



WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 6: Future direction

6.1: Implementation plans and methodologies

MODERNIZING ATM ECONOMIC ASSESSMENTS

(Presented by the Presidency of the European Union on behalf of the European Union and its Member States¹; by the other Member States of the European Civil Aviation Conference²; and by the Member States of EUROCONTROL)

SUMMARY

This paper promotes network-wide economic assessments of operational improvements included in major ATM modernization programmes. This type of analysis recognizes the importance of the interconnectivity of the ATM network, aligns with ICAO's aviation system block upgrade (ASBU) framework, focuses on the actual benefits delivered to passengers and operators, identifies critical elements to enable deployment, substantiates performance benefits and allows for an assessment of the impact on different users. It also promotes the inclusion of social factors in economic assessment to reflect the nature of airspace as a social asset.

Action: The Conference is invited to agree with the recommendations in paragraph 5.

1. INTRODUCTION

1.1 Air traffic management (ATM) requires a complex interaction of technologies and capabilities across air navigation service providers (ANSPs), airspace users and airports, alongside airspace designs and procedures to deploy these capabilities in a practical and efficient air traffic environment. Historically ATM modernizations were focused on technological or capability improvements by individual ANSPs, airports or airline operators as benefits could be achieved through changes by individual operators.

1.2 The significant rise in air traffic demand and increasingly complex airspace structures means that future ATM modernizations require more systemized network-level changes and coordinated input from all airspace users to achieve sufficient benefits for passengers and airspace users, in terms of better capacity, efficiency, safety and environment performance. Therefore a different approach is also needed to evaluate the costs and benefits of future ATM modernization programmes in order to facilitate effective decision-making and evaluation of options aligned to meeting regional and national performance objectives.

¹ Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom. All these 27 States are also Members of ECAC.

² Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Croatia, Georgia, Iceland, Moldova, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, The former Yugoslav Republic of Macedonia, Turkey and Ukraine.

1.3 This type of assessment must be undertaken at a level at which operational improvements are delivered and benefits are realized. Secondly it should incorporate the impacts on all airspace users across an ATM network, thereby reflecting the interconnected nature of the ATM environment. Finally, it should attempt to describe and capture the costs and benefits to the wider society.

1.4 The aviation system block upgrade (ASBU) framework provides the technical and operational blocks delivering enhanced ATM capability, but it does not indicate to a State or ANSP how to make the transition from one airspace configuration to another, e.g. Block 0 to Block 1. For this, an economic assessment is required to help inform the decision making process.

2. ASSESSMENT AT THE OPERATIONAL IMPROVEMENT LEVEL

2.1 Major ATM modernization programmes tend to cover an extensive range of areas for improvement, extend over long periods of time and may include a combination of known capabilities and those still in the research and development phase. This makes a complete and comprehensive assessment of an entire modernization programme very difficult, and it is necessary to break the programmes down into components of a manageable size for analysis.

2.2 Assessment of future ATM technologies or capabilities is problematic because some do not result in improvements themselves, but enable improvements only through a combination of changes across an ATM network or modernization programme. An economic assessment of wider operational improvements is likely to be a more accurate reflection of the costs needed to deliver change and the benefits delivered to passengers and users. It deals with the performance of aviation systems, which may need a wider perspective than individual technical improvements and may impact the scale of the required implementation as well.

2.3 This type of analysis is consistent with and can be aligned to the outcome-focused ASBU framework proposed by ICAO, which provides the basis for the operational improvement assessments that could be undertaken for ATM modernizations. Additionally, network assessments should be based on standard values and commonly agreed methods for assessing the costs and benefits in order to facilitate meaningful global comparisons.

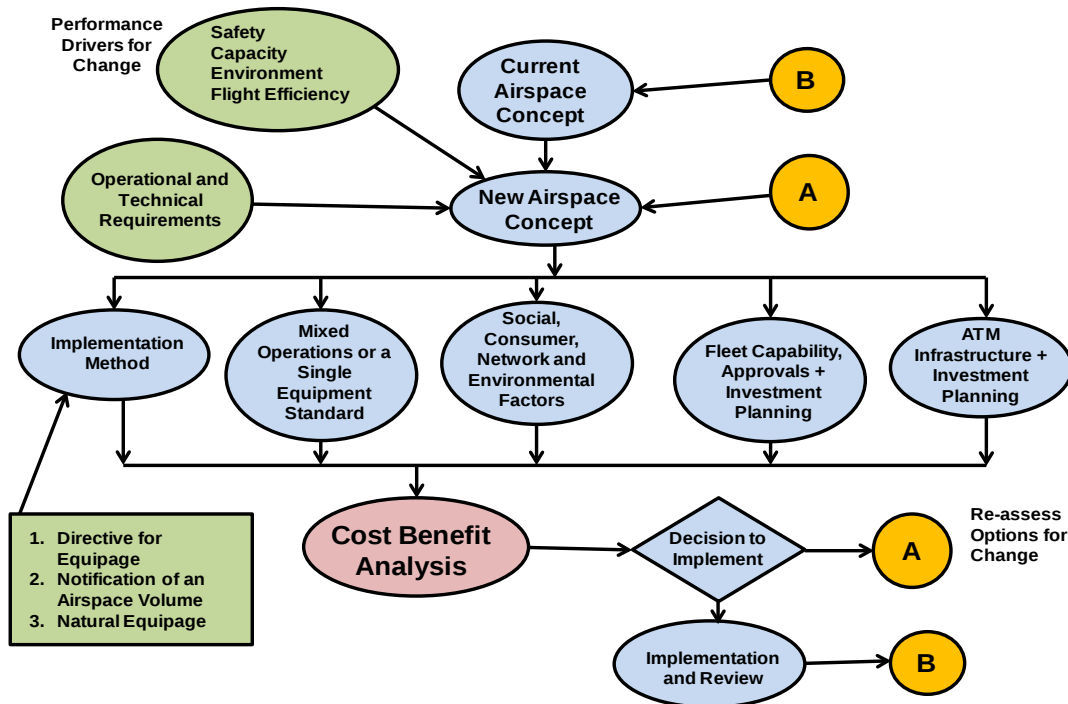
3. ASSESSMENT ACROSS AN ENTIRE ATM NETWORK

3.1 Assessment at the operational improvement level requires the analysis to be undertaken across an entire ATM network, as it incorporates the interconnected and dependent nature of ATM modernization programmes across ANSPs, airline operators, and airports. The nature of ATM modernization programmes means it is necessary for all parties to adopt an improvement for maximum benefits to be realized across an ATM network, and the identification of implementation barriers can help to drive regulatory and policy-making decisions.

3.2 Proposed policies such as the SESAR Joint Undertaking's (SESARJU) "Best Efficient Best Served" (BEBS) is a good example of policy development reacting to an implementation barrier, which would affect the level of benefits that could be achieved across an ATM network. BEBS recognizes that only limited benefits could be realized if all operators are not equipped to the same level, and therefore attempts to develop a policy to realize benefits for those operators who are fully equipped whilst providing an incentive to those who are equipped to a lower standard. The development of the SESAR-deployment is another example that the scale and governance of implementation have to be taken into account, as cost and benefits may differ per individual actor whereas the performance of the aviation system will require a certain critical mass of implementation to be beneficial.

3.3 Furthermore, this kind of network-wide operational level economic assessment could also be aligned with the technological development phase and the future deployment and implementation stages in order to make sure the full costs and benefits are captured. Figure 1 below illustrates how technological development, economic assessment and deployment and implementation can be aligned for systemized ATM modernization development and deployment.

Figure 1 - Systemized ATM Modernization and Deployment



3.4 The benefits of a coordinated approach to ATM modernization programmes were highlighted in a study undertaken by SESAR “Assessing the macroeconomic impact of SESAR”³, which showed that a desynchronized implementation of SESAR would reduce the level of benefits by over one quarter.

4. INCORPORATION OF SOCIAL COSTS AND BENEFITS

4.1 Airspace is a national public asset; therefore ATM modernization programmes should capture the costs and benefits to society as well as the pure monetary costs and benefits to stakeholders, where appropriate. Social, or national, costs and benefits for ATM modernization programmes could include areas such as environmental impacts or the access to and value of airspace.

4.2 Environmental impacts should include costs or benefits associated with CO2 emissions or reductions in emissions, local air quality impact or noise levels. The level of cost or benefit could be determined directly, such as costs associated with the European Emissions Trading Scheme (ETS) or airport noise abatement costs, and/or indirectly through methods such as those that estimate the depreciation of property values from airport noise levels.

4.3 Higher classification of airspace predominantly used by commercial air traffic (CAT) has a value to passengers, airline operators and airports as it increases capacity for passengers to travel safely and efficiently and for airlines and airports to operate additional routes. However, airspace also has a value as it is

³ SESAR Joint Undertaking (June 2011) “Assessing the macroeconomic impact of SESAR”; <http://www.sesarju.eu/news-press/documents/assessing-macroeconomic-impact-sesar-874> (accessed on 21 June 2012)

a national asset that can be safely used by general aviation and the military and is of strategic importance for the States and the military, creating a trade-off between the benefits that could be gained from an increase in airspace used by CAT and the costs this would incur to users, such as the military and general aviation, from a decrease in airspace not used by CAT. A national network-wide assessment enables the impacts on all airspace users to be assessed and included in decision making processes.

4.4 A network-wide assessment allows for the social impacts of ATM modernization programmes to be more readily captured, as the analysis is not focused on any one individual stakeholder and should relate to the contribution to the performance of the aviation sector. Individual operator assessments would not necessarily incorporate all of the social costs and benefits as operators are affected differently by an operational improvement. For example, an airport might be more likely to incorporate costs or benefits associated with noise to local residents because it incurs direct costs such as noise abatement reimbursements, whereas an airline operator might be more likely to incorporate costs or benefits associated with emissions but less likely to incorporate those associated with noise.

4.5 Whilst the value of social costs and benefits are often difficult to measure in practice and invariably subject to some level of judgement, it is important to recognize, describe and quantify or monetise them where possible.

4.6 The UK CAA is currently undertaking a social cost benefit analysis based on the methodology included in this paper to assess an operational improvement across the UK to support the development of an industry deployment plan. One of the operational improvements under analysis is the implementation of more continuous climb operations (CCOs) as part of the UK's Future Airspace Strategy⁴; which aligns with the improvement in ASBU B0-20.

5. ACTION BY THE CONFERENCE

5.1 Complex and systemized network-wide ATM modernization programmes require a network-wide assessment of the costs and benefits at the operational improvement level. Assessments should also aim to capture the costs and benefits across as many ATM network stakeholders and society as a whole as possible, and be aligned to the deployment process to maximize the benefits that can be achieved through ATM modernization programmes.

5.2 It is of prime importance that the impact of the deliverables of the ASBUs and the economic impact thereof are evaluated. The planned speed up of deployment and the required financing to go with it, will be a key success factor. It cannot be that elements are deployed without any validation.

5.3 The conference is invited to:

- a) support the approach to undertake network-wide operational improvement level assessment of air traffic management modernization programmes aligned with ICAO's aviation system block upgrade framework, which can be used to assess performance benefits;
- b) request ICAO take forward work to develop this approach for use globally, including the development of standard values and processes for economic evaluations; and
- c) promote the inclusion of wider social impacts in air traffic management assessments.

— END —

⁴ UK Civil Aviation Authority Future Airspace Strategy for the United Kingdom 2011-2030 published 30 June 2011 (www.caa.co.uk/FAS)