolution identifying actions at both European and national level to be implemented by all actors.

Military ATCOs

It will be important to better exploit synergies with military staff in relation to aligning common operational standards and ensuring robust contingency measures. Liaisons with the military stakeholders should be ensured so that military ATCO training evolves, to the maximum extent possible, with re-defined standards. This is particularly relevant in the case of joint civil-military operations. Common operational standards and proper contingency measures between civil and military elements should be agreed and established.

RECOMMENDATIONS
OF THE WISE
PERSONS
GROUP

SIMPLIFYING THE REGULATORY FRAMEWORK

7

Recommendation 7:

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

The Group believes that economic and performance regulation can be more effective if it is both simplified and strengthened. The principles and objectives of regulation need to be clear and well-defined. There are a number of elements to this.

The performance scheme itself needs to be more outcome-oriented, by better measuring the outputs of the system and not only delays, with incentives for good performance, and disincentives or penalties for poor performance (as discussed earlier in relation to the capacity manager). It needs to take greater account of the interdependencies between the different targets, in particular the relationship between capacity and cost-efficiency.

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

It should also promote provision by ANSPs of the required capacity. This relates to the role of the Capacity Manager. In order to facilitate new "capacity-on-demand" services, which can improve the efficiency and resilience of the system, a revised charging regime needs to support the arrangements to be established between all the actors (ANSPs for cross-border delegation of service, Capacity Manager to require predictability of the airspace users and to conclude contracts with the ANSPs).

8

Recommendation 8:

Establish a strong, independent and technically competent economic regulator at European level.

Strengthening economic regulation at European level can also help ensure better consistency in approach, also at national level, towards regulatory decisions. A reformed economic regulation should set targets where no market exists, and incentives to invest and modernise the ATM system. A European Economic Regulator is therefore required. This body, which could be accommodated within EASA, would have permanent staff. The Commission would elaborate new legislative proposals. The independent economic regulator would provide evidence and advice to the Commission in relation to the definition of performance targets and approval of performance plans. It would establish Acceptable Means of Compliance, monitor performance and support national authorities to oversee the performance of service providers. Its decisions should be subject to an appeal mechanism (mediation body, ultimately access to the European Court of Justice/Court of First Instance in case of disagreement with its decisions).

9

Recommendation 9:

Establish a Seamless European (Upper) Airspace System including a common route charge.

Aviation is a global market, with flights crossing several States, but ANSPs operate only on national territories. Coordination is performed with neighbouring Area Control Centres (ACCs), Network Manager and airports. Consequently, any operational actor outside the ACC has a limited situational awareness of any changes on the flight trajectory imposed by the air traffic control within that ACC. In order to reduce or abolish existing fragmentation of the airspace a Seamless European (Upper) Airspace System should be established. In this environment service providers would be able to collaborate and operate as if they were one organisation, with both airspace and service provision optimised according to traffic patterns.

The creation of a common route charge would reduce the incentive for airspace users to opt for longer and less efficient routes in order to minimise their ATM charges, thereby bringing important environmental benefits. Setting the appropriate flight level above which this concept and charge should apply in Europe should be further investigated, aimed at ensuring the required capacity is delivered at a cost-efficient level, based on a study by CRCO.

There are growing developments for higher airspace operations above FL600. This provides an opportunity to establish from the start a common route charge for what is in effect a new category of airspace.

10

Recommendation 10:

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

Market-based provision of tower services has shown some significant benefits for the airports that have already adopted this approach. Consistent with the principle that introducing more market mechanisms to the provision of ATM services would help improve efficiency, the Group's view is that contracting or tendering for tower services at airports can in principle deliver efficiency gains. At the same time, it recognises that this may not be operationally feasible at all airports. In such cases, service-level agreements could provide a useful alternative. Encouraging and enabling possibilities to open the provision of tower services to a more market-based approach is therefore to be welcomed, as a means of delivering greater efficiency and a more user-focused service including better collaborative decision-making at airport level.

ANNEXES

ANNEX 1
HIGH-LEVEL ROADMAP

This Annex sets out an indicative roadmap for how the recommendations may be implemented. The WPG agreed that short term priority is AAS Implementation and therefore Recommendation 3 is shown first.

Key:

- Actions that can be done using the existing regulatory framework (no legislative change required)
- Actions that are likely to require a change in the regulatory framework

WHAT ?	WHO?	WHEN?
Recommendation 3 | Implementation of the Airspace Architecture Study		2019 2023 2027 2031 2035
Develop a roadmap for implementation of the AAS	SJU, NM	
Integrate the AAS roadmap into ATM Master Plan including the Implementation View	SJU	
Manage the implementation of the AAS	NM, IM (SDM), SJU	
Monitor the implementation of the AAS	EC	
Recommendation 1 | The EUROCONTROL NM as Airspace and Capacity Manager		
Develop an elaborated proposal on airspace and capacity role of the NM to be submitted to the European Commission	NM	
Assess the proposal including the need for a regulatory action or adaptation of the existing rules	EC	
Regulatory framework and designation of the NM as Airspace and Capacity Manager	EC	
Implement necessary tools and procedures to support new airspace and capacity role of the NM	NM, AU, ANSPs	
Recommendation 1 | The EUROCONTROL NM as Infrastructure Manager		
Develop an elaborated proposal on Infrastructure Manager role of the NM to be submitted to the European Commission	NM	
Develop a transition plan from current activities performed by the SDM to new Infrastructure Manager function of the NM	NM, SDM	
Assess the proposal including the need for a regulatory action or adaptation of the existing rules	EC	
Regulatory framework and designation of the NM as Infrastructure Manager	EC	
Implement necessary tools and procedures to support new Infrastructure Manager tasks of the NM, including the parts of agreed transition plan	NM, SDM, all relevant ATM stakeholders	

Key:

Actions that can be done using the existing regulatory framework (no legislative change required)

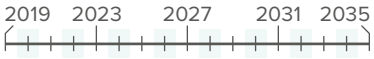
Actions that are likely to require a change in the regulatory framework

WHAT ?	WHO?	WHEN?
Recommendation 2 | Fully Integrate Airports in the Network		2019 2023 2027 2031 2035
Define the list of important airports that require integration in the network	NM, airports	
Implement Airport Operations Plan	Airports	
Integrate Airport Operations Plan into Network Operations Plan based on extensive CDM process	NM, Airports	
Recommendation 3 | Digital European Sky		
Continue deployment momentum through available mechanisms and support implementation activities leading towards more digital ATM (i.e. PCP, SES digital backbone)	All stakeholders	
Engage in standardisation activities to support market solutions	EUROCAE, ESOs, manufacturing industry, EASA, SJU	
Ensure cyber resilience of the system	EASA and all other stakeholders	
Accommodate new types of airspace users in ATM	EC, all stakeholders	
Recommendation 4 | ATM Data Service Providers		
Assess the need for regulatory initiatives related to the ATM data availability in order to foster opening of the data service market	EC	
Launch the legislative procedure to address the ATM data, to support ADSPs creation.	EC	
Adapt certification rules to accommodate data service market creation	EASA	

ANNEXES

Key:

- Actions that can be done using the existing regulatory framework (no legislative change required)
- Actions that are likely to require a change in the regulatory framework

WHAT ?	WHO?	WHEN?
Recommendation 5 | Use of Performance and Charging Scheme to Support Digitalisation		
Adapt performance and charging scheme to ensure market-based incentives to drive technology uptake	EC	
Incentivise the creation of ATM data service market and reward early movers	EC, economic regulator	
Consider public funds in situations where deployment has a negative business case and where network benefits outweigh negative local business case	EC, economic regulator	
Continue using public funds to support R&D	EC, SJU	
Recommendation 6 | Evolving Role of People		
Review the current rules for ATCO licensing and training	EASA, staff associations	
Define new requirements for ATCO licensing and training	EASA, staff associations	
Ensure appropriate training of ATSEP staff	ANSPs	
Publish new ATCO requirements rules	EASA	
Establish a human dimension roadmap as part of Digital European Sky implementation	SJU	
Establish a change management process to facilitate the transition in staff requirements	ANSPs, ATCO staff associations	
Monitor the change management process to facilitate the transition in staff requirements	ANSPs, staff associations	
Agree common operational standards and proper contingency measures between civil-military elements	ANSPs (civ and mil), EASA, EDA	

ANNEXES

Key:

- Actions that can be done using the existing regulatory framework (no legislative change required)
- Actions that are likely to require a change in the regulatory framework

WHAT ?	WHO?	WHEN?
Recommendation 7 | Simplifying the Economic Regulation		
Evaluate the options for the evolution of the performance charging regime (including incentives policy), including appropriate impact assessments	EC, economic regulator	
Launch a legislative procedure to revise performance and charging rules	EC	
Recommendation 8 | European Economic Regulator		
Evaluate the options for a future setup of the European economic regulator	EC	
Launch a legislative procedure to establish future European economic regulator	EC	
Recommendation 9 | Seamless European (Upper) Airspace System		
Evaluate the options for the setup of SE(U)AS including the airspace volume, service provision and associated charge	NM, CRCO	
Secure the buy-in of Member States for SE(U)AS concept	All stakeholders	
Launch a legislative procedure related to establishment of SE(U)AS (if needed)	EC	
Recommendation 10 | Provision of Tower ATC Services		
Create conditions for opening the market for the provision of ATC tower services	Member States, EC	
Encourage airports to procure tower ATC service through tender of contract (if possible) or at least to consider a service-level as an alternative	Member States, ACI	

ANNEX 2
TERMS OF REFERENCE

MANDATE

"Wise Persons Group" on the future of the Single European Sky (SES)

Introduction

Since the last fundamental SES legislative proposal, SES2+, proposed by the Commission in 2013 but not yet adopted by the European co-legislators, the aviation context has evolved. Continuous growth in air traffic is leading to a lack of capacity, and stakeholders and policy makers are focussing on new priorities in emerging areas not catered for in this legislative proposal as it stands: airports, passenger experience, space, safety, cyber-security, U-space and perhaps some aspects of aircraft systems (avionics, drones). Digitalisation of the economy is accelerating in ways not envisaged even a few years ago.

Furthermore, while SES2+ is still being considered, the Air Traffic Management (ATM) ecosystem is being modernised by the Commission through a combination of legal measures, partnerships, targeted incentives and policy initiatives steering a comprehensive innovation cycle that takes innovative ATM solutions from definition, development and deployment (SESAR) to operations. SES performance mechanisms regulate and monitor the provision of air navigation services largely enabled by these solutions. This cycle, developed with stakeholders over the past decade, is finally becoming a reality on the ground. It is an essential instrument to eliminate fragmentation in European ATM and a catalyst for partnerships.

After 15 years of implementation of the SES, the time has come to determine a future direction for the Single European Sky in a realistic, practical and beneficial way.

In this context, DG MOVE is establishing this Wise Persons Group with the intention of sparking intensive discussion on these and other topics related to the future of ATM and SES, producing a final report containing collective recommendations. The recommendations should identify how to best offer increased capacity at a reasonable cost, while most importantly continuing to ensure safety, which is and should remain the first priority.

Statement of Purpose/ Objective

The objective of this group is threefold:

- To listen to the views of all major ATM stakeholder groups (airspace users, airports, ANSPs/staff, manufacturers, military, staff associations) on the future of the Single European Sky;
- To consider new information, such as the Airspace Architecture Study, the Challenges of Growth report and the European Court of Auditors report;
- To subsequently discuss and agree recommendations, in a collective report, on the direction that ATM in Europe should take, making use of existing tools and instruments, or proposing new ones.

Methodology and Organisation

The Group will meet three times in total: twice in 2018 and once in early 2019. During the first two meetings, members will discuss the main topics (see below) to be focused on in the report of the group. The third meeting will include a hearing by each ATM stakeholder group (airspace users, ANSPs, manufacturers) as input to the final report. Drafting sessions will take place virtually as needed.

Mr Pekka HENTTU will chair the meetings.

The Directorate-General for Mobility and Transport of the European Commission (DG MOVE) will provide secretarial support, including in the production of a concise final report containing clear recommendations on the way forward with the Single European Sky and on the instruments to be used to achieve the recommendations. This exercise will run in parallel to the airspace architecture study being conducted by the SJU and Network Manager, and will also benefit from the stakeholders' consultations that are taking place in the context of the study.

Main topics to be discussed

- Emerging challenges (capacity, fragmentation, performance etc.)
- Need for a new airspace architecture
- Role of ATM modernisation (Innovation/Digitalisation/Virtualisation/Remotisation)
- Economic governance and incentives

Hearings

Invitees:

- A6, CANSO, industrial partnerships (COOPANS, Borealis, etc.), CNS providers
- A4, airlines associations
- Airports, ACI
- Manufacturing industry (ATM, airframe, CNS)

Confidentiality

Discussions of the Group are to be held without any assumptions, in full confidentiality and under Chatham House rules. None of the members will be there to defend the particular interests of a particular organisation. The resulting conclusions of the Group will be collective and will not identify any member's particular view.

Expected Outcome

A collectively agreed final report containing recommendations shall be produced by mid-2019 at the latest.

ANNEX 3
MEMBERSHIP

Mr Eamonn BRENNAN
Director General
Eurocontrol

Mr Volker DICK
President
ATCEUC

Mr Patrick GANDIL
Director General
French Civil Aviation Authority

Mr Pekka HENTTU
Director-General of Civil Aviation
Finnish Transport and Communications Agency

Mr Kay KRATKY
Former CEO and Member of the
Management Board at Austrian Airlines

Mr Marian-Jean MARINESCU
Vice-President, EPP
European Parliament

Mr Raùl MEDINA CABALLERO
Director General
Spanish Civil Aviation Authority

Mr Nicolas WARINSKO
General Manager
SESAR Deployment Manager

Ms Regula DETTLING-OTT
Chairwoman
Performance Review Body

Mr Emilio FAJARDO
Director Industry, Synergies & Enablers
European Defence Agency

Mr Florian GUILLERMET
Executive Director
SESAR Joint Undertaking

Mr Simon HOCQUARD
Deputy Director General
CANSO

Mr Patrick KY
Executive Director
EASA

Mr David McMILLAN
Director General (2008-2012)
Eurocontrol

Mr Joe SULTANA
Director
Network Manager

ANNEX 4
HEARINGS AND MEETINGS

Date	Type of meeting	Attendance
02/10/2018	Launch	Wise Persons Group
20/11/2018	Hearing	Network Manager, Croatia Control Limited, DFS, DSNA, ENAV, LFV, Air France, LOT, Ryanair
23/11/2018	Bilateral	CANSO, ASDA, Lilium Aviation, Safety Line
26/11/2018	Bilateral	A6, BOREALIS, B4, COOPANS
11/12/2018	Hearing	Fraport, Royal Schipol Group, AENA, ATCEUC, ECA, IFATCA, IFATSEA, ETF, Military
09/01/2019	Bilateral	A4E, AIRE, EBAA, ERA, IAOPA
10/01/2019	Hearing	Airbus, Frequentis, Indra, Leonardo, Thales, economist expert (Ecole Polytechnique), ATM performance/economic regulation expert (KUL), competition expert (EUI Florence), Drone Alliance Europe
11/01/2019	Bilateral	ACI, IATA, ASD
14/01/2019	Meeting	Wise Persons Group
01/02/2019	Meeting	Wise Persons Group
19/03/2019	Meeting	Wise Persons Group

ANNEX 5
ACRONYMS

AAS	Airspace Architecture Study
ACC	Area Control Centre
ADSP	ATM Data Service Provider
ANSP	Air Navigation Service Provider
AOP	Airport Operations Plan
ATCO	Air Traffic Control Officer
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSEP	Air Traffic Safety Electronics Personnel
CDM	Collaborative Decision Making
CRCO	Central Route Charges Office
DES	Digital European Sky
EASA	European Union Aviation Safety Agency
EC	European Commission
EUROCAE	European Organisation for Civil Aviation Equipment
FAB	Functional Airspace Block
ICAO	International Civil Aviation Organisation
IM	Infrastructure Manager
NM	Network Manager
NMB	Network Management Board
NOP	Network Operations Plan
PCP	Pilot Common Project
R&D	Research and Development
SDM	SESAR Deployment Manager
SES	Single European Sky
SESAR	Single European Sky ATM Research
SESAR JU	SESAR Joint Undertaking
STATFOR	Statistics and Forecasts
WPG	Wise Persons Group

> there remains an urgent and pressing need to address the immediate capacity issues facing the European ATM network