EUROPEAN COMMISSION

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COMMISSION STAFF WORKING PAPER

IMPACT ASSESMENT

Accompanying the document

on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC of the European Parliament and of the Council

{COM(2011) 828 final}
{SEC(2011) 1456 final}

This report commits only the Commission's services involved in its preparation and does not prejudge the final form of any decision to be taken by the Commission.

TABLE OF CONTENTS

1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

Identification

Lead DG: Directorate General for Mobility and Transport

Agenda Planning: 2008/MOVE/054

Proposal for a Regulation on rules and procedures with regard to the introduction of noise-related operating restrictions at EU airports which will repeal Directive 2002/30/EC of the European Parliament and of the Council of 26 March 2002

1.1. Organisation and timing

1. This impact assessment (IA) has been prepared in two phases. The first phase started in 2007 with an external report assessing the implementation of Directive 2002/30/EC (hereinafter "the Directive")[1]. The Commission's assessment was presented in a report adopted in 2008[2] by which it has invited all stakeholders to provide comments. Subsequently the second phase of the IA cycle was initiated, consisting of the appropriate consultations of stakeholders, the establishment of a Commission Impact Assessment Steering Group (IASG). The Impact Assessment Board examined two draft IA reports already on 14 July 2008 and 9 October 2008 respectively.

2. The current proposal forms part of a wider 'Airport Package' which is planned to include also proposals on airport slots, and groundhandling. The common trait of all of these proposals is their impact on airport capacity and hence on the performance of the European transport network.

3. The IASG[3] was reconvened, met five times and had the opportunity to comment on the final version of the IA report until 23 June 2011[4]. Stakeholders were also given the opportunity to endorse or amend their earlier positions.

1.2. Consultation and expertise

4. The most affected stakeholders concerning noise and aviation are the airlines (with air cargo as specific niche), aircraft manufacturers, airports, community groups and independent noise councils. These stakeholders were intensely consulted as outlined below:

– in 2007 the external consultant collected responses to questionnaires received, and made interviews with a range of stakeholders on the implementation of Directive 2002/30/EC;

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1 MPD Group Ltd, (2007), "*Study of Aircraft Noise Exposure at and around Community Airports: Evaluation of the Effect of Measures to Reduce Noise*".

2 COM(2008) 66, Report from the Commission to the Council and the European Parliament - Noise Operation Restrictions at EU Airports (Report on the application of Directive 2002/30/EC).

3 The services involved in this group included the Secretariat-General, Legal Service, DG Climate Action, DG Employment, Social Affairs and Equal Opportunities, DG Enterprise and Industry, DG Environment, DG Health and Consumers, and DG Research.

4 The IASG met on 27 May 2010, on 6 July 2010, on 2 September 2010, 19 October 2010 and on 17 June 2011.

– in 2008 the Commission organised an open consultation on the ways forward to amend the Directive on basis of the report referred to above;

– in 2010, all stakeholders were again contacted to see whether the organisations wanted to endorse their 2008 positions or not, in particular to give their views on the possible amendments of the directive; in addition, the range of stakeholders was widened with (1) Autorité de Contrôle des Nuisances Aéroportuaires (ACNUSA), the French independent noise council; (2) the Aviation Environmental Federation, representing UK, DE, FR community action groups; and (3) the Aerospace and Defence industries Association in Europe (ASD).

5. All in all, the aviation community, including the relevant community groups, have been fully able to contribute to the current proposal for the review of Directive 2002/30/EC. Their views have been assessed and appropriately taken into consideration. Appendix 1 demonstrates that the general principles and minimum standards for consultation of the interested parties by the Commission were respected. The full details of the consultation are given in Appendix 2: Details of the consultation process and outcome.

1.3. Results of the consultation of the Impact Assessment Board

6. In the course of preparing this IA, the Impact Assessment Board delivered three opinions, on 14 July 2008, 9 October 2008 and 22 July 2011, respectively. This report has been improved to fully reflect the main recommendations for improvement made by the Board in its opinions. These recommendations related (1) to the policy context with a clarification of the scope of the addressed problems; (2) to the control function of the Commission; and (3) to other aspects of the problem definition.

7. The report now explains the wider policy context of noise standards and indicates the role of operating restrictions as one of the available tools to mitigate noise nuisances in Appendix 3: Overview of international and EU policies affecting airport noise. The relationship between this directive and the preparation of noise actions plans under the Environmental Noise Directive 2002/49/EC was clarified. The information requirements for assessing the impact of noise restrictions were also highlighted with particular attention to potential effects.

8. The problem definition is more focused and more limited in scope, so as to make realistic progress within a better-identified area of action. The Impact Assessment also develops now a range of realistic policy options with regard to the problem identified in relation to the Directive.

9. Concerning the third main recommendation of the Board, the justification for the scrutiny right for the Commission is documented, pointing to the weaknesses of the current system and assessing alternatives.

10. Finally, the revised IA report has also been fine-tuned on the basis of the more technical comments transmitted to DG MOVE.

2. PROBLEM DEFINITION

2.1. Policy context

11. In 2006, the European Council adopted the Renewed Sustainable Development Strategy of the European Union[5] which sets as its operational objective "*Reducing transport noise both at source and through mitigation measures to ensure overall exposure levels minimise impacts on health*".

12. On 28 March 2011, the Commission adopted the White Paper on Transport 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system'[6]. The White Paper recognised that airports play a capital role in the aviation chain. Their well-functioning and efficiency is central for the successful delivery of the Single European Sky reform; and the White Paper called for a more efficient use of airport capacity to tackle the expected saturation of European skies and airports. In this respect, the Commission Staff Working Document accompanying the White Paper[7] noted that aircraft noise is often the reason for the difficulty of expanding airport capacity at major European hubs.

Noise policy in the EU

13. Noise policy is a shared responsibility between the EU and the Member States. The local nature of noise problems does not mean that all action is best taken at local level, as sources of noise are not always of local origin. However, effective action is very dependent on strong local and national policies and these need to be more closely related to measures decided at Community level.

14. For this reason and further to its 1996 Green Paper on Future Noise Policy[8], the Commission developed a framework for noise policy, based on shared responsibility between the EU, national and local level, and including measures to improve the accuracy and standardisation of data to help improve the coherency of different actions. As part of the effort to tackle noise pollution, the European Union has laid down a common approach to avoiding, preventing or reducing on a prioritised basis the harmful effects of exposure to environmental noise. This approach is based on using common methods to map noise, on providing information to the public and on implementing action plans at local level.

15. The Environmental Noise Directive 2002/49/EC[9] serves as a basis for developing EU measures concerning noise sources. Aircraft noise is considered to be one of the major sources of noise.[10] Directive 2002/49/EC aims to define a common approach to avoid, prevent or reduce the harmful effects, including annoyance, of environmental noise.

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5 European Council, June 2006

6 COM(2011) 144.

7 Commission staff working document accompanying the White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system (SEC(2011) 391 final).

8 COM(96)540

9 Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise.

10 Report from the Commission to the European Parliament and the Council concerning existing Community measures relating to sources of environmental noise, pursuant to article 10.1 of Directive 2002/49/EC relating to the assessment and management of environmental noise - COM(2004) 160 final.

Eventually it aims at developing European measures to reduce noise emitted by road, rail, aircraft, industrial equipment and mobile machinery. This directive covers airports with more than 50,000 movements. The noise assessments are based on harmonized indicators, assessment methods and noise mapping. For aviation, a reference is made to the relevant international guidance material[11].

[11] ECAC document 29. – report on standard method of computing noise contours around civil airports.

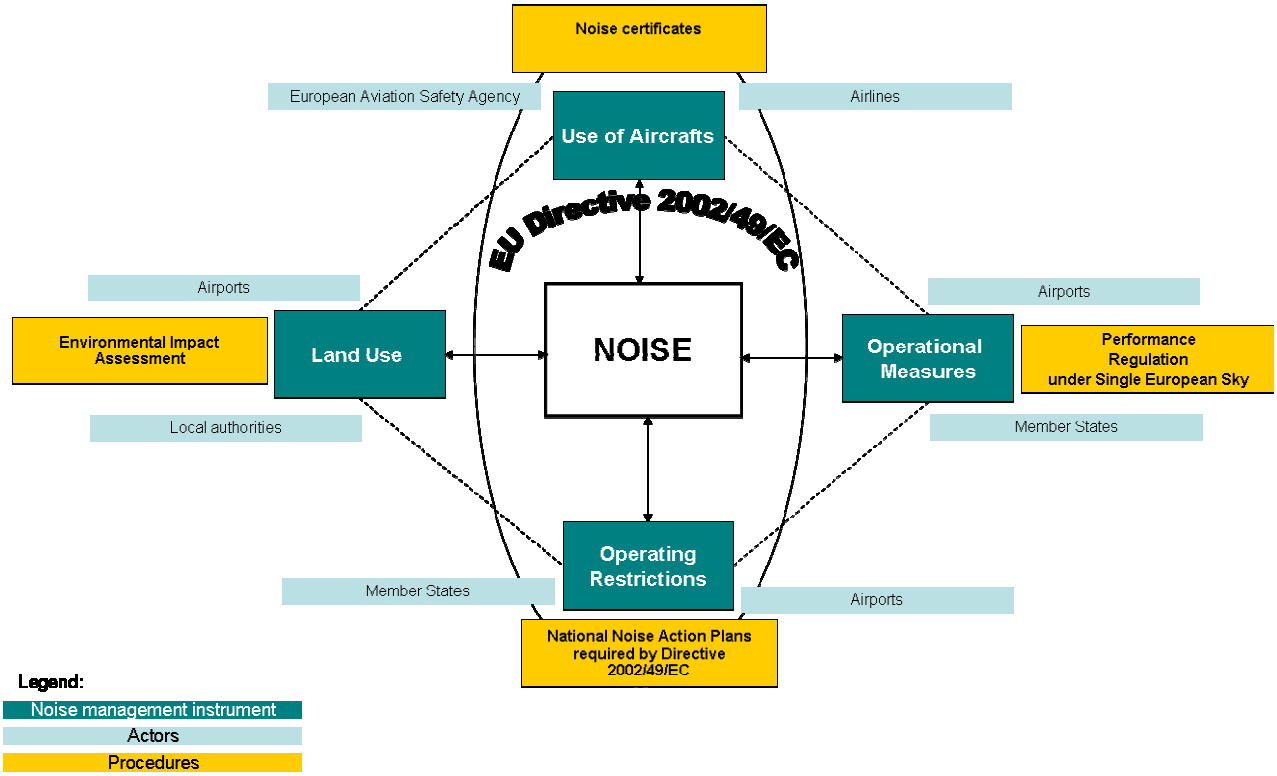

Figure 1: Interaction between the Directive and other EU policies

Balanced approach to aircraft noise management at international level

16. In 2001, the International Civil Aviation Organisation (hereinafter ICAO) Assembly endorsed the concept of a "balanced approach" to aircraft noise management[12, 13]. The Assembly in 2007 reaffirmed the "balanced approach" principle and called upon States to recognize ICAO's role in dealing with the problems of aircraft noise.[14]

17. The ICAO Balanced Approach offers a policy framework to reduce noise at airports in a cost-effective manner and using restrictions on operations[15] not as a first resort, but only after consideration of other possible measures[16]. According to the definition adopted by the

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12 Appendix C of Assembly Resolution A35-5

13 Additional information is provided on the Balanced Approach in Appendix 3: Overview of international and EU policies affecting airport noise.

14 Appendix C of Assembly Resolution A36-22

15 Operating restrictions mean noise related actions that limit or reduce access of civil subsonic jet aeroplanes to an airport.

16 ICAO Assembly Resolution A36-22 "*Encourages States to* […] *not apply operating restrictions as a first resort but only after consideration of the benefits to be gained from other elements of the balanced approach*

Organization, "*the balanced approach to noise management developed by ICAO consists of identifying the noise problem at an airport and then analysing the various measures available to reduce noise through the exploration of four principal elements, namely reduction at source, land-use planning and management*[17]*, noise abatement operational procedures*[18] *and operating restrictions, with the goal of addressing the noise problem in the most cost-effective manner*"[19].

18. The Balanced Approach adds value through setting out a framework for authorities to pursue a consistent noise management policy, tailored to the characteristics of the airport. It is designed to provide a range of policy options for policy makers. It should lead to consultation of all actors involved and to evidence-based decision-making guided by the objective of cost-effectiveness in each case where the noise management policy is amended by the airports or competent authorities.

Box 1: An example of good practice

In 2007-2008, substantial political pressure was mounting from local and national politicians to introduce a complete night ban at Paris Charles De Gaulle airport (CDG), one of the main entry points into France and Europe. CDG has more than 500,000 flight movements a year, more than London and Frankfurt. It also is the European home base for FedEx and has intense night activities. At the same time, CDG operates a partial night curfew. The CDG 'heliotropolis', the 'city of the air' attracting more industrial activities and services, creates more than 12,000 direct jobs.

With such political pressure to swiftly introduce a complete night ban as the only possible remedy, the French Directorate General for Civil Aviation (DGCA) started a process of intense consultation and analysis based on the Balanced Approach. A survey conducted among stakeholders revealed that most of the annoyance was in fact created by an increase in traffic during the 10-12pm time period when most people try to get to sleep, and over particular zones. On the basis of this result, the DGCA analysed the range of measures already in place. Indeed, for years, CDG had given equal attention to all four pillars of the ICAO **B**alanced Approach. The analysis showed that the potential of the reduction of noise at source and land use planning had already fully been utilized, together with that of operational measures.

At the end of this 3-year consultation and analysis, the DGCA came up with a combination of measures which delivers better environmental protection and preserves long-term environmental sustainability. The number of people affected by a 50dB(A) air traffic noise level at night would **decrease by 70%** from the current 90,000 to 24,000 in 2017, whilst **growth** of air traffic is maintained.

Beyond operational improvements, the measures also focus on the least noise performing aircraft. As from 2012, all aircraft must satisfy chapter 3 minus 8; from 2014, the margin is increased to minus 10. The measure does not impact chapter 4 aircraft.

19. In this context, the scope for EU action is limited by the regulatory framework set out at international level. Reduction at source means noise reduction through the adoption and implementation of the noise certification standards. The adoption and implementation of certification standards is within the authority of the ICAO.

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and in a manner which is consistent with Appendix E [on local noise-related operating restrictions at airports] *to this Resolution and taking into account the possible impact of such restrictions at other airports*"

17 Land-use planning and management measures can be categorized as planning instruments (comprehensive planning, noise zoning, subdivision regulations, transfer of development rights, and easement acquisition), mitigating instruments (building codes, noise insulation programmes, land acquisition and relocation, transaction assistance, real estate disclosure, and noise barriers), financial instruments (capital improvements, tax incentives.

18 ICAO's noise abatement procedures such as use of flight departure and approach routings or use of approach procedures are also contained in Annex 16.

19 As established in ICAO Assembly Resolution A33-7.

20. In this respect, it is worth noting that ICAO has set progressively tighter certification standards for noise emissions from civil aircraft. Aircraft operating in Member States must conform to these standards, which are known as Chapters. The Chapters set maximum acceptable noise levels for different aircraft during landing and take-off. The Commission has systematically transposed ICAO noise standards into European law[20] to reduce noise at source and promote the use of quieter aircraft: aircraft falling within Chapter 2 have been banned from operating within the EU since 1 April 2002, unless they are granted specific exemptions. The vast majority of civil aircraft now operating therefore fall within Chapters 3 and 4, i.e. they are less than half as noisy as the previous Chapter 2 aircraft. All new aircraft manufactured from 2006 onwards have to meet the requirements of Chapter 4.

The Directive

21. In this context, the Directive, acting under the umbrella of the Environmental Noise Directive, implements one of the four main pillars of ICAO's Balanced Approach to noise management at EU airports. This is because, in addition to the limitation described above, the scope for EU action with respect to certain type of measures such as land use planning, operational procedures or insulation programmes is limited further for subsidiarity and proportionality considerations.

22. Within the regulatory framework described above, the aim of the Directive is to facilitate the introduction of operating restrictions in a consistent manner at airport level so as to limit or reduce the number of people significantly affected by the harmful effects of noise.[21]

23. To this end, the Directive lays down a common framework of *rules and procedures* for the introduction of operating restrictions at Community airports, as part of a balanced approach on noise management. The purpose of this common framework is to safeguard environmental protection around EU airports in a way that is compatible with internal market requirements by considering similar operating restrictions at airports with broadly comparable noise problems. The common framework includes assessment of the noise impact at an airport and evaluation of the measures available to alleviate that impact, and selection of the appropriate mitigation measures with the goal of achieving the maximum environmental benefit most cost effectively.[22]

24. More precisely, the Directive lays down *rules on how to carry out in general the noise assessment process*, which has to be taken into account prior to the introduction of noise related operations restrictions.[23] Operating restrictions are defined as noise related actions that limit or reduce access of civil subsonic jet aeroplanes to an airport; and they include operating restrictions of a partial nature, affecting the operation of civil subsonic aeroplanes according to time period. Operating restrictions or noise related restrictions of

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20 E.g. Council Directive 98/20/EC amending Directive 92/14/EEC on the limitation of operation of aeroplanes covered by Part II**,** Chapter 2, Volume 1 of Annex 16 to the Convention on International Civil Aviation.

21 The objectives of Directive 2002/30/EC are set out in Article 1. In particular, states that "[the objectives of this Directive are] to "lay down rules for the Community to facilitate the introduction of operating restrictions in a consistent manner at airport level so as to limit or reduce the number of people significantly affected by the harmful effects of noise;[…] "to enable measures to be chosen from those available with the aim of achieving maximum environmental benefits in the most cost-effective manner". Directive 2002/30/EC, Art. 1(a) and Art. 1(e)

22 See Recital 7 of the Directive.

23 See Article 5 of the Directive.

traffic can be *inter alia* curfews (limiting operations during a certain period of time), quotas, noise budget, noise level limits and restrictions on the operations of Chapter 3 aircrafts[24].

25. In addition, the Directive also sets up *specific rules on the introduction of operating restrictions aimed at the withdrawal of marginally compliant aircraft* (hereinafter MCA). The latter are defined by the Directive as aeroplanes that have a cumulative margin of no more than 5 decibels in relation to Chapter 3 certification limits. The Directive also defines a time schedule of 5 years for the introduction of the total phase-out of MCA. Completely banning certain aircraft complying with ICAO certified noise standards from operations at specific airports is a strong policy instrument which could have far reaching economic consequences for airlines, unless an appropriate transition period is implemented enabling airlines to adapt to the new noise regime. This set of specific rules is aimed at ensuring an optimal targeting of operating restrictions on the noisiest aircraft and at the same time protect the legitimate economic interests of airlines and the citizens.

26. Finally, the Directive sets out a *procedure* to be followed by the relevant authorities on the introduction of any new operating restriction. This procedure covers areas such as consultation of stakeholders, prior information of the Commission and other Member States and right of appeal.

27. The Directive currently covers the 69 European airports as they have more than 50 000 movements of civil subsonic jet aeroplanes per calendar year.

Interaction between the Directive and the Balanced Approach

28. The interaction between the Directive and the Balanced Approach is schematically presented in Figure 2. While instruments such as land-use planning and operational procedures are not directly covered in the Directive for subsidiarity and proportionality reasons, their interaction with operating restrictions must be recognised. This is because the Balanced Approach requires all other measures to be first taken into account before an operating restriction is implemented[25]. Reduction of noise at source is indirectly linked to the Directive, because the legislation defines a category of aircraft (the MCA) as a complementary measure on the basis of current noise standards. MCA can become subject to a total ban from an airport after their stepwise withdrawal over 5 years.

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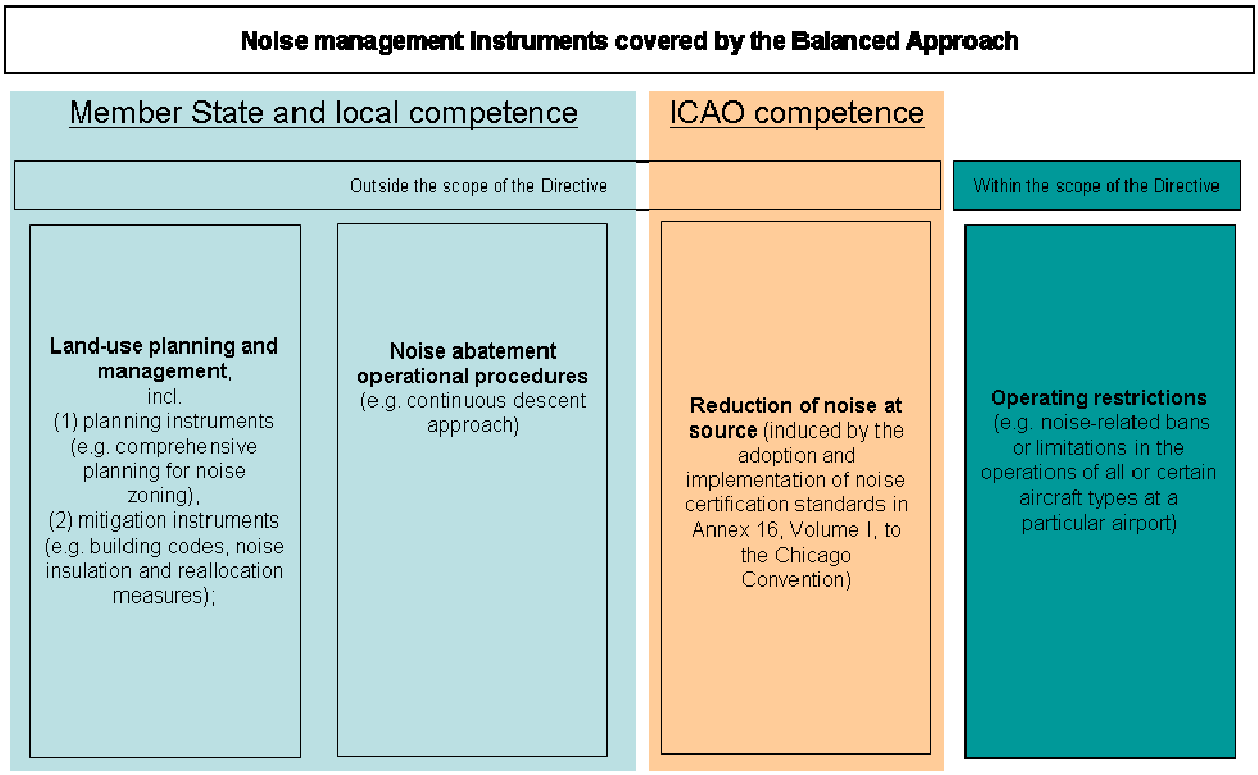
[24] Further explanation is provided in Appendix 5: Explanation on noise abatement measures applied at EU airports.

[25] Ibid footnote 16.

Figure 2: Interaction between ICAO's Balanced Approach and the Directive[26]



2.2. Description and scope of the problem

29. Pursuant to Article 13 of the Directive, its review[27] was undertaken in 2008. In light of the results of this review and of the ensuing stakeholder consultation, the Commission has come to the conclusion that, taking into account the intrinsic limitations to EU action set out above, the rules and procedures laid down by the Directive on the way EU airports introduce operating restrictions today are not applied in a consistent manner and their impact is limited[28]. This is particularly felt at two levels. First, the specific rules on MCA are no longer effective. Second, in the current legal framework, the analysis of available data shows that the assessment of possible noise-related measures by airports is not done in a consistent manner.

30. This is confirmed not only by the results of the stakeholder consultation, but also by the results of a comparative analysis undertaken by the Commission.

31. As shown in Figure 3, the measures primarily applied at European airports are noise abatement procedures. However, in addition, operating restrictions are used. Regarding the latter, the following restrictions have been introduced at the 224 EU airports assessed[29] for

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26 Further explanation is provided in Section 6 in Appendix 3: Overview of international and EU policies affecting airport noise.

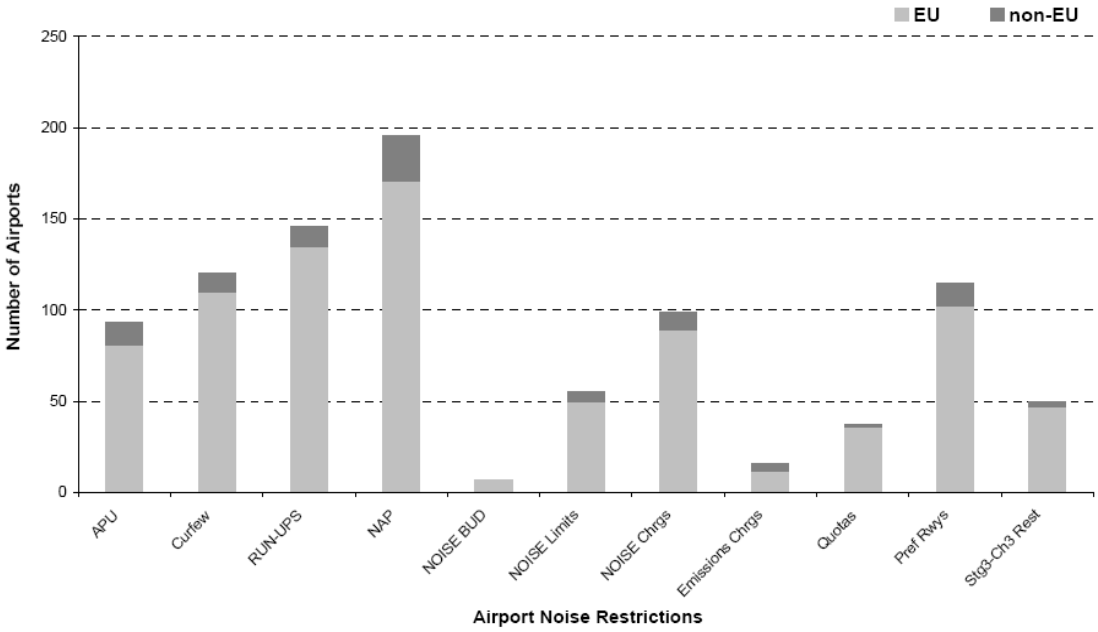
27 COM(2008) 66 final.

28 See in this respect the Report from the Commission to the Council and the European Parliament - Noise Operation Restrictions at EU Airports (Report on the application of Directive 2002/30/EC) COM(2008)_66

29 See also Appendix 5: Explanation on noise abatement measures applied at EU airports. The figure appears in DLR (2011), based on database maintained by Boeing. The database "Airports with Noise Restrictions" is publicly available. The information and the data on this website are provided directly by the airports themselves. http://www.boeing.com/commercial/noise/listcountry.html. Although only 69 airports are

this report: 116 curfews[30], 52 noise limits, 51 restrictions targeted aircraft of the noise standard "Chapter 3", 38 noise quotas and 7 noise budgets.

Figure 3: Overview of current European (EU and non-EU) airport noise restrictions[31]



32. Additional analysis has been performed on the nature of the most prevalent operating restriction, curfew. As shown in Table 1, among the 69 airports currently covered by the Directive, approximately 70% operate curfews. Out of these 49 airports, around one-third operates a night ban on air traffic.

Table 1: Overview of assessment results on curfews[32]

	EU27 airports	*%*	*EU27 airports covered by the Directive*	*%*	*US airports*	*%*	*Japanese airports*	*%*
Number of airports	224	100%	69	100%	229	100%	19	100%
Number of curfews	116	52%	49	71%	53	23%	3	16%
Number of night bans	61	27%	17	25%	11	5%	3	16%

33. For comparison purposes, analysis has also been carried on airports in the United States and Japan. It appears that in the US there are approximately 50% less curfews for around

currently covered by the Directive, more airports will fall within its scope with increased traffic foreseen for the future. Therefore an overview of all 224 airports is also provided.

30 Curfews limit operations during a certain period of time (noise related restrictions of traffic).

31 Further explanation is provided in Appendix 5: Explanation on noise abatement measures applied at EU airports.

32 Ibid footnote 29.

the same number of airports as in the EU[33]. The number of night bans is less than 5% of the total. In Japan, only 1 in every 6 airports operates a curfew. The large number of curfews already in place in Europe compared to other major economies could indicate that the assessment required by the Directive is not applied in a consistent manner and operating restrictions are implemented too often as a first resort.

2.2.1. The specific rules on MCA are no longer effective

34. Stakeholders reported that the impact of the Directive on the targeting of operating restrictions on the noisiest aircraft through MCA is relatively limited. Indeed, over time, the number of MCA has become comparatively small due to their natural replacement following technological development.

Obsolete definition of MCA

35. As indicated above, a MCA is currently defined in the Directive as an aircraft 5 EPNdB[34] less noisy than the Chapter 3 standard called 'Chapter 3-5'[35]. The update of this definition would currently require completing a co-decision procedure. At the same time, the new noise standard of Chapter 4 was adopted in 2001 in ICAO and became applicable as from 2006, when Chapter 2 aircraft, the older and very noisy aircraft, were totally banned from European skies. Chapter 4 (or higher) became the *de facto* fleet standard. Chapter 3 aircraft and especially MCA were systematically taken out of circulation due to autonomous fleet development and noise management policies. This leads to a situation where the current definition only covers a marginal fraction of the fleet and the measure has lost its effectiveness.

36. As shown on Table 2, the share of aircraft not satisfying Chapter 4 requirements is steadily falling, from one fifth in 2002 to one tenth in 2010. Especially the number of movements of the noisiest aircraft types (Chapter 3 -5) has shrunk in 2010 to less than 0.3% of total movements. The night movements of noisy aircraft are however systematically higher than day movements due to their relatively larger share in freight operations.

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33 In the US, decisions on operating restrictions are taken at the federal level on basis of the 'interstate commerce' principle. The FAA plays a dominant role in aviation. Firstly, as responsible for air navigation, it can elaborate operational improvements of noise procedures upfront in the noise management process. Secondly, the FAA takes the final decision on operating restrictions. This regulatory competence is financially supported through an Airport Investment Programme which finances airport investments, land use measures (even buying houses around airports) and insulation programmes. A corresponding mechanism does not exist in Europe. The administrative procedure in the US is quite burdensome if an airport intends to introduce operating restrictions. The FAA receives less than one application for a noise restriction per year.

34 Effective Perceived Noise in decibels.

35 Article 2 (d) of the Directive states that "'*MCA' shall mean civil subsonic jet aeroplanes, that meet the certification limits laid down in Volume 1, Part II, Chapter 3 of Annex 16 to the Convention on International Civil Aviation by a cumulative margin of not more than 5EPNdB (Effective Perceived Noise in decibels), whereby the cumulative margin is the figure expressed in EPNdB obtained by adding the individual margins (i.e. the differences between the certificated noise level and the maximum permitted noise level) at each of the three reference noise measurement points as defined in Volume 1, Part II, Chapter 3 of Annex 16 to the Convention on International Civil Aviation;"*

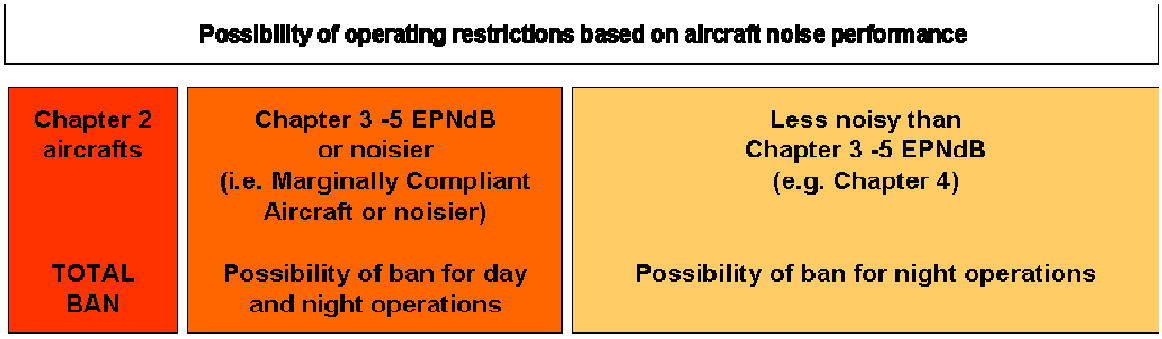
Table 2: Movements by aircraft in the EU according to noise standard – evolution 2002-10[36]

	2002 Day	*2002 Night*	*2006 Day*	*2006 Night*	*2010 Day*	*2010 Night*
Ch3 -5	2.63%	3.03%	0.86%	1.40%	0.28%	0.54%
Ch3 -8	0.41%	0.35%	0.30%	0.25%	0.17%	0.13%
Ch3 -10	8.22%	9.32%	6.71%	8.23%	5.09%	6.90%
Ch3 -U	9.67%	11.01%	7.63%	8.65%	3.83%	4.60%
Ch3	20,94%	23,71%	15.51%	18.52%	9.37%	12.17%
Absolute	1,714,014	415,914	1,476,931	425,484	420,369	232,887
All absolute	8,187,250	1,754,283	9,525,282	2,297,712	9,454,100	2,341,800

Inappropriate associated phasing-out period

37. When the assessment of the potential noise reducing measures has shown that to achieve the noise objectives requires the introduction of restrictions aimed at withdrawal of MCA, Article 6[37] of the Directive defines a time schedule of 5 years for the introduction of the total phase-out. Subject to this phase-out schedule, the operation of these MCA aircraft can be restricted irrespective of the period of the day. This relationship is presented in Figure 4.

Figure 4: Relationship between aircraft noise performance and applicable rules[38]



36 Ch3-5: aircraft 5dB less noisy than chapter 3; Ch3-8: aircraft 8dB less noisy than chapter 3; Ch3-10: aircraft 10dB less noisy than chapter 3; Ch3-U: aircraft with different noise certification levels, the lowest falling within the chapter 3 band. A considerable proportion of these aircraft may satisfy chapter 4. Source: Eurocontrol. Further explanation is provided in Appendix 6: Data sources and limitations on information.

37 COM (2008) 66 provides the following interpretation: "Article 6.1 of the Directive permits the introduction of "operating restrictions of a partial nature" on unspecified aircraft types, as part of the preferential hierarchy of actions within the Balanced Approach preceding the 'last resort' withdrawal of marginal Chapter 3 aircraft".

38 ICAO Contracting States decided on phasing-out chapter 2 aircraft in 1990 with complete withdrawal by 2002. ICAO Resolution 37-18 and guidance stipulate that all aircraft should be allowed to fly as long as they satisfy chapters 3 or 4. Operating restrictions should not be imposed on chapter 3 aircraft, except as part of the Balanced Approach to noise management. In addition, noise measures can always be enhanced at night. Explanation of ICAO noise standards ("Chapters") is provided in Section 4 of Appendix 3: Overview of international and EU policies affecting airport noise. EPNdB refers to Effective Perceived Noise in decibels.

38. However, this phase-out period for operating restrictions on MCA has now become too long so as to render the targeting of operating restrictions on the noisiest aircrafts attractive and effective. To achieve the noise objectives, airports often apparently have to use the remaining possibilities, i.e. putting operating restrictions on less noisy aircraft or taking action such as noise abatement procedures, land-use planning.[39] This could lead to the introduction of operating restrictions that are suboptimal in terms of cost-effectiveness, countering the objective of the Directive laid out in Article 1(e)[40]. Given the continuous growth of aviation in combination with the noise objectives, ever quieter planes need to be incentivised through focusing noise measures on the noisiest aircraft.

2.2.2. The existing legal framework does not ensure that operating restrictions are considered at airports with broadly comparable noise problems in a consistent manner

39. Stakeholders reported that, in the current legal framework, operating restrictions are considered differently at airports with broadly comparable noise problems, entailing the possibility of distortions of competition. Many airports have implemented operating restrictions as a first resort instead of only after assessing the range of alternative noise management instruments.

40. Given that the current legal framework implements one of the four main pillars of ICAO's Balanced Approach to noise management, the problem referred to above implies that the Balanced Approach is not applied in a consistent manner at EU airports[41] (see in this respect Box).

Box 2: Case studies on the incorrect application of the Balanced Approach

Not taking account of safety consideration

Case 1: There is a notable case in Europe where noise rules preventing overflight of an adjacent State's territory may have partly contributed to a major civil aviation disaster. It is not known if a safety assessment was carried out when such noise rules were originally considered.

Case 2: In 2003-04, a Member State government installed a microphone in order to monitor and, if necessary, impose fines on aircraft on approach (around 2-3 miles from threshold) at large airport. "Approach" is a very safety-critical phase of the flight where the pilot is following standard operating procedures, and where wind and weather can be more influential over noise than pilot techniques. For example, gear, flap and thrust are being chosen for the safe operation of flight and not for noise purposes. This kind of measure had been previously considered for an airport in another Member State, but was rejected on grounds of safety. It would have been safer and more effective to encourage low power-low drag techniques and to publish guidance on these. The noise rule was eventually withdrawn.

Lack of awareness of practice elsewhere in the EU

Many airports have total night time restrictions while at others (e.g. airports around London) scientific studies dictate that for the quietest jets, sleep disturbance may be minimal (insignificant), and hence that some movements should be allowed. It could be that these and other restrictions are based on complaints, and not noise impact and therefore reflect the incorrect application of the Balanced Approach.

[39] Article 5 of the Directive states *"When a decision on operating restrictions is being considered, the information as specified in Annex II shall, as far as appropriate and possible, for the operating restrictions concerned and for the characteristics of the airport, be taken into account."*

[40] Ibid footnote 21.

[41] Ibid footnote 16.

Ineffective land-use planning

Land-use planning is an essential pillar of the Balanced Approach. However, many airports have inappropriate development (residential, schools and hospitals) that were permitted without integrated land-use and airport planning. As noise contours temporarily shrink due to reduction at source (i.e. use of less noisy aircraft), encroachment of the airport is often allowed to fill the temporary ease in noise annoyance. This produces problems for airport growth in the longer term. At one European airport a major initiative is been undertaken to build a new airport in a green field location largely because of the failure of land use planning protection.

Unachievable rules

For at least one ECAC[42] airport, aircraft are fined for straying off track without any international (ICAO) guidance on what accuracy of Standard Instrument Departure (SID) navigation is safely achievable. Sometimes there is no transparent assessment of the flyability of the SID (routes) before such rules are implemented. The fines can even be imposed in cases where the pilot is instructed to leave the SID by air traffic control.

Regulating using a specified solution instead of a desired performance

An EU airport has noise departure procedures that are imposed in its operating permit. These rules remain in place for 10 years before review. This long timeframe before review and implementation of noise management instrument based on mandated procedures rather than on desired noise outcomes means that more people are being unnecessarily impacted by noise and it is not in line with the Balanced Approach.

41. The principal risks associated with this situation are the lack of consistency and cost-effectiveness of introducing operating restrictions. In other words, reduction of noise pollution is achieved at a higher cost than necessary for the airports undertaking the operating restrictions, for the airlines obliged to comply with such measures, and for the surrounding communities which depend on these airports.

42. Indirectly, this situation also harms regional development and has repercussions for the European transport system as a whole by limiting airport capacity. It may also accelerate the need for investment in new airport infrastructure (with attendant costs and impacts), and risk the accelerated transposition of noise impact to areas not presently affected (e.g. around smaller airports).The scope of the initiative is therefore to improve the functioning of the existing Directive and, more specifically, the functioning of the two main instruments of the Directive (i.e. the set of rules and procedures for the introduction of operating restrictions at Community airports as well as the specific rules on the introduction of operating restrictions aimed at the withdrawal of Marginally Compliant Aircraft (MCA)).

The causes

43. Over the last 10 years, EU legislation has evolved and Member States are now required to deal with a range of EU instruments relating to noise[43]. Furthermore complexity in assessing noise issues has grown as markets have completely opened up, widening and deepening the European air transport network. The steps in the (national) noise assessment process are explained in Box .

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[42] Founded in 1955 as an intergovernmental organisation, the European Civil Aviation Conference (ECAC) seeks to harmonise civil aviation policies and practices amongst its Member States and, at the same time, promote understanding on policy matters between its Member States and other parts of the world. ECAC is composed of 44 Member States.

[43] A brief overview of existing legislation in the field is provided in Appendix 3: Overview of international and EU policies affecting airport noise.

Box 3: Description of noise assessment process

The noise assessment process may be triggered on a regular basis by national or EU legislative requirements (like the Environmental Noise Directive or performance plan under the Single European Sky legislation) or by particular events, e.g. a decision on a building a new runway. Normally, the process starts with a declaration by the competent authorities setting the objectives for noise reduction in a wider context of regional development.[44]

As a second step, in light of the declared objectives for noise reduction, the authority should consider a range of noise abatement measures during the preparation phase to achieve the aims. The technical measures should ideally be prepared in full collaboration between airports, airlines and air navigation service providers. The impact of alternative measures should thereafter be assessed using evidence from noise mapping: a model calculates the noise contours in light of existing and projected aircraft noise performance and traffic volumes. Experts views suggest that the preparation phase is often incomplete: either because only a limited number of noise abatement instruments are considered, because not all affected airlines are involved in the assessment [45], or because there is not sufficient modelling underpinning the results. The cost of undertaking this assessment ranges from around €20,000 to €100,000, depending on the size of the airport and depending on the modelling efforts, which may cost up to €50,000, for multi-airport and multi-runways configurations.[46]

A stakeholder consultation is held as the next phase on the different possible measures in order to get the views of interested parties. However in many cases no consultation is organised, as the measures are not perceived or defined as operating restrictions (e.g. a new operational measure which de facto restricts access to the airport or limits the optimal capacity should be considered as an operating restriction).

After assessing the observations, as a fourth step, the airports select certain measures to abate noise and have them approved by the competent Member State authorities. Member States usually take around several months to take a decision, depending on the quality of the consultation and assessment process. In line with these decisions, airports then set the exact measures and communicate the details of the chosen instruments to ICAO. Member States are also required to notify the Commission, an element which however is almost always ignored.

The existing rules on how to carry out a noise assessment process are unclear and not precise enough

44. Article 5 of the Directive requires that a set of information detailed in Appendix 2 of the Directive is taken into account when a decision on operating restriction is taken; The information requirements cover amongst others the following aspects:

- Detailed description of the specific situation of the airport concerned in terms of geography environmental objectives, noise, noise measures already in place;

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44 http://www.gov-news.org/gov/uk/news/consultation_night_flying_restrictions_heathrow/77870.html; Alternatively see for an explanation of government policy: http://www.developpement-durable.gouv.fr/Environnement-Les-actions,10105.html

45 That is why the bilateral air services agreements contain a clause on appropriate consultation and notification.

46 The cost of Environmental Impact Assessments due to new infrastructure or programmes (e.g. change in air space structure above an agglomeration) are of another magnitude. The mapping requirements, also stemming from the Environmental Noise Directive, have a much smaller cost burden.

- Forecasts related to airport development and expected impacts on noise in comparison with a do noting option;

- Assessment of additional noise measures (detailed description, cost/effectiveness or cost/benefit analysis of the introduction of specific measures, analysis of possible environmental and competitive impacts of thr proposed measures, reason for selection of the preferred option).

45. According to stakeholders, the existing rules on noise assessment process are not sufficiently precise so as to ensure that the assessment of the noise impact and evaluation of the measures available to alleviate that impact is made on a uniform way across EU airports.

46. At this time of growing technical and legal complexity of aviation noise assessments, it appears that the Directive does not equip stakeholders with sufficient assessment tools to ensure the correct application of the Balanced Approach. Although ICAO produced a revised guidance document as recently as in 2008[47], EU-wide databases and analytical assessment tools based on an internationally recognised method and data to be used for noise modelling and cost-benefit analysis are not systematically utilised and need some further development.

47. In addition the scope of the assessment is open to interpretation as to when it must be applied and whether it covers all significant effects from a proposed noise related action or whether it is restricted to the effects on parties specifically named in the clause. The lack of clarity on noise assessment process may conceivably lead to omission of potentially significant impacts from the local assessment scope including impacts on wider economy and employment; on the wider air traffic management system and on greenhouse gas (GHG) and pollutant emissions.

48. The stakeholder consultation and discussions with experts revealed many concrete concerns and problems on how to carry out a noise assessment process:

- Failure to correctly assess implications for other enviro-social and socio-economic impacts and interdependencies.

- Failure to consult interested parties properly and to involve local expertise in noise rule development.

- Many stakeholders had the impression that local decisions (e.g. total curfews and land-use planning restriction exemptions) were made on the basis of political expediency and without full transparency of their effects or benefits.

- Failure to consider the impacts of local decisions on the wider ATM system.

- Lack of awareness of existing and emerging aircraft capabilities.

- Adopting rules that exist for too long a duration without possibility of review.

[47] ICAO (2008), Guidance on the Balanced Approach to Aircraft Noise Management, Doc 9829 AN/451.

- Lack of transparency of decisions that can have effects under any of the Balanced Approach elements and an over emphasis for the need for assessment of restrictions only.

- Basing noise rules on specific procedures or solutions and not on desired noise outcomes – the latter provides the same protections but also allows for continual improvement and the adoption of new techniques.

The existing procedure to introduce operating restrictions is too weak

49. Finally, the Directive is not clear as to whether the assessment should also link with other elements of the balanced approach, so as to take due account of evolving noise standards of aircraft, operational measures under the Single European Sky performance regulation, and requirements of the Environmental Noise Directive.

50. As indicated above, Member States introducing operating restrictions must follow certain procedures regarding:

– *Consultation and transparency*: Interested parties shall be consulted in accordance with applicable national law;

– *Notice of introduction*: public notice, including an explanation of the reasons for introducing it taking into account the appropriate elements of the balanced approach, should be given to all interested parties;

– *Information*: Member States shall inform the other Member States and the Commission of any new operating restriction;

– *Right of appeal*: Member States shall ensure the right to appeal against the measures taken before an appeal body other than the authority that has adopted the contested measure, in accordance with national legislation and procedures.

51. The existing possibility of infringement procedures is normally not adequate to prevent or to avoid the damages caused by such an operating restriction[48]. Although prior notification has been a legal requirement in the Directive, there are indications that there is ample scope to improve its implementation considerably[49].

52. While the Commission launched infringement procedures for not timely transposition into national law against ten Member States, only one single procedure was launched for failing to fulfil its obligations under the Directive. This is due to the rather unclear wording of the text, which creates legal uncertainty as to the correct application of the Balanced Approach. Indeed, the noise assessment need not be applied for minor technical changes or for already established restrictions. If the measure is substantial and new, the process is to be applied "as far is appropriate and possible" and "for the characteristics of the airport". Though the spirit of the Balanced Approach is clear, the wording of the Directive does not provide the sufficient legal clarity for court proceedings.

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[48] Further details on the how various stakeholders are affected by cost-ineffective operating restrictions are provided in Section 2.3.

[49] Over the course of 2007-2010, the Commission did not receive any notification on a newly introduced operating restriction while there have been a number of cases, such at Paris CDG or at Frankfurt airport.

53. Moreover the Directive does not allow temporary suspension of the implementation of measures restricting operations[50] in the event where the cost-effectiveness of these measures is contested by stakeholders, and where there is demonstrated that the impacts on noise, safety, competition or network efficiency have not been properly taken into account. Such a possibility of suspension is important as there is ample evidence that introduction of local noise rules that were not preceded by the correct application of the Balanced Approach have had significant adverse affects on the European aviation system.[51]

54. Finally, rules on the scope of the stakeholder consultation, namely which actors need to be consulted, vary considerably across Member States.

2.3. Stakeholders affected

55. Airports certainly lose revenue as a result of operating restrictions. Attempts to offset such loss of capacity by increasing the frequency of operations is often no longer possible due to existing congestion levels[52] and related provisions on safety. The restricted activities have knock-on effects on other aviation operators, like ground-handlers and air navigation service providers. Airport capacity is also a crucial factor for Single European Sky Key Performance Areas such as flight efficiency (fuel use and climate change) and delay management. In addition, maximising existing airport capacity to the extent sustainably possible delays the need for new infrastructure and optimises the economic benefit from existing investment and helps European competitiveness (economies of scale).

56. Airlines are significantly affected as operating restrictions have a substantial impact on the flexibility of organising their business. Operating restrictions affect all types of operators. Concerning passenger transport, the low cost airlines' business model is based on high utilization of their fleet enabled by the use of shoulder hours (i.e. early morning and late evening flights). Network carriers may need to abandon a route if the spoke/hub can not be reached within the day. Charter airlines use night flights to a considerable extent to offer the cheapest holidays packages. As for freight transport, Figure 5 below shows that all-cargo[53] flights rely most on operations at night, the time of the day that is most often subjected to operating restrictions. There may be an additional negative impact on

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50 Paragraph 3 of Article 20 of Regulation 1008/2008 of the European Parliament and the Council of 24 September 2008 on common rules for the operation of air services in the Community, OJ L 293/3 of 31.10.2008 foresees the suspension of measures taken to address serious environmental problems stating that "*At the request of another Member State or on its own initiative, the Commission may, in accordance with the procedure referred to in Article 25(2), suspend the measures if they do not meet the requirements of paragraph 1 or are otherwise contrary to Community law*".

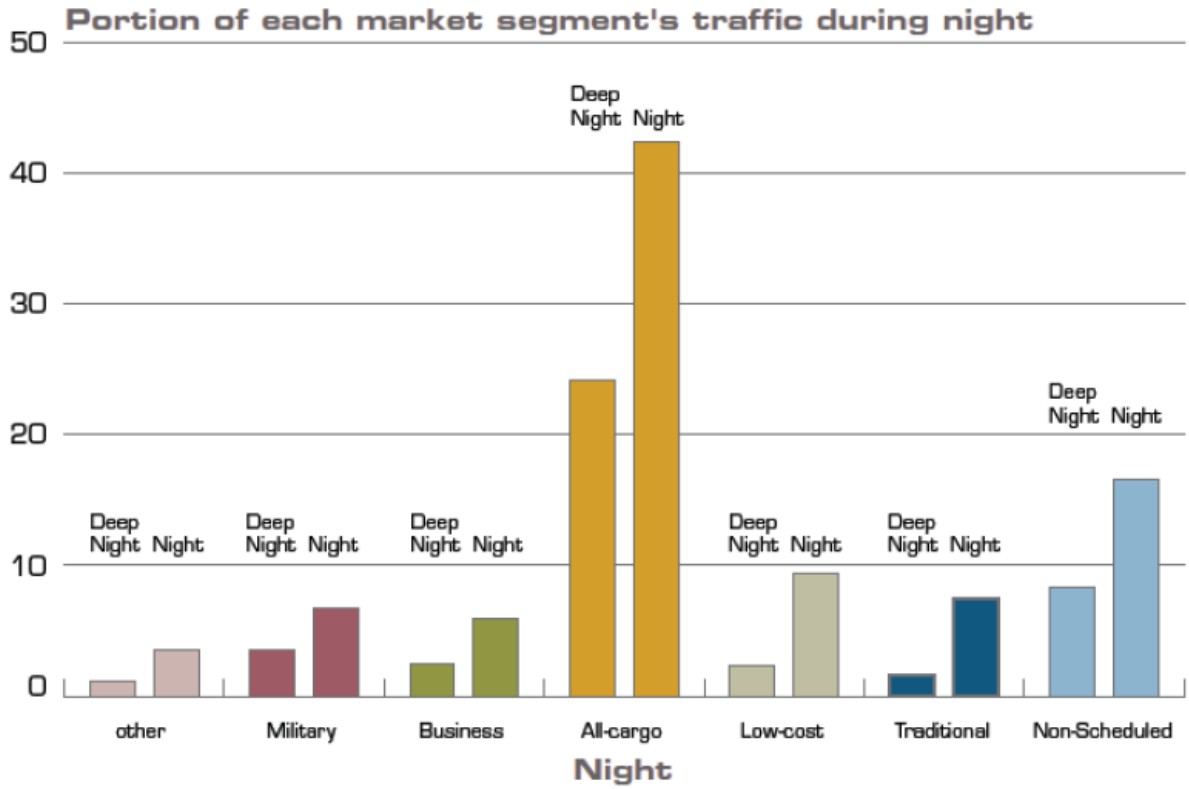
51 Box gives a range of real-world examples for the incorrect application of the Balanced Approach at a number of European airports.

52 In its survey of 138 airports in 2008, Eurocontrol has highlighted that, despite a 41% increase in airport capacity between 2007 and 2030, 11% of demand will not be accommodated in the most favourable scenario and 25% in the most challenging one. 19 airports will function at full capacity 8 hours/day in the former case; 39 airports in the latter. Source: Eurocontrol, (2008), Long-Term Forecast: IFR Flight Movements 2008-2030.

53 DLR (2011): "*Cargo flights in this data have been identified by classifying each flight based on the following rules: all-cargo operator, an aircraft type which is always all-cargo, an aircraft type which for particular operators is a cargo type, call sign which particular operators assign to their cargo flights. These rules do not cover belly-hold cargo. A major proportion of general freight, global and European mail air cargo is transported in the bellies of passenger aircraft on scheduled services. However, high value express freight is usually not carried in belly-holds. Therefore, this data should include a large proportion of this type of freight. cf. EUROCONTROL (2009), p. 18 et seq."*

competition among aircraft operators if decisions on noise measures are motivated by bias towards a particular, mostly home-based, operator.

Figure 5: Traffic during night by market segment[54]



57. Consumers will be adversely affected by suboptimal noise policies leading to unnecessary operating restrictions. Operating restrictions limiting the choice of the consumer could lead to higher prices due to increase in costs of airlines. Moreover there have been cases where operating restrictions have negatively influenced the safety of air travel[55].

58. Citizens in the vicinity of airports are directly affected by the various noise mitigation options. The impact may be quite differing for various communities. For instance, they can be affected by poor land-use planning decisions close to an airport, by additional costs to insulate properties, and by unexpected severity in noise impact leading to reductions in house value. A poor analysis of the problem may miss key aspects, e.g. where a problem is concentrated in a particular zone or during a particular time period, and may gear solutions towards the most vocal group instead of focusing on the reduction of the global noise impact – or impact on citizens of a neighbouring country. [56]

59. The development of areas surrounding airports is also affected as airports are essential to boost the local economy[57]. Industry has become increasingly reliant on overnight/24h delivery and dispatch of high-value documents, products and components to feed the 'just in time' production chain[58]. Operating restrictions may prevent the satisfaction of this

54 Reproduced in DLR (2011) based on Eurocontrol (2009) Trends in Air Traffic, Vol. 5, Fig. 16, p. 30.

55 See Box .

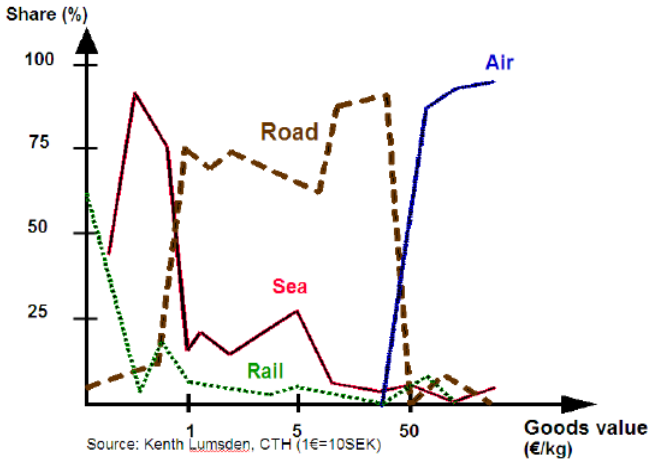
56 In a recent petition, a German citizen complained that the traffic at Weeze airport was so regulated that the noise impact was less felt in the Netherlands at the expense of German citizens.

57 York Aviation, 2004, The social and economic impact of airports in Europe.

58 MPD Group Ltd, (2005), *'Assessing the economic costs of night flight restrictions'*, London, p. 24.

demand. As shown in Figure 6, the transport of high value goods is principally carried out by air. According to OECD estimations while only 3% of all globally traded goods are currently transported by air, this part represents 40% of the value of these goods[59].

Figure 6: Value of goods in relation to transport modes[60]



60. Finally, due to the network characteristics of the transport system, aviation operations across the whole of the EU are impacted by the effects of operating restrictions of a given airport. Depending on the characteristics of the airport (hub, regional airport), the ripple effects and associated costs for airlines, airports and industry to adapt to the new conditions could be considerable. There could be a loss in overall efficiency of the air transport system leading to a permanent increase in costs for airlines and in unnecessary emissions from aircraft. Figure 7 shows the impact of the closure of three (out of six) runways at Amsterdam airport, after the noise limits were reached sooner than expected. The measure had to be urgently withdrawn after two weeks in effect: it caused havoc throughout the European aviation system, where average delays soared from the standard 2-3 minutes to more than 30 minutes for departures and up to 50 minutes for arrivals. The cost of this measure can be estimated to be in the range of €1bn[61].

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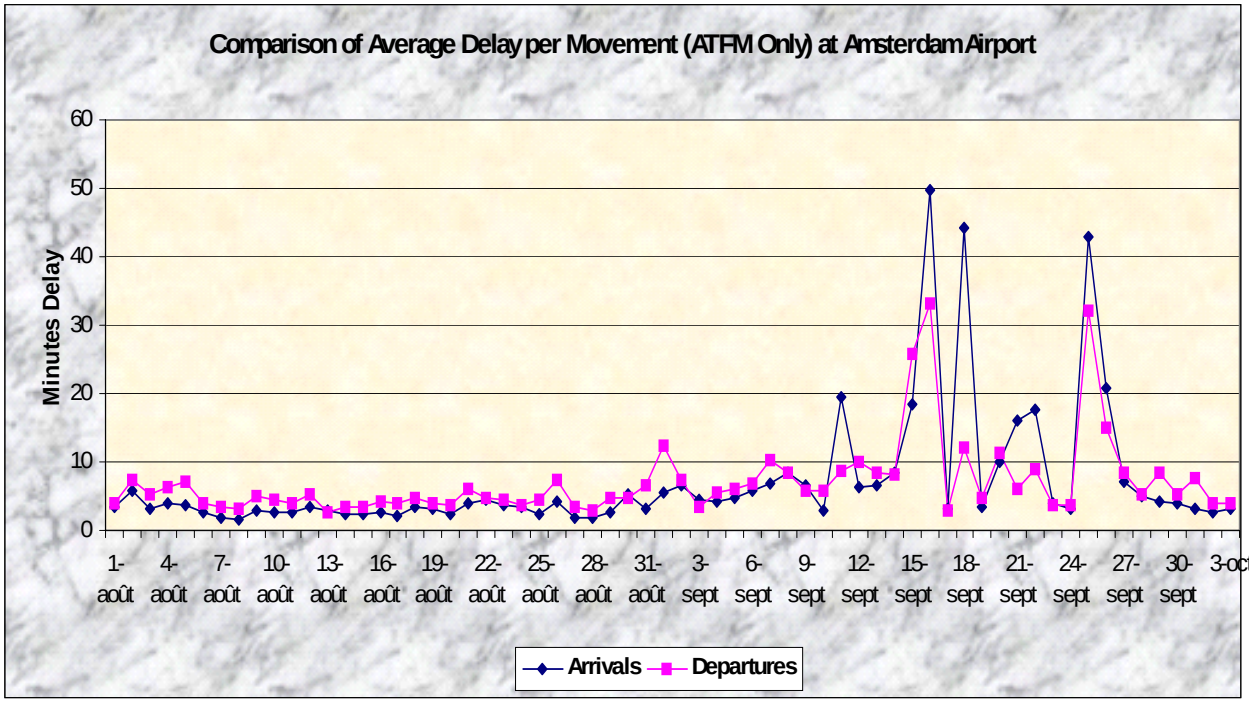
59 Oxford Economic Forecasting (2004).

60 As reproduced in the presentation of ACEA at the second large stakeholder meeting of 10 Nov 2009 of the project 'EU Transport GHG:Routes to 2050'.
http://www.eutransportghg2050.eu/cms/assets/ACEA-EU-Transport-GHG-2050.pdf

61 Own cost calculations based on €100 per minute delay with an average of 30 minutes for 20,000 daily flights during two weeks. Such average delays indeed lead to these costs, as they hide the huge number of missed connections, cancelled meetings and shortened holidays.

Figure 7: Ripple effects of local noise restrictions on the European aviation network[62]



2.4. What if present trends continue?

61. The Commission has carried out an analysis of possible future developments in a scenario based on unchanged policies, the so-called 'baseline scenario'.

62. Aviation activities are expected to continue to grow[63]. Economic growth and increasing need for connectivity are likely to make European citizens fly more. So the need to carefully balance the welfare effects of aviation against noise nuisances will grow. The growing demand for air traffic services, together with competition among airports and among airlines, will increase the cost of any inefficiency in the network. On the other hand, quality of life issue and noise induced health effects make a strong case for integrating these aspects into active noise management policies.

Table 3: ICAO forecasts of number of people affected by noise (in Million) in Europe – without substantial operational and technological improvements[64]

Noise level/Year	*2006*	*2016*	*2026*	*2036*
> 55 DNL	2.63	3.47	4.48	5.79
> 60 DNL	0.799	1.14	1.53	2.12
> 65 DNL	0.23	0.32	0.43	0.66

63. Excessive introduction of operating restrictions (curfews, night bans etc.) not targeting the noisiest aircraft due to obsolete definition of MCA and an extended phasing out period (further exacerbate the already challenging capacity crunch of the current air transport

62 Ibid footnote 61.

63 As shown in the Impact Assessment accompanying the White Paper on Transport (SEC(2011) 358 final).

64 Source: CAEP/8 – Information Paper 8 – expressed in Day-Night average noise levels (DNL) – baseline scenario, without substantial technology or operational improvements – ICAO European region

system artificially. These operating restrictions create economic competitive disadvantages for aircraft operators as well as for the relevant airports and the regions.

64. Moreover, they act as a considerably limiting and cost increasing factor as airlines need to preserve sufficient margin to cater for delayed flights; a banned delayed flight leads to extra passenger entitlements and crew costs. Failure to provide sufficient capacity as a measure to curb throughput will tend to reduce flight efficiency and reduce system resilience to perturbations (e.g. volcanic ash or severe weather). Ultimately this could lead to the abandonment of certain routes, in extreme cases, relocation[65].The considerable differences and deficiencies in the way the present rules on noise abatement analysis are interpreted and put into practise and how stakeholders are involved in the decision process implies that, in addition to MCA problems mentioned above, there is considerable risk that noise abatement policies in airports will continue to be inefficient in the future. As noise problems due the expected increase in aviation activities (cf. table 3) will grow, it is important that the desired noise level at airports is achieved at minimum costs.

65. Finally, without the update of the definition of MCA, a signal would be lost for airframe and engine manufacturers, which further stimulates innovation in noise reduction at source by providing a predictable investment framework. This risks leading to a situation where aircraft do not improve their noise performance. Indeed, while large body aircraft demonstrate substantial improvements in noise performance to satisfy local requirements, short and medium-range aircraft have not had significant noise improvement over the past two decades. The noise certification levels of this category have plateaued[66]. The technology is proven cost-effective, but there is not sufficient incentive to use the best available technology on the full range of aircraft[67].

66. Drawing on their currently use shown on Figure 8, it is unlikely that there will be fewer operating restrictions in the future.

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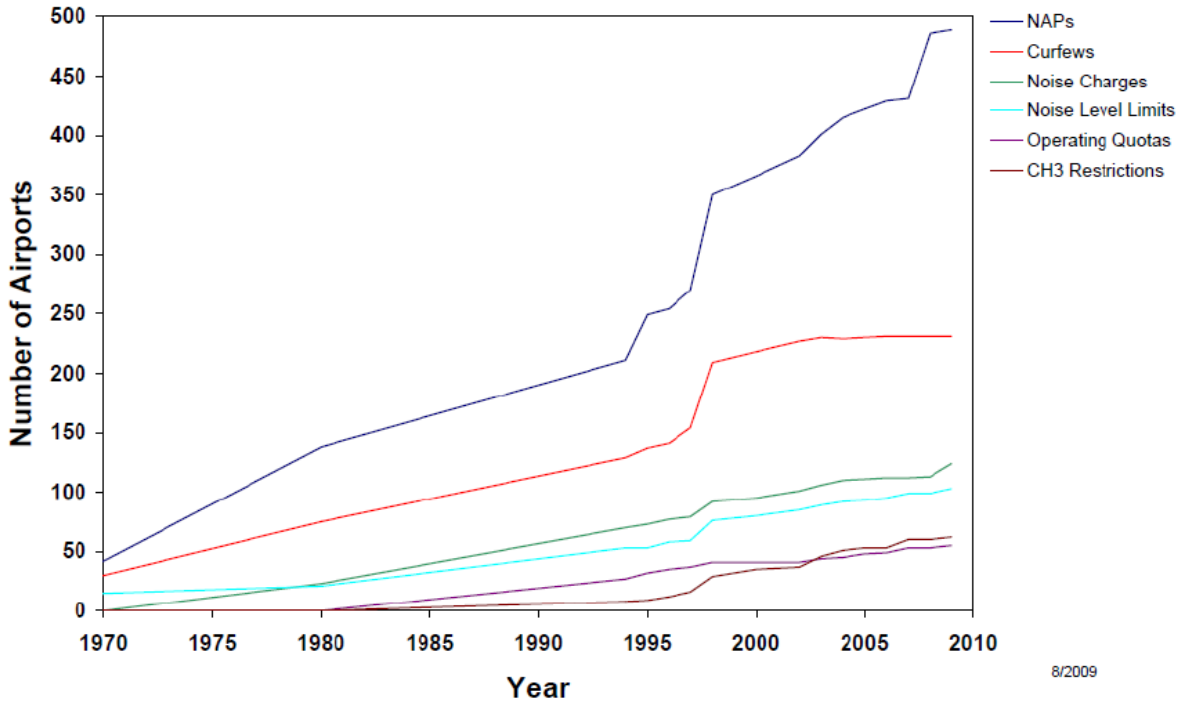
65 A prominent example is DHL and the relocation of its European hub from Brussels to Leipzig/Halle Leipzig in 2008. The decision resulted from the implementation of an operating restriction. According to estimates, Brussels airport DHL's hub function at Brussels contributed in 2003 to the regional and national economy by a direct value added of € 273 million, an indirect value added of € 121 million and a catalytic value added of € 600 million. DLR (2011).

66 Source: CAEP/8 – Working Paper 74, p; 3.

67 CAEP8 Working Paper 74, 2010, "*Proposed Noise Stringency Options for CAEP9*", Paper introduced by EC, FR, DE, IT, NL, NO, PO, ES, SV, CH and UK, 5 p. + annexes.

Figure 8: Growth in airport noise restrictions[68]



2.5. The EU's right to act

67. The necessity to act at European level in relation to noise-related operation-related operating restrictions was recognized in 2002 with the adoption of Council Directive 2002/30/EC on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports. This Directive contributes to the proper functioning of the European air transport system. It responds to the objective Articles 90 and 91 of the Treaty on the Functioning of the European Union (TFEU).

68. According to Article 4 of the TFEU, EU action regarding noise-related operating restrictions, as part of the common air transport policy, has to be justified. EU action is only necessary to the extent that the internal market is affected by non-harmonised procedures to introduce noise-related operating restrictions at EU airports. In the present case, it is therefore necessary that the subsidiarity principle set out in Article 5(3) of the Treaty on the European Union is respected. This involves assessing two aspects.

69. Firstly, it has to be assessed if the objectives of the proposed action could not be achieved sufficiently by Member States in the framework of their national constitutional system, the so-called "*necessity test*". In the present case, this justification centres on the need to ensure that international rules and procedures are implemented by Member States in a uniform and efficient manner in order to provide EU and non-EU operators with a level playing field.

70. Secondly, it has to be considered whether and how the objectives could be better achieved by action on the part of the EU, the so-called "*test of European added value*". The EU's added value of the present initiative should consist of implementing measures that take into account the situation of different airports while, at same time, ensuring that noise-related

68 http://www.boeing.com/commercial/noise/restrictions.pdf

operating restrictions are implemented in a cost-effective way at locations where the noise situation requires action and the appropriate, locally-tailored balance is found between the various transport and environmental policy objectives. Any individual action at the Member State level would have the potential to prejudice the functionality of the internal market.

3. OBJECTIVES

71. Section 2 has shown that the rules and procedures laid down by the Directive on the way EU airports introduce operating restrictions today are not applied in a consistent manner and their impact is limited[69]. This is particularly felt at two levels. First, the specific rules on MCA are no longer effective. Second, in the current legal framework, the analysis of available data shows that the assessment of possible noise-related measures by airports is not done in a consistent manner. The scope of the initiative is limited to improving the functioning of the existing Directive, and more in particular, the functioning of the two main instruments (the set of rules and procedures for the introduction of operating restrictions at Community airports, and the specific rules aimed at the withdrawal of MCA).

72. This section defines the general, specific and operational policy objectives of the proposed initiative, and verifies their consistency with other EU horizontal objectives. An overview on their relationship with the identified problems is provided in Table 4.

3.1. Policy objectives

General policy objective

73. As indicated above, the proposed initiative should fit in a specific regulatory framework defined by ICAO obligations, by Article 5 of the Treaty on European Union on the principles of subsidiarity and proportionality and by the umbrella Directive on EU noise policy (i.e. the Environmental Noise Directive)..

74. In this context, the general policy objective of this initiative is to harmonise and strengthen further the common rules and procedure related to the introduction of noise related operating restrictions at EU airports as part of the noise management process, thereby promoting the most cost-effective noise-related solutions to merely achieve established noise quality objectives as established by EU, national and local rules

Specific policy objectives

75. In light of the root causes of the problems that have been identified in section 2 above, the general objective of the proposed initiative can be translated into more specific goals:

(1) Make the set of rules on MCA effective by revising the definition of MCA and the associated phasing-out provision[70];

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69 See in this respect the Report from the Commission to the Council and the European Parliament - Noise Operation Restrictions at EU Airports (Report on the application of Directive 2002/30/EC) COM(2008)_66

70 This would involve the revision of Article 2 (d) and Article 6 on "*Rules on the introduction of operating restrictions aimed at the withdrawal of MCA*".

(2) Ensure that operating restrictions are considered at airports with broadly comparable noise problems in a consistent manner by:

- clarifying how to carry out a noise assessment process;
- strengthening the procedural framework leading to the introduction of operating restrictions.

Operational policy objectives

76. In order to evaluate the progress made towards achieving the general and specific policy objectives, the following operational policy objectives are proposed:

- The share of new curfews to total operating restrictions should be substantially reduced by 2020;
- To achieve the noise objectives, airports often apparently have to use the remaining possibilities, i.e. putting operating restrictions on less noisy aircraft or taking action such as noise abatement procedures, land-use planning. Therefore all new operating restrictions should include measures targeting MCA with the aim of maximising noise reduction.

Table 4: Mapping problem, drivers and objectives

Problem		***General objective***
The common rules and procedures laid down by the Directive on the way EU airports introduce operating restrictions today are not applied in a consistent manner and their impact is limited		Harmonise and strengthen further the common rules and procedure related to the introduction of noise related operating restrictions at EU airports as part of the noise management process.
Drivers to the problem		***Specific objectives***
Dr.1	The specific rules on MCA are no longer effective because:	*SO1* Target operating restrictions on the noisiest aircraft by:
	- The definition of MCA is obsolete	Revising obsolete definition of MCA
	- The associated phasing-out period is too long	- Choosing an adequate associated phasing-out period
Dr.2	The existing legal framework does not ensure that operating restrictions are considered at airports with broadly comparable noise problems in a consistent manner	*SO2* Ensure that similar operating restrictions are considered at airports with broadly comparable noise problems in a consistent manner by:
	- The existing rules on how to carry out a noise assessment process are unclear and imprecise	- clarifying and specify how to carry out a noise assessment process
	- The existing procedure to introduce operating restrictions is too weak	- strengthening the procedural framework leading to the introduction of operating restrictions

3.2. Consistency with horizontal objectives of the European Union

77. The ongoing revision of the Environmental Noise Directive (Directive 2002/49/EC)[71] has set the scene for this initiative.

78. The European aviation policy requires the same rules for all market players to ensure fair competition. Environmental policies form part of the aviation regulatory framework. Whilst local noise issues deserve local solutions, operators are entitled to have stability and consistency in the application in environmental standards.

79. Directive 2002/49/EC obliges Member States to identify industrial and transport sources of noise pollution, make noise mappings to identify the number of people affected, and take the required mitigating measures, especially in view of the long-term health effects.

80. The Commission report[72] on the implementation of the Environmental Noise Directive in accordance with Article 11 of Directive 2002/49/EC announced the revision of Directive 2002/30/EC on airport noise, "*which will, as part of the airport package, improve noise mapping on the basis of an internationally recognised method and data, and drive towards the adoption of cost-effective noise mitigating measure, taking into account internationally agreed standards to streamline the relationship between the airport noise directive and the Environmental Noise Directive. It will also update the definition of noisy aircraft ("MCA") in line with the current composition of the aircraft fleet*". The review of the Directive on airport noise will contribute to the setting-out consistent and ambitious National Noise Action Plans, as required by Directive 2002/49/EC.

4. DESCRIPTION OF POLICY OPTIONS

4.1. Establishing Policy Options

81. The logic of constructing the Policy Options reflects the interaction between the two problems. The phase-out period for operating restrictions on MCA has now become too long and the definition too outdated so as to render the targeting of operating restrictions on the noisiest aircrafts attractive and effective. Hence, to achieve the noise objectives, airports often apparently have to use the remaining possibilities, i.e. putting operating restrictions on less noisy aircraft. For example, at a major hub, in 2008, 4% of the movements contributed to 25% of the nuisance as measured in noise contours. Hence, the authorities could benefit from a new MCA definition harmonized at a stricter level and a swifter phase-out of the most annoying aircraft to see these replaced by the latest generation of aircraft which produce 75% less noise[73].

82. At the same time, the existing rules on noise assessment process are not sufficiently precise to make sure that the most cost-effective measures are considered and are tailor-made for the specific airport situation and the noise problems encountered. The noise climate could

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71 Further information on the European noise policy framework is provided in Appendix 3: Overview of international and EU policies affecting airport noise.

72 COM(2011) 321 final.

73 For this reason, many airports impose the use of chapter 4 compliant aircraft at night, like Paris CDG and Fraport. There are some cases known where the margin was increased up to minus 15 or even minus 17 in order to leave the airport open for aircraft which are by far less noisy than the current standard.

be improved through a better analysis of the noise problem and a more thorough analysis of the contribution of each of the available measures.

83. The Policy Options to be examined are constructed in order to address these problems in the most cost-efficient way. Therefore each Policy Option has two main components which tackle one of the problems each. Moreover, each Policy Option is designed to maintain at least the same noise climate as under a business-as-usual scenario (Policy Option 1), in other words, to maintain existing noise protection standards. What distinguishes the Policy Options is not the noise climate, but the intensity of intervention that, depending on the option, is higher on the first (MCA-related issues), and lower on the second problem (procedure-related considerations). As explained in Section 2, tackling the issues related to MCA (Problem 1) will enable fewer and/or better-focused operating restrictions affecting non-marginally compliant (less noisy) aircraft. Hence the significance of the issues related to the correct implementation of the Balanced Approach (Problem 2) for the latter aircraft decreases.

84. In light of the above, the Commission has identified three Policy Options – besides the baseline scenario – that combine specific EU actions across the two policy areas described above. By construction, the Policy Options described below are capable on a standalone basis to address the two drivers identified in section 2, and to reach the specific objectives defined in section 3 above. An overview of the Policy Options is provided in Table 5.

Policy Option 1: No additional EU action

85. Policy Option 1 assumes the continuation of the Directive unchanged. The developments foreseen under this Policy Option are presented in Section 2.4.

Policy Option 2

86. Policy Option 2 includes the revision of Article 2[74] to amend the definition of MCA. This Policy Option foresees the new definition to be based on a very ambitious noise certification limit of Chapter 3 with a cumulative margin of not more than 12 EPNdB[75]. This reflects the trend of the last 10 years where the number of movements performed by Chapter 3 aircraft in the EU has steadily fallen to about 10% in 2010. This lower margin would mean a greater coverage of aircraft movements. Article 6 on the phase-out requirements of MCA would be shortened by one year.

87. Concerning the second problem identified in Section 2, in order to ensure that existing rules on how to carry out a noise assessment process are clearer and more precise, the Policy Option foresees the establishment of an EU-level support cell. This cell will act as a helpdesk and will assist airports and Member States by providing advice[76] on how to best carry out the appraisal required by the Balanced Approach; manage central databases on aircraft noise performance to ensure consistent noise performance information for aircraft including certification margin values for use locally; and supply the necessary modelling

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74 Ibid footnote 35.

75 Please note that Chapter 3 -12 EPNdB is not necessarily compliant with the Chapter 4 standard as it requires that the -10 EPNdB cumulative margin from the Chapter 3 limit is achieved by reduction of noise at least at two of the three different points (approach, lateral and fly-over) of measurement. Further explanation on measurement is provided in Appendix 4: Glossary.

76 The advice would inter alia relate to the noise mapping and cost-benefit analysis.

software and related technical guidance to perform noise mapping around airports. With the creation of this EU support cell, the Commission will be able to spread good practice in considering the most cost-effective measures.

88. With the aim of ensuring that the existing procedure to introduce operating restrictions is sufficiently stringent, Policy Option 2 foresees the revision of the wording of the Directive so that sufficient legal clarity for court proceedings is provided in case of infringement cases need to be launched by the Commission. In addition, the Policy Option foresees an additional provision on the scope of the stakeholder consultations required for measures covered by the Directive

Policy Option 3

89. Policy Option 3 also includes the revision of Article 2[77] to amend the definition of MCA. This Policy Option foresees the new definition to be based on a less ambitious noise certification limit of Chapter 3 with a cumulative margin of not more than 10 EPNB. Article 6 on the phase-out would also be amended to allow for a complete phasing-out of marginally-compliant aircraft within 2 years.

90. Concerning the second problem identified in Section 2, similarly to Policy Option 2, in order to ensure that existing rules on how to carry out a noise assessment process are sufficient, the Policy Option foresees the establishment of an EU-level support cell.

In addition, with the aim of ensuring that the existing procedure to introduce operating restrictions is sufficiently stringent, it foresees the right of scrutiny for the Commission to check whether the authority followed the noise assessment process and temporarily suspend the implementation of an operating restriction, mirroring the provisions of Regulation No. 1008/2008[78]. In addition, the Policy Option foresees an additional provision on the scope of the stakeholder consultations required for measures covered by the Directive. Policy Option 4

91. Policy Option 4 also includes the revision of Article 2[79] to amend the definition of MCA. This Policy Option foresees the new definition to be based on the least ambitious noise certification limit of Chapter 3 with a cumulative margin of not more than 8 EPNdB. Article 6 on the phase-out would also be amended to allow for a complete phasing-out of marginally-compliant aircraft within 2 years.

92. As for the second problem identified in Section 2, similarly to Policy Options 2 and 3, in order to ensure that existing rules on how to carry out a noise assessment process are sufficient, the Policy Option foresees the establishment of an EU-level support cell.

93. In addition, with the aim of ensuring that the existing procedure to introduce operating restrictions is sufficiently stringent, it foresees the need for the Commission to grant prior authorization to any operating restriction. In addition, the Policy Option foresees an additional provision on the scope of the stakeholder consultations required for measures covered by the Directive.

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77 Ibid footnote 35.
78 Ibid footnote 50.
79 Ibid footnote 35.

94. The difference compared to Policy Option 3 is that under the latter Commission would review the noise assessment process (appropriate consultation, adequate noise mapping methods and data used, fair cost-benefit analysis methods and values used). Under Policy Option 4, the Commission would effectively take a decision on a concrete noise operating restriction ("grant prior authorization"). Hence, under Option 3, the Commission protects the assessment rules and procedures; under Policy Option 4 the Commission would assume the full political responsibility of confirming or refusing operating restrictions. The right to suspend the measure prior to its implementation is a necessity under both Policy Option 3 and 4, as the measures may have lasting effects on safety, competition and the network capacity. Both options will clearly identify the actors and their tasks and responsibilities in the decision-making process. This will provide sufficient legal clarity for court proceedings in case of infringement cases need to be launched by the Commission.

4.2. Discussing the legal instrument

95. The European legislation on airport noise is currently in the form of a Directive (Directive 2002/30/EC). This choice of the legal instrument has partly led to the large heterogeneity in the way operating restrictions are introduced in Europe, since the Directive in question leaves a wide margin of interpretation to the Member States in the implementation. One of the consequences of this heterogeneity, described above, is the excessive use of operating restrictions.

96. In order to address the problems identified above, Policy Option 3 and 4 proposes to give the right to the Commission for scrutiny. This is motivated by the fact that if the cost-effectiveness of an operating restriction is not demonstrated taking into account other noise management instruments, the Commission would need to ensure that such a measure can be suspended until the assessment process is done in a correct way. Transparent, EU-wide applicable and interpreted criteria would need to be established on the possibility of suspending an operating restriction.

97. Moreover the fact that the Policy Options foresee an update of the definition of the MCA. This definition would need to apply equally in all Member States, being a technical standard which is agreed by the same Member States in ICAO. Reflecting on the likely future need to amend this definition in order to keep up with scientific progress and the autonomous renewal of the aircraft fleet, all Policy Options foresee the possibility of updating the definition of MCA through delegated act by the appropriate Committee. Given the potential impact of any such update on aircraft operators, the proposal will be accompanied by a proportionate Impact Assessment carried out by the Commission.

98. On the basis of the above argumentation, a Regulation would probably be a more appropriate tool for translating the policy changes into legislation. [80]

Table 5: Mapping objectives and Policy Options

Specific Objectives	*Policy options*		
	PO2	**PO3**	**PO4**
Make the specific rules on MCA			

[80] Airlines, including express carriers, favoured the transformation of the directive into a regulation, if legislative action was deemed necessary.

effective by*:*			
revising the obsolete definition of MCA	Change the definition of MCA to include aircraft below Chapter 3 -12 EPNdB standard	Change the definition of MCA to include aircraft below Chapter 3 -10 EPNdB standard	Change the definition of MCA to include aircraft below Chapter 3 -8 EPNdB standard
choosing an adequate associated phasing-out period	Complete phase-out allowed within 4 years	Complete phase-out allowed within 2 years	Complete phase-out allowed within 2 years
Ensure that similar operating restrictions are considered at airports with broadly comparable noise problems in a consistent manner by:			
-strengthening the procedural framework leading to the introduction of operating restrictions	Establishment of EU-level support cell for the implementation of the BA	Establishment of EU-level support cell for the implementation of the BA	Establishment of EU-level support cell for the implementation of the BA
-clarifying and specify how to carry out a noise assessment process	Additional rules on the scope of the stakeholder consultation	Additional rules on the scope of the stakeholder consultation	Additional rules on the scope of the stakeholder consultation
	Higher legal certainty for infringement procedures	COM right of scrutiny with suspension possible until revised assessment is found adequate	Mandatory COM scrutiny and prior authorisation

5. IMPACT ANALYSIS OF POLICY OPTIONS

99. This section provides an assessment of the economic, social, and environmental impacts of the Policy Options identified in section 4 that is proportionate to the scope of the proposed initiative being of a procedural nature. The assessment of those impacts is supported by quantitative data and/or by academic research where necessary. Table 10 presented at the end of this section summarises the results of the assessment of impacts.

5.1. Impact on the implementation of the Balanced Approach

100. As explained in previous section and shown on Figure 2, the Directive acts under the umbrella of the Environmental Noise Directive. It sets out provision on one of the four main pillars of ICAO's Balanced Approach to noise management at EU airports: operating restrictions. The scope for noise-related EU action with respect to certain type of measures such as land use planning, operational procedures or insulation programmes (Pillars 1 and 2 of the Balanced Approach) is limited for subsidiarity and proportionality considerations. On Pillar 3 (reduction of noise at source), it is ICAO who sets noise standards for aircraft. Therefore the impact of the proposed Policy Options on the overall implementation of the ICAO Balanced Approach is assessed separately.[81]

101. In light of improved EU-level oversight of Policy Option 4, this option is most likely to have the greatest positive effects on the implementation of Pillar 1 and 2. This is because it would ensure that noise management instruments such as land use planning and operational measures are considered as part of the assessment required for introducing operating restrictions.

102. With regards reduction of noise at source, Pillar 3 of the Balanced Approach, Policy Option 2 would send a signal to ICAO that the update of noise standards should be continued.

5.2. Economic impacts

103. Over the last decade, the number of movements performed by Chapter 3 aircraft in the EU has steadily fallen to about 10% in 2010 or about 420,000 movements[82]. Reflecting this trend, Policy Options 2, 3 and 4 propose revising the coverage of the definition of MCA, currently set at Chapter 3 -5 EPNdB, to Chapter 3 -12, -10 and -8 EPNdB, respectively. The lower the margin is set, the greater the coverage of movements, i.e. Chapter 3 -5 EPNdB covers the least movements.

104. While the most important economic impact is likely to be on aircraft operators, the impacts of noise measures in Policy Options 2, 3 and 4 are not limited to the particular airport or the region where the affected airport is located. As aviation is a network industry, the wider impact of operational restrictions at a particular airport could in principle have consequences over the whole European network[83]. In addition to the effects on the affected

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81 All industry stakeholders stressed the need for more coherence between the different pillars of the Balanced Approach.

82 See Table 2: Movements by aircraft in the EU according to noise standard – evolution 2002-10.

83 See paragraph 60 for further details.

airports and the airlines using this airport, the main economic impacts to be assessed should include the effect on the efficient functioning of the aviation network as a whole.

5.2.1. Impact on the efficient functioning of the European aviation network

105. The potential effect of revising the possibility to target operating restrictions at MCA on the aviation network in Europe depends basically on the number of airports resorting to this instrument, which airports and which of the policy three options is implemented. If a large number of airports comprising an important share of operations with MCA are introducing MCA restrictions it would put serious limitations on the possible traffic programmes which the airline industry could offer to the customers. This effect would be felt especially by airlines with a relatively large share of MCA in their fleet. It would be especially critical for these airlines if the operating restrictions were put in place in the airports functioning as important nodes in their traffic programme. These restrictions would probably lead to increased costs for these companies, but create opportunities for airlines with less noisy fleet. On the other side if only a few airports comprising only a minor share of the operations the effects on potential traffic programmes, the choice of customers and on the competition between airlines would be limited.

106. In comparison to Policy Option 1, it can be argued that Policy Option 2 would have the potentially greatest impact on the functioning of the European aviation system. as it would have the possibility to influence up to 10% of movements in the EU, depending on the number of airports implementing MCA operating restrictions. [84] However the phasing-out period would only be shorted by one year compared to the provision of the current Directive, allowing sufficient time for the overall adaptation of the system.

107. On the contrary, Policy Options 3 and 4 would allow significantly less time for phasing out MCA if an airport decides to apply an operating restriction targeting the nosiest aircraft. However, as shown on Table 6, the revised definition of MCA in these Policy Options would affect fewer aircraft movements, up to 8% and 2% respectively. Moreover, while an operating restriction can be implemented far quicker, both Policy Options require a wider stakeholder consultation prior such a decision than Policy Option 1.

Table 6: Estimated movements of MCA[85]

Aircraft type per noise limit	*Movements impacted on EU airports*
Chapter 3 minus 8dB	0 – 2%
Chapter 3 minus 10dB	2 – 8%
Chapter 3 minus 12dB	6 – 10%

108. Looking at individual aircraft, raising the margin even up to -12 EPNdB would not affect great numbers of aircraft and hence disrupt the network. Raising up to -8 would affect older versions of the A321-100/200, the B737-400 and the MD82. A margin set at -10 would also affect a few B737-300s and some B747-400 (the overwhelming majority of

84 The decision to phase-out MCA is taken on an airport by airport basis, after a cost-effectiveness assessment. Airports then also can decide on the exact date of the introduction of such measures. Industry has expressed its opposition to a revised MCA definition of Chapter 3 minus 12 dB, also pointing to the risk of political problems.

85 Source: Eurocontrol – PRISME and CFMU data.

them have at least a 15.6 margin). A -12 margin would add the B747-400 freighter on the list of impacted aircraft, where also most of the individual aircraft would meet this standard, with margins up to 16.2.

109. To conclude, it is unlikely that there would be any significant disruptions in European air transport in any of Policy Options 2, 3 or 4. On the contrary Policy Options 3 and 4 would better safeguard protect the smooth functioning of the network due to enhanced scrutiny powers foreseen at EU level.

5.2.2. Impact on airport capacity

110. Demand currently exceeds capacity throughout most or all of the day at six European airports (London Heathrow, London Gatwick, Paris Orly, Milan Linate, Düsseldorf and Frankfurt). Some of this shortfall in these highly congested airports is specifically related to noise management measures. [86] Demand also exceeds capacity during peak hours at a number of other airports (Frankfurt and Munich)[87].

111. Policy Options 2, 3 and 4 could be all effective in ensuring that airports better utilize their capacity for an equal level of noise annoyance abated compared to Policy Option 1. This may result in less congestion and more revenues in particular at airports which face the highest capacity constraints.

112. On the other hand, this general positive economic impact will be partially offset by the increased administrative costs for airports. Under Policy Option 1, noise management in connection with the implementation of the present directive already entails some administrative costs. These costs are predicted to grow due to increasing complexity and complaint management requirements. [88]

113. Policy Option 2 mitigates this administrative burden through the establishment of an EU support cell which will provide central databases on aircraft noise performance[89] and the necessary software to perform noise mapping. Policy Option 4, on the contrary, will likely increase the burden for airports who would be obliged to seek prior authorisation from the European Commission. The likely magnitude of this impact is specified in Section 5.2.6.

5.2.3. Impact on aircraft operators

114. The further strengthening and harmonisation of the process leading to the introduction of operating restrictions as foreseen in Policy Options 2, 3 and 4 should allow increasing the cost-effectiveness of noise abatement measures. In addition transparency will be better enforced, which will contribute to a more predictable and stable investment climate. [90] Increased certainty concerning the regulatory environment would be achieved in particular in Policy Options 3 and 4. In these Policy Options, a wider stakeholder consultation would ensure the involvement of affected airlines in the establishment of noise-related operating restrictions at individual airports. In addition, the right of scrutiny for the Commission

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86 ACI stressed this issue.

87 Steer Davies Gleave, (2011), Supporting study for the impact assessment of revising Regulation 95/93.

88 Many stakeholders, both community groups of citizens living in the surroundings and airlines, complained about the lack of transparency of the noise management process.

89 Currently airports need to ask for the noise certification for each and every aircraft using their facilities.

90 Airlines stressed their willingness to invest in performing aircraft, but the standards should be harmonized and should not change overnight.

(reinforced under Policy Option 4 to the requirement for prior authorisation) would enable temporary suspension of measures that are rightfully contested by stakeholders.

115. The positive effect of a more stable and transparent EU-wide investment climate would be at least in the short and medium run decreased by the need to replace noisy aircraft in the airlines' fleets. Airlines normally have a long term investment programmes to steadily replace older (and noisier) aircraft[91]. Any change in the regulatory environment will require adaptation of these programmes. The extent of this adjustment is however very much dependent on the particular strategy adapted by the individual airline. In general, however, operators tend to use ICAO standards as benchmarks for investment purposes. As all Policy Options foresee to maintain this benchmark in the revised legislation, the adjustment required will be limited on this aspect.

116. Concerning the magnitude of the impacts caused by this adjustment, it is clear that Policy Option 2 would most heavily affect aircraft operators all other things equal as it would allow the banning of a greater number of noisier aircraft than Policy Options 1, 3 and 4. The effects would to a large extent depend on the number and the role (hub, spoke) of airports choosing to introduce MCA restrictions. Especially express cargo carriers could be seriously affected as they operate older aircraft, in many cases pensioned off passenger aircraft transformed into cargo carriers. The value of MCA would most likely drop through the anticipation of likely operating restrictions targeting these aircraft. As shown on Table 6 however, even if all aircraft that are noisier than Chapter 3 -12 EPNdB are assumed to be banned once this is made possible by the revision of the Directive, the number of affected movements would not exceed 10% of the total. Further details are provided in Appendix 8: Impact of defining MCA.

117. In general, raising the margin up to -8 EPNdB does not affect flag carriers.[92] Only Lufthansa is expected to be impacted on a smaller part of its B737-300 fleet when the margin is raised up to -10 EPNdB. Raising the margin up to -12 EPNdB does not have an additional impact.

118. Cargo operators would be affected more if the margin is raised up to -12 EPNdB, in particular some parts of the B747-400 freighters of Cathay Pacific and CargoLux. [93] The fleet of FEDEX and DHL consist mainly of Airbus 310-200 (margins of -14 EPNdB), McDonnell Douglas DC-10 (-15.5 EPNdB) and Boeing 757 (-18.6 EPNdB). The aircraft of charters and regional airlines have margins above -20.

119. To reinforce this conclusion, analysis has also been carried out to determine which aircraft types would be the most impacted by the change in the definition of MCA. The A321 and the B733 aircraft have been identified as the two most affected airframes. Table 7 shows the impact on some major airlines operating these aircraft differentiated according to Policy Options 2, 3 and 4. For Policy Option 4, it is clear that this negative impact would be extremely limited in comparison to Policy Option 1.

Table 7: Impact on airlines and aircraft types along the three Policy Options[94]

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91 See e.g. http://corporate.airfrance.com/en/sustainable-development/environment-and-climate/

92 This information mainly stems from the noise certification levels of aircraft at Heathrow airport and relates to individual aircraft. It does not relate to number of flights. Heathrow has a strict noise quota count system where the use of quieter aircraft is promoted.

93 Ibid footnote 92.

94 Eurocontrol, 2011, PRISME and CFMU data.

Airline	*Policy Option 2*		*Policy Option 3*		*Policy Option 4*	
	Absolute number	% of A321 fleet	Absolute number	% of A321 fleet	Absolute number	% of A321 fleet
Lufthansa	0	0%	0	0%	0	0%
Air France	21	100%	17	81%	0	0%
Iberia Airlines	18	100%	18	100%	0	0%
Alitalia	23	100%	0	0%	0	0%
British Airways	0	0%	0	0%	0	0%
Monarch Airlines	0	0%	0	0%	0	0%
Spanair	0	0%	0	0%	0	0%
Turkish Airlines	2	10%	2	10%	0	0%
	Absolute number	% of B733 fleet	Absolute number	% of B733 fleet	Absolute number	% of B733 fleet
Lufthansa	31	97%	0	0%	0	0%
Norwegian Air Shuttle	6	25%	2	8%	0	0%
Bmibaby	3	27%	1	9%	0	0%
Jet2.com	16	50%	1	3%	0	0%
Europe Airpost	5	31%	0	0%	0	0%
KLM	5	100%	0	0%	0	0%
Air Baltic	1	13%	0	0%	0	0%
Jat Airways	10	100%	0	0%	0	0%

5.2.4. Impact on airframe and aircraft engine manufacturers

120. Updating the definition of MCAs could as mentioned above change the investment programme of aircraft operators, bringing forward the purchasing of less noisier aircraft. [95] This would have a positive effect in the short to medium term on the turnover and sales figures of airframe and engine manufacturers, generating further employment opportunities.

[95] The newest generation of aircraft reduces both emissions and noise substantially – by some 25%. Some stakeholders expressed the concern that the search for emission reductions would go at the expense of noise reductions.

121. In terms of noise performance, one of the most recently introduced aircraft, the Airbus A380 has a cumulative margin of around 28dB[96], whilst some business jets have cumulative margins of between 30 and 40dB with regard to the Chapter 3 standard. This demonstrates that the necessary noise abatement technology already exists, but this needs to 'trickle down' from the large airframes to the medium-sized and smaller models. Substantially revising the definition of MCA, as foreseen under Policy Options 2 and 3, would give a signal that reducing noise will remain an important aspect of future airframe and engine development. It will also incentivise the timely renewal of the fleet generating additional market demand for quieter aircraft.

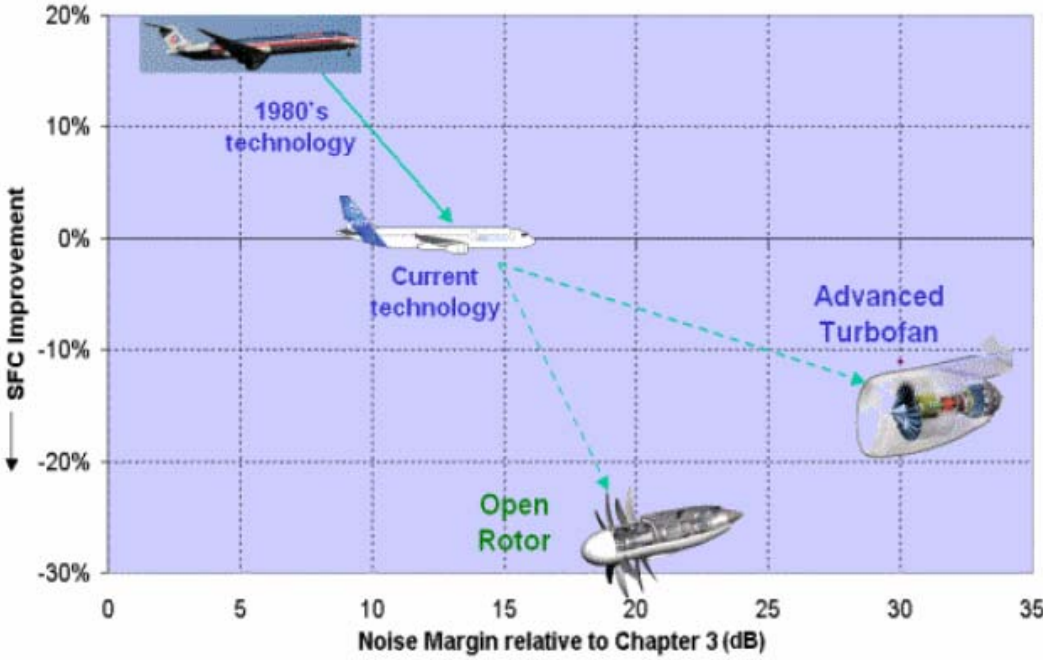
122. As for aircraft engines, there are now in principle major technologies[97] to further improve their noise performance, shown on Figure 9. While engine manufacturers will likely be impacted by more stringent noise measures in the longer run depending on their principal choice of technology investment, the Policy Options in this Impact Assessment would not at this stage have any significant effect, in addition to providing the signal on the future importance of noise abatement technologies. However, it is clear that new technology should deliver on both emissions and noise performance, and that they should not cause additional environmental harm.

Figure 9: Specific fuel consumption versus noise for open-rotor engine technology[98]

96 Depending on the exact Maximum Take-Off Weight.

97 The performance of the so-called “open rotor” engines needs to be compared with state of the art aircraft. However, open rotor might be limited to lower flight speeds hence their application will be limited to short-haul aircraft, where marginally increased journey times may be acceptable. Open-rotor technology is therefore affected by operational trade-offs as well as “emissions versus noise” trade-offs. Longhaul aircraft are more likely to continue to be powered by advanced turbofan engines where flight time, airport noise curfews and operational issues may preclude open-rotor solutions. Indeed, open rotor might lead to 'en route' noise, due to its specific noise profile caused by the counter rotating blades. The exact noise performance of open rotor is not yet publicly known. In this example, interdependencies prompt two potential solutions showing that fuel burn can be decreased at the expense of noise compared with equivalent technology turbofans. Source: Advisory Council for Aeronautics Research in Europe, 2010, Aeronautics and Air Transport: Beyond Vision 2020 (Towards 2050), Background Document.

98 Rolls-Royce as shown Advisory Council for Aeronautics Research in Europe, 2010, Aeronautics and Air Transport: Beyond Vision 2020 (Towards 2050), Background Document p. 65.



5.2.5. Impact on innovation and research

123. In 2001, the Advisory Council for Aeronautics Research in Europe set the target of achieving by 2020 "a reduction in perceived noise to one half of current average levels". In line with this goal, substantial R&D and deployment efforts have been undertaken, for instance through the Clean Sky Joint Technology Initiative[99] by developing quieter aircraft; and through the SESAR Joint Undertaking[100] by producing the new ATM system enabling better noise performance through innovative operational measures. While both Policy Option 2 and 3 would in particular incentivise action to reduce noise at source through updating the definition of MCA, Policy Option 3 would in addition guarantee that operational measures are fully recognised and taken into account to assess the cost-effectiveness of operating restrictions through the Balanced Approach.

5.2.6. Impact on administrative costs

124. Administrative costs are defined as the costs incurred by different stakeholders in meeting legal obligations to provide information on their action or production either to public authorities or to private parties. Information is understood in a broad sense, i.e. including labelling, reporting, registration, monitoring and assessment needed to provide the information.

125. The administrative costs are calculated as changes in costs compared to the baseline scenario. Additional costs for public authorities and airports are all considered.

126. The identification and assessment of administrative costs have as far as possible been following the steps in the EU standard cost model. A more detailed description of the calculation of administrative costs is available in Appendix 7: Revision of the Directive - assessment of administrative costs. The calculations are based on best available estimates

99 http://www.cleansky.eu/
100 http://www.sesarju.eu/

and assumptions. It should be stressed there is a considerable uncertainty in the calculations.

127. The estimated yearly change in administrative costs associated with each Policy Option is shown in **Error! Reference source not found.**.

Table 8: Change in yearly administrative costs

Euros/year	*Policy option 2*	*Policy option 3*	*Policy option 4*
1. Support cell	*1,000,000*	*1,000,000*	*1,000,000*
1 a. Establish support cell	0	0	0
1 b. Annual update of support cell	40,000	40,000	40,000
1 c. Impact of support cell on operating costs	- 40,000	- 40,000	- 40,000
1 d. Mandatory modelling	1,000,000	1,000,000	1,000,000
2. Stakeholder consultation	*800,000*	*800,000*	*800,000*
3. Notification procedure	*0*	*1,200,000*	*2,400,000*
3 a. Change in notification procedures	0	1,200,000	0
3 b. Change in notification procedures	0	0	2,400,000
Total	**1,800,000**	**3,000,000**	**4,200,000**
Private sector	**14 %**	**8 %**	**6 %**
Public sector	**86 %**	**92 %**	**94 %**

128. The aggregate annual administrative cost in relation to the support cell gives rise to administrative costs to airports and airlines in the EU due to increased information obligations. At the same time there will be an annual reduction in costs of around the same size to airports performing a noise assessment in line with the Balanced Approach. The information obligation and the costs will fall on all major airports and airlines while the savings will be concentrated on the airports obliged to perform an analysis of operating restrictions.

129. Mandatory utilisation of a noise modelling tool in assessing the impacts of the different noise abatement measures in all Policy Options will increase the costs. It is assumed that this will imply an average cost of € 50,000 for each assessment. This corresponds to the estimated cost of procuring this service from a consultant who would tailor the EU tool provided by the support cell to local conditions.

130. All Policy Options foresee a widening and deepening of the scope of stakeholder consultation. This measure would imply more specific demands on the existing national

rules, and would increase the cost per assessment for authorities in Member States due to information obligation, assessment of contributions and decision-making.

131. The change in notification and scrutiny procedure in Policy Option 3 and Policy Option 4 compared to the Policy Option 1 will raise the quality of the analysis which the authorities have to deliver.

132. It is assumed that the Policy Option 3 (scrutiny) would give rise extra cost for public authorities due to information exchange with Commission, preparation of supplementary material, meetings in Brussels etc. These activities would probably involve different specialists and management levels from the Member States, hence a close to average hourly rate can be assumed. It is assumed that the Commission scrutiny will amount to 1 man year distributed on different specialists within the Commission at large. This would be in line with the current efforts to monitor the implementation of the directive and undertake noise related action.

133. Policy Option 4 (prior authorisation) is assumed to give rise to the same type of costs as mentioned above, but it clearly would be more demanding on the Member States. The Commission would take greater responsibility and would probably have to ensure that the information and analysis supporting the decisions are correct. It is assumed that the workload for the Commission will amount to 1-2 man year distributed on different specialists, as every decision on an operating restriction would become subject to Commission analysis.

134. In addition to a change in the annual administrative costs, all Policy Options would imply a very modest initial data collection aiming at adjusting already existing data for this specific purpose, refinement of existing Eurocontrol data, and the validation and update of this information on a recurrent basis. Data has to be supplied by airports, aircraft manufacturers, international organisations and public authorities in Member States. The baseline scenario does not contain administrative costs for this purpose. The one time cost is assumed to be € 120,000.

5.2.7. Impact on EU budget

135. The EU budget would be affected by Policy Options 2, 3 and 4 compared to Policy Option 1. The effect on the budget is due to the establishment of a support cell and to the staff necessary for the increased supervision (Policy Option 3) and enhanced control (Policy Option 4), being the lowest in Policy Option 2 and the most significant burden in Policy Option 4. Nevertheless, the impact of the proposal on the EU budget will be fairly limited, as the assessment tools, the required data and the evaluation efforts have already been developed and will also be used for other purposes. Databases on noise performance, noise mapping software, a multi-airport model[101] already have been developed by Eurocontrol[102]. They can be used by the SESAR Joint Undertaking to assess the performance of new air traffic systems or by the Single European Sky Performance Review Body to assess feasibility of setting performance targets and monitoring them with

[101] The Commission and Eurocontrol have jointly developed such model, which is currently used to assess noise stringency. The model would also be used to assess SESAR induced operational improvements and would allow assessing the interdependencies between noise and emissions.

[102] The current Eurocontrol framework agreement covers this action. The earmarked budget amounts to about €20,000 for the collection of additional data on noise.

appropriate incentives. The Commission has control over these tools. [103] In general these tools improve the environmental policy assessment capacity of the Commission.

136. The costs to the EU budget which are associated with the set-up of the support cell, could be quite limited if the cell was integrated in an existing structure like Eurocontrol or the Performance Review Body, estimated at around €100,000 per year. This estimate includes the cost of one full-time equivalent Commission official as well as IT costs. The above-mentioned Commission-Eurocontrol Framework Agreement already foresees support to National Supervisory Authorities.

137. In addition to this support cell, Policy Option 3 foresees the right of scrutiny for the Commission in case of a substantiated appeal. Such scrutiny would entail the verification of the national noise assessment process. This task is estimated to demand what corresponds to a full time Commission official and the associated overhead cost. Due to the relatively modest demand on resources it is expected that the financing could be found within the existing budget.

138. Under Policy Option 4 the task performed by the Commission would be more demanding. The task of the Commission would be to assess the quality of the data or the robustness of the methods used. Hence, the cost per decision would rise as compared to Policy Option 3, but the number of decisions would increase.

5.2.8. Impact on international relations

139. In Policy Option 2, MCA are defined as Chapter 3 -12 EPNdB, effectively encroaching on Chapter 4 aircraft. However, such an approach does not follow the ICAO resolutions[104] where Contracting States committed, at least for day operations, not to use restrictions on Chapter 4 compliant aircraft. ICAO resolutions are binding for all EU Member States which are ICAO Contracting States. A harmonized definition of MCA going beyond Chapter 3 as envisaged under Policy Option 2 could therefore lead to an international conflict with major aviation partners, in particular the United States.

140. Policy Options 3 and 4 are fully in line with ICAO commitments and requirements with regard to the definition of MCA, as well as to a strengthened application of the Balanced Approach.

5.3. Social impacts

141. In this section, the Commission will assess social impacts of the various policy options in the fields which affect primarily people, namely governance and participation, employment level and conditions and safety. The impacts of variation of noise pollution on human health are assessed in the section analysing environmental factors[105].

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103 For instance, STAPES is a multi-airport model to assess noise, developed by Eurocontrol and Commission. This model is currently used to assess noise stringency for new aircraft in the ICAO process. With a limited effort, the model could be used to assess both noise and the interdependencies noise/emissions for SESAR or for particular airports. The model could also be used for the implementation of the Environmental Noise Directive, delivering EU wide noise assessments.

104 Resolution 37-18 adopted during the ICAO Assembly of 2010.

105 When assessing social impacts in transport policy, no clear distinction can be made between social, economic and environmental impacts. For instance, a policy that reduces noise pollution induced by transport activities

5.3.1. Impact on governance and participation

142. Thanks to the strengthened procedure, an improvement is expected in the transparency of noise assessments. The possibility of involvement by all stakeholders, in particular citizens, would be guaranteed by the additional provision on the scope of stakeholder consultation foreseen in Policy Options 2, 3 and 4. The common procedures EU-wide would ensure the equal treatment of citizens confronted with decisions on airport noise management, irrespective of where they live.

5.3.2. Impact on employment level and conditions

143. Policy Options 2, 3 and 4 will likely have a positive impact on employment levels due to the positive effects outlined in Section 5.2.2, and 5.2.4[106]. The direct employment benefits in the air transport industry can be estimated to be around 1.53 million jobs in the EU; while indirect and induced employment is about 4.2 million in EU[107].

144. The better implementation of the Balanced Approach will provide more certainty for investment decisions, and will enable aircraft operators to organize their businesses in a more efficient flexible way. In particular abrupt and costly relocations will be more certainly avoided under Policy Options 3 and 4.

145. Concerning the profile of jobs provided, it is likely that in particular Policy Option 2 would generate additional employment outside normal business hours. Good working conditions will thus need to be maintained in order to avoid any possible negative impact on employees.

5.3.3. Impact on safety

146. Noise measures may have an impact on the safety of air transport. Despite clear ICAO requirements to give absolute priority to safety, there are cases where noise related measures interfere with safety decisions, namely if imposing specific characteristics on the final approach of the aircraft to airport, which is a safety critical phase. Through the better enforcement of the correct implementation of the Balanced Approach, Policy Options 3 and 4 would ensure that such conflicts are avoided.

5.4. Environmental impacts

147. The Policy Options may affect the environment in two principal ways through their impact on the noise climate and their influence on greenhouse gas and pollutant emissions.

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affects primarily the natural environment, but also human health. It has therefore both social and environmental impacts. In this context, and to ensure complete coherence with the methodology used in the Impact Assessment accompanying the recently adopted White Paper on Transport, the Commission assesses social impacts of the various policy options in the fields which affect primarily people, namely governance and participation, employment level and conditions and safety. The impacts of variation of noise pollution on human health are assessed in this section analysing environmental factors.

106 Further discussion on the employment effects of air transport are described in Appendix 3: Overview of international and EU policies affecting airport noise.

107 Air Transport Action Group, (2008), *The economic and social benefits of air transport 2008*, Geneva, 26p.

5.4.1. Impact on noise climate

148. As explained in paragraph 81, the underlying logic when constructing the Policy Options was to maintain at least the same noise climate as under Policy Option 1 as it is crucial to achieve established noise quality objectives. Given that the proposed initiative relates only to rules and procedure to be followed to introduce operating restrictions, the impact of Policy Options 2, 3 and 4 on noise contours will be highly dependent on the particular noise abatement measures adopted by the individual airports.

149. This dependence also holds for health impacts. Therefore the health impacts should be the principal element of noise assessments. Appendix 3: Overview of international and EU policies affecting airport noise highlights the crucial importance of noise impacts on human health and the contribution of aviation to noise pollution.

5.4.2. Impact on greenhouse gas and pollutant emissions

150. Noise and emissions are conflicting objectives in the design of both airframes and engines (do manufacturers optimize in terms of fuel consumption or in terms of noise) and in the adoption of noise mitigating measures (does air traffic management provide for the shortest routes (which are likely to be least costly in terms of emissions) or for somewhat longer routes to avoid noise impact on the communities on the ground, or stack aircraft in the air as long as the night ban lasts).

Manufacturers need to be incentivised to try to achieve both noise and emission reduction, as encouraging the use of quieter aircraft can lead under the current state of technology to fewer emissions. The latest generation of jets is significantly better in terms of both noise and emissions.

Table 9: Synergies and trade-offs between noise, local air quality and climate from various measures[108]

[108] IEA, 2009, Transport, Energy and CO_2. Moving Toward Sustainability. Chapter 7, Table 7-3.

	Noise	Local air quality	Climate
Nacelle modifications	• Reduced noise	• Increased HC & CO	• More fuel burn/CO_2
Increased engine pressure ratio & temp		• Increased NO_x • Reduced HC & CO	• Reduced fuel burn/CO_2
Reduce cruise altitude			• Increased fuel burn/CO_2 • Increased NO_x • Less increase in ozone • Reduced contrails
Increase engine bypass ratio	• Reduced noise	• Increased NO_x	• Reduced fuel burn/CO_2
New runways	• New noise exposures	• Reduced delay (fuel burn)	
Reduce polar flights	• Potentially increased noise exposures		• Less effects on stratosphere • More fuel burn/CO_2
Steep climb	• Reduced noise	• More fuel burn	• More fuel burn/CO_2
Continuous descent approach (CDA)	• Reduced noise	• Reduced delay (fuel burn)	• Reduced fuel burn/CO_2
Reduced thrust takeoffs	• Reduced noise	• Reduced NO_x • Reduced PM • Increased SO_x	• More fuel burn/CO_2

Positive effects
Negative effects
Mixed effects

151. On the other hand, it is recognised that in certain cases, measures taken to improve the fuel efficiency of aircraft and hence lower their emission, may negatively affect noise performance. Table 9 (and also Figure 9) highlights some of these trade-offs and synergies for operational measures. Many operational and technical measures have conflicting impacts: for instance, the Continuous Descent Approach benefits all three environmental (noise, local air quality and climate). Lightweighting also provides benefits across all areas, as do most types of aerodynamic improvement. In all other cases, trade-offs are necessary. The inclusion of aviation in the EU ETS from 2012 will in particular provide further incentives for lower fuel burn, which in some cases will counteract the effectiveness noise management instruments.

152. While this trade-off affects all Policy Options, Policy Option 4 is expected to be most affected since this Option introduces an increase in the cumulative margin to the noise standard of chapter 3 from five to eight in the definition of marginally compliant aircraft. Such a measure will unlikely to be a strong incentive and signal to develop and use quieter aircraft, and hence will necessitate more operating restrictions.

5.5. Conclusions

153. The results of the previous sections give the following picture of the impacts of the various Policy Options relative to Policy Option 1.

Table 10: Summary table of impacts compared to Policy Option 1

	Policy Option 2	*Policy Option 3*	*Policy Option 4*
Impact on the implementation of the Balanced Approach	Medium	Medium	High
Economic impacts			
Impact on:			
The efficient functioning of the European aviation network	Low	Low	Low
Airports	Medium	Medium	Low
Aircraft operators	Low	Low	Medium
Airframe and aircraft engine manufacturer	Medium	Medium	Neutral
Administrative costs	***Up to € 1,800,000/year***	***Up to € 3,000,000/year***	***Up to € 4,200,000/year***
EU budget	***Low***	***Medium***	***High***
International relations	***High***	Low	Low
Social impacts			
Impact on governance and participation	High	High	High
Impact on employment level and conditions	Low	Low	Low
Impact on safety	Low	Medium	Medium
Environmental impacts			
Impact on noise	Neutral	Neutral	Neutral
Impact on climate change	Medium	Medium	Neutral

Legend: negative impacts are identified as dark orange in bold italics.
"High" refers to high likelihood of significant impacts. "Medium" and "Low" mean lower probabilities for a significant impact to arise. The magnitude of impact will in all cases depend on the measures chosen through the discretion of local and national authorities, and aircraft operators.

6. COMPARISON OF THE OPTIONS

154. The analysis above has shown that the three Policy Options have clear economic, social and environmental impacts.

– From an economic point of view, Policy Option 2 seems to be overall preferable as it has the smallest increase in administrative costs. However this Policy Option can be regarded as challenging in terms of international relations. Policy Option 3 would avoid this negative impact on the external relations, but would pose an additional burden on the EU budget. This Policy Option would keep the administrative burden similar to Policy Option 1.

– Also from a social point of view, Policy Options 2, 3 and 4 have a similar impact. The only major difference in the effects stems from the extent to which operational measures

affecting the safety of aircraft are scrutinised. Policy Options 2 and 3 can be considered largely equivalent in this respect.

– With regard to environment, Policy Option 4 can clearly distinguished by the relatively high potential of negative impacts related to trade-off between operational measures addressing noise and climate change. Again, Policy Option 2 and 3 can be considered by and large comparable in relation to the environmental impacts.

155. This section provides for an assessment of how the policy options will contribute to the realization of the policy objectives, as set in Section 3, in light of the following evaluation criteria:

- **effectiveness –** the extent to which options achieve the objectives of the proposal;
- **efficiency –** the extent to which objectives can be achieved at least cost;
- **coherence –** the extent to which policy options are likely to limit trade-offs across the economic, social, and environmental domain.

6.1. Effectiveness

156. Table 11 gives a synthetic overview of the policy options' effectiveness with regard to the specific policy objectives defined in section 3. This shows that in terms of effectiveness, no clear priority can be established. This being said, Policy Option 3 appears to be the most balanced Policy Option because it offers the most appropriate pallet of actions to meet the defined objectives.

157. As regards the objective related to the rules on MCA, the effectiveness of the envisaged Policy Options is dependent upon their level of ambition in relation with the noise performance of aircraft. In this respect, Policy Option 2 is expected to score best because the revised definition of MCA is the strictest, that is the MCA will encompass aircraft, the noise performance of which will be below Chapter 3 -12EPNdB standard and therefore close to Chapter 4 aircraft. Accordingly, Policy Option 4 offers the lowest effectiveness being the least ambitious in terms of noise performance of aircraft whereas Policy Option 3 scores better than Policy Option 3.

158. As regards the objective related to the consistent introduction of operating restrictions at EU airports, the effectiveness of the envisaged Policy Options is dependent upon the degree of the quality control performed. Policy Option 4 offers the best possibilities in this respect because it benefits from its much stronger focus on the procedural framework, especially with the prominent role of the Commission in controlling the quality of the assessment process leading to the introduction of operating restrictions. The Commission will indeed be in charge of mandatory scrutiny and prior authorisation of any envisaged operating restrictions at EU airports. Compared to Policy Option 4, Policy Option 3 is less effective because the quality control will not be systematic. However, it will enable the Commission to focus its quality control on the most problematic operating restrictions. Policy Option 2 is expected to be by far the least effective because the scrutiny of the quality of the assessment process procedure will be performed ex post through infringement procedures.

Table 11: Effectiveness of envisaged Policy Options in light of specific policy objectives

Specific policy objectives	*Policy Option 1*	*Policy Option 2*	*Policy Option 3*	*Policy Option 4*
Make the specific rules on MCA effective by: - Revising obsolete definition of MCA - Choosing an adequate associated phasing-out period	neutral	high	medium	low
Ensure that similar operating restrictions are considered at airports with broadly comparable noise problems in a consistent manner by: - clarifying and specify how to carry out a noise assessment process - strengthening the procedural framework leading to the introduction of operating restrictions	neutral	low	Medium - high	high

6.2. Efficiency

159. Given that the proposed initiative is of procedural nature, the total cost of the envisaged Policy Options covers administrative costs (see section 5.2.6) and cost for the EU budget (see section 5.2.7).

160. In light of the estimations detailed above, Policy Option 2 appears to be the most efficient as it would bring about the smallest increase in administrative costs. However, this assessment does not take account the potential costs of an international dispute in the highly globalised aviation market, possibly negatively affecting EU aircraft operators.

6.3. Coherence

161. As shown on Table 10, Policy Option 3 is the most coherent, carefully balancing action to achieve the specific policy objectives. No significant negative impact is foreseen under this Policy Option, which therefore represents lowest trade-offs across the economic, social, and environmental domain.

6.4. Conclusion

Table 12: Comparison of options in terms of efficiency, effectiveness and coherence

Specific policy objectives	*Policy Option 1*	*Policy Option 2*	*Policy Option 3*	*Policy Option 4*
Effectiveness	neutral	low	medium	high
Efficiency	neutral	high	medium	medium
Coherence	neutral	medium	high	low

162. In light of the above and as summarised in Table 12, the preference is given to Policy Option 3 which performs under no criteria inadequately. Policy Option 3 appears in particular with respect to coherence, the most suitable Policy Option to achieve the objectives identified in Section 3.

7. MONITORING AND EVALUATION

163. The Commission will properly evaluate and review the Regulation five years after its adoption by the Commission. On top of the evidence produced in the framework of a scrutiny or appeal procedure on particular cases, the Commission will constantly monitor a set of core indicators which will be updated to trace the effectiveness of the regulation.

(1) In particular, in line with the operational policy objective that all new operating restrictions should include measures specifically targeting MCA, the evolution of the role that MCA play in the European aviation system will be monitored. This can be done through a set of concrete indicators:

- Noise certification: EASA has a publicly available data bank[109] on certification information, including noise performance, of all new aircraft types.

- Movements performed by MCA: Eurocontrol has information on all movements in the ECAC region (to be defined). This information can be combined with their PRISME data base, which is the Eurocontrol data warehouse holding information on movement numbers, aircraft types, airports, etc. [110]

(2) It is generally observed that political pressure points to a single solution to the noise problem – usually operating restrictions – while a thorough and refined analysis may lay the basis for considering a wider range of noise mitigating measures from which the most cost-effective can be selected. Therefore another operational policy objective requires that the share of new curfews to total operating restrictions should be substantially reduced by 2020. This can be monitored through the following indicator, which would also complement monitoring required by the first operational objective:

- The evolution of noise mitigating measures (based on number and policy mix). This information can be drawn from the Performance Plans under to Single European Sky legislation; from National Noise Action Plans; to be delivered under the Environmental Noise Directive; and from specific noise performance trend reports.

Table 13: Monitoring indicators

Key indicators	*Definition*	*Relevance*
Monitoring the noise performance of aircraft and quality of noise management policies		
Noise certification	This indicator shows the noise performance of new aircraft.	This indicator monitors the progress in noise performance of new aircraft.

[109] http://easa.europa.eu/certification/type-certificates/noise.php

[110] These two databases still need to be linked with a common key (with airport data) so that the noise performance of individual aircraft is known. This would in any case be required to assess noise performance of the Single European Sky.

Number of movements of MCA	This indicator gives the number of flights performed in the ECAC region of MCA (can be detailed per airport and airline).	This indicator shows trends in the use of MCA.
Overview of operating restrictions and the mix of noise mitigating measures	This new indicator would compile information from noise action plans and performance plans on the quality of noise mitigating measures.	This indicator would reveal the quality of noise assessment process.

164. Beyond the existing sources, the Commission is building up its monitoring and modelling capacity, including by gearing existing Eurocontrol expertise and data towards more precise noise (and environmental) assessment capabilities, including through the standing framework agreement with Eurocontrol. To summarize, Commission is responsible for the monitoring arrangements with the associated administrative costs, in particular by providing for adequate indicators for the noise annoyance in view of the implicit objective to keep low noise levels.

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9. APPENDICES

Appendix 1: Assessment of the application of the minimum consultation standards

- Clear content of the consultation process

1. The evaluation of Directive 2002/30/EC started five years after its adoption. It consisted of an implementation assessment, and a questionnaire sent to stakeholders. The views of stakeholders, indicating room for improvement, form the basis for the revision of the Directive.

- Consultation of target groups

2. All relevant stakeholders, as specified in Appendix 2: Details of the consultation process and outcome, have been able to participate in the consultation process. These stakeholders can be deemed adequately representative for aviation noise issues. Beyond Member States and aviation industry, also community groups and independent 'noise councils' were consulted.

- Publication

3. The results of the study and views of the stakeholders were reflected in COM(2008) 68.

- Time limits for participation

4. Stakeholders have been given three months time to provide written comments.

5. During 2010 until mid-2011 stakeholders were given the opportunity to confirm their positions. In addition, the scope of the consulted stakeholders was widened to also include community groups.

- Acknowledgement and feedback

6. Responses from stakeholders following the public consultations and stakeholder meetings have been acknowledged and most of the stakeholders' responses or background documents are publicly available on their websites[111].

- Main results and how these have been taken into account

7. The Commission has analysed the comments made, and the results of the consultation have been taken into account in assessing the different possible actions to improve the quality of the noise assessment measures. In addition, Commission services were able to count on the appreciated support of European Aviation Safety Agency, Eurocontrol and the SESAR Joint Undertaking.

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[111] See for instance: http://www.aea.be/assets/documents/positions/PP_00329.pdf; http://www.acnusa.fr/index.php/fr/qui-sommes-nous/publications/communiques/1384.

Appendix 2: Details of the consultation process and outcome

1. The most affected stakeholders concerning noise and aviation are airport community groups, airports, airlines (including air cargo), aircraft manufacturers and independent noise councils. These stakeholders were consulted in two phases.

2. In a first phase a general open consultation took place in 2007-2008. Article 14 of the Directive requires the Commission to report to the European Parliament and to the Council on the application of the Directive. The open consultation of stakeholders was done as a central part of the preparation of this report.

3. Interviews were conducted with 52 Community airports and a number of aviation industry representatives: [112]

- Association of European Airlines (AEA), representing the "mainstream" European scheduled service airlines;
- European Business Aviation Association (EBAA);
- European Express Association (EEA), whose full members are DHL, FedEx, TNT and UPS, hence representing the cargo carriers;
- European Regions Airline Association (ERA);
- Committee for Environmentally Friendly Aviation (CEFA);
- International Air Carrier Association (IACA), traditionally representing "leisure" (holiday/charter) airlines.
- Airports Council International

4. The result of this consultation formed part of a more general background study performed by MPD Group Limited. The report from the Consultant covering consultation and study was completed in October 2007. All stakeholders and stakeholder groups have been invited to send their reactions in the three months after the publication of the Report. The Report has also been published on the Internet[113].

5. In the second phase the main stakeholders which had responded to the open consultation were contacted again in the course of 2010-11 to see whether their 2008 positions were still valid and could be confirmed. In addition, the consultation was widened to the "Autorité de contrôle des nuisances sonores aéroportuaires" (ACNUSA); the Aviation Environment Federation, an European NGO representing national Community groups speaking on behalf of the affected population[114]; and the AeroSpace and Defence Industries Association of Europe (ASD), the European of equipment manufacturers.

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112 See especially chapter 5 of MPD Group Ltd (2007).

113 http://ec.europa.eu/transport/air_portal/environment/aircraft_noise_en.htm

114 Community groups are by definition focused on particular airports and are not able to take a substantiated position on EU legislation. There are a few NGOs who are able to do so. For aviation noise one of the most active is Aviation Environment Federation. This NGO shares the work with other NGOs like T&E to follow European policies. Other, not noise-specific environmental organisations did not reply to the open consultation

6. The main outcome of this consultation round was as follows. The operators[115], namely the Association of European Airlines (AEA), representing the traditional flag carriers:

- insisted that the principles of ICAO's Balanced Approach should be correctly applied (on an airport-by-airport basis; operational restrictions only to mitigate identified noise problems; use of most cost-effective measures on basis of cost-benefit analysis; and land use planning as a prerequisite) on basis of the existing Directive;
- agreed that a new 'chapter 5' noise standard might be feasible, to be developed in an ICAO context which takes due account of technical feasibility, environmental benefit and economical affordability;
- requested a further clarification of the Directive, what exactly it permits and what it prohibits;
- reiterated the need to consider the amendment of the definition of noisy aircraft (MCA) on basis of international regulation to avoid market distortions; and
- stated that the availability of new wide body aircraft which are significantly quieter would contribute to contain noise contours.

7. The European Express Association validated the main points of their 2008 position[116] with a substantial change: the association would now favour guidance instead of a review of the directive, involving a co-decision process. The position pointed at:

- the inconsistent interpretation and applications of the Directive;
- the focus on operating restrictions instead of a Balanced Approach, making best use of the full range of instruments, especially land use planning and reduction of noise at source;
- the disproportionate impact (heavy burden for express carriers with a marginal environmental benefit) that a widening of the definition of 'noisy aircraft' would have; and
- its preference of having guidance material developed to help Member States in the implementation – however, if a review of the Directive is deemed necessary, in such case the express carriers strongly prefer the transformation of the Directive into a regulation;

8. The airports [117], represented by ACI, reiterated and updated their 2008 position:

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115 While this is the AEA statement, its position should represent all operators, namely ERA (regional), IACA (leisure) and ELFAA (low cost), as they are impacted in quite similar ways. Only IACA may have relatively more night flights for their operations. Also exchanges with IATA, the International Aviation Trade Association, took place. IATA represents the aircraft operators' interests at the global scale. IATA was in particularly interested in the follow-up of the EU-US second stage agreement on air services and the consequences of the possible proposals on non-EU operators – including US carriers.

116 Details of the EEA's contribution can be found at:
http://www.europeanexpressassociation.eu/about_the_eea.php?section_id=1

117 The Airports Council International ACI has a specific working group on the issue.

- the Directive is more a guideline than hard law, but can be useful in avoiding hasty noise measures;

- full range of Balanced Approach measures should be exploited;

- there is scope to widen the definition of noisy aircraft up to "chapter 4" aircraft, but an overall EU ban is not appropriate; and

- clarification of exact possibilities/obligations would be greatly appreciated, paying particular attention to the burdensome procedures (which should not become mandatory) and the need to have recognition of national equivalent procedures.

9. The French independent noise council (ACNUSA)[118], on the basis of 10 years of independent noise policy in France, pleaded for:

- a widening of the definition of MCA;

- use of parameters which genuinely capture the annoyance feelings (e.g. complete the L_{den} parameter with the number of too loud aircraft events; absolute loud events instead of averages);

- improved modelling of airport noise, backed up with actual measuring; and

- a more systematic use of noise friendly operating procedures, such as “continuous descent approaches”.

10. The Community groups, namely the Aviation Environment Federation representing noise and environmental action groups from the UK, France and Germany, stressed:

- the need to properly regulate, on basis of a noise threshold, as airports under competition pressure want to remain as flexible as possible;

- the key role of operating restrictions to improve the noise nuisance situation and incentives to replace the noisiest aircraft; and

- to widen the definition of "MCA" to have a real impact.

11. The aircraft manufacturers (ASD) are especially involved in the development of new noise standards within the ICAO technical working groups and focused on:

- the need to consider interdependencies between possibly conflicting objectives like noise and CO_2 reduction;

- the longer term view of standard development, where the rhythm of standard setting must keep pace of technological feasibility, the value of the fleet over the lifetime of aircraft and should be competition neutral.

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118 ACNUSA (together with its Walloon sister organisation) is a unique forum to tackle, in an advisory capacity, noise nuisances independently from authorities and airports. More information of ACNUSA activities can be found at: http://www.acnusa.fr/index.php/fr/qui-sommes-nous/

12. The Member States were consulted at numerous occasions, including the various meetings of ANCAT[119], EuroCAEP[120] and the Noise Regulatory Committee[121], and the following general messages were communicated to the Commission:

- the need to preserve flexibility in the assessment of the noise problems and necessity to provide for transitional arrangements;
- avoid duplication of efforts (e.g. environmental assessments to be re-used) and fine-tune the relation between the two directives 2002/30/EC and 2002/EC/49, so that the same assessments can satisfy the two directives; and
- consider the international context, with regard to the use of methods and measures.

13. Finally, the local authorities were consulted in a technical meeting with the ARC – Airports Regions Conference, who are mainly in charge for land use. The ARC participants approached the issue from an environmental capacity perspective of a region, which includes land use planning, use of appropriate indicators, a mediation process, and a need to better integrate the requirements under the environmental noise directive with the airport noise directive (2002/30/EC).

119 Meetings by the group "Abatement of Nuisances Caused by Air Traffic" took place in May and October 2010 and in May 2011. In this group European Civil Aviation Conference members are represented together with industry.

120 Only Member States participate. The most recent meeting took place in May 2011.

121 This group was established by the Environmental Noise Directive 2002/49/EC> meetings took place in September and December 2010 and in May 2011.

Appendix 3: Overview of international and EU policies affecting airport noise

1. THE EUROPEAN APPROACH TO NOISE

1. Europe is working within the international framework to contribute to consistent noise policies where each governance level bears responsibility for a range of noise mitigating actions.

2. As at ICAO level, reducing noise at source is a key component of EU policy. Firstly, the EU actively supports the development of new noise standards for aircraft through ICAO. After the adoption of the current standard of chapter 4, in 2001, ICAO will develop new noise stringency standards in the next activities cycles 2010-13 and 2013-16, expected to lead to a new standard by 2016. Secondly, the EU is also investing in new technologies through the Framework Programmes and the Clean Sky project[122]. Thirdly, once a new standard is set [123], the older, noisier aircraft should be phased out and banned from European airspace. This is done through directive 2006/93/EC for "chapter 2" aircraft. Directive 2002/30/EC, under review, allows taking a range of mitigating measures, including a ban of aircraft, which are just above the noise standard (with a common definition of so-called 'MCA', currently defined in the Directive as "chapter 3 minus 5" [124]) on a airport by airport basis.

3. Land use planning, together with the associated insulation and compensation programmes, is a national competence. This measure is mentioned here as relevant to assess the need for operating restrictions. Firstly, authorities should give planning guidance and could refuse planning permission for housing in areas exposed to high noise levels (>57dB(A) is a general standard). Secondly, land around airports also can be demarcated, in function of regularly updated noise maps, as either qualifying for compensation or support for insulation, or as being inappropriate for residential development.

4. Operational noise abatement procedures are used at all airports and may take different forms: noise preferential routes (where aircraft fly e.g. over least populated areas), thrust management (the more thrust, the more noise is generated but the steeper the aircraft may climb) or specific measures on the ground (e.g. use of specific taxi or runways). The EU contributes through its Single European Sky legislation, which provides for setting performance targets for air navigation service providers in the environmental field. This could provide for a strong boost for emission and noise profile improving flights (green flights), such as precision navigation and continuous descent approaches (not descending in steps, but following a natural descent rate to minimize thrust). The SESAR project should in the medium term allow for such "green" flights, i.e. precise navigation 'business

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122 The Clean Sky JTI will be one of the largest European research projects ever, with a budget estimated at €1.6 billion, equally shared between the European Commission and industry, over the period 2008 - 2013. This public-private partnership will speed up technological breakthrough developments and shorten the time to market for new solutions tested on Full Scale Demonstrators, contributing to fulfilling the objectives set by ACARE (50% less CO_2 emissions, 80% less NO_x emissions, half the noise levels and consider the full life cycle of the product. Noise is covered through both engine and airframe improvements.

123 Chapter 2 was adopted in 1977; chapter 3 in 1988; chapter 4 in 2001.

124 Meaning the aircraft satisfies the ICAO chapter 3 requirements with at least 5 dBA difference, measured for the three measuring points cumulatively. See glossary for noise certification measuring points.

trajectories' with an optimized flight profile. The assessment tools under this programme will also provide evidence on the interdependencies between noise and CO_2 emissions.

5. The last element of the Balanced Approach, the introduction of operating restrictions, is the most delicate element and is a far reaching measure. Hence, the process leading to such decision should be consistent, evidence based and robust to be acceptable for all stakeholders. The Directive 2002/30/EC implements the fourth pillar of the Balanced Approach into European law, and provides in particular a decision-making process which Member States must follow in case of the implementation operating restrictions.

6. In 1992, in order to cut down the level of nuisance from air transport, the EU adopted Directive 92/14/EEC, based on standards of ICAO, to ban the noisiest aircraft from European airports. These aircraft - defined in Chapter 2 of Annex 16 to the Convention on International Civil Aviation ("Chicago Convention") - were no longer allowed to operate in the European Union after April 2002.

7. In March 1998 the Commission proposed a new Directive aimed at limiting the operation in the European Union of Chapter 2 aircraft fitted with "hushkits" (a noise reducing device fitted on the engine of an aircraft, which was subsequently re-certificated to satisfy higher noise standards) .The ensuing Regulation was repealed on 28 March 2002 following the adoption of the Directive which enshrined the ICAO Resolution A33-7 on the use of a 'balanced approach' to noise management around airports (see below).

8. The Directive was successful to avoid an open row with major aviation partners on the hushkit regulation. In addition, the common definition of MCA led to the phasing-out of this generation of aircraft types. On the other hand, the Directive was less successful in establishing a strong noise management structure.

9. In addition to the aviation specific legislation, the Environmental Noise Directive 2002/49/EC[125] provides for noise protection from all sources of environmental sources (transport and industry), obliging Member States to identify the main sources of noise (including from aircraft around airports), to make regular assessments on noise nuisances in five years cycles, and then adopt noise action plans on a five yearly basis.

10. Directive 2002/49/EC aims to define a common approach to avoid, prevent or reduce the harmful effects, including annoyance, of environmental noise. Eventually it aims at developing European measures to reduce noise emitted by road, rail, aircraft, industrial equipment and mobile machinery. This directive covers airports with more than 50,000 movements. The noise assessments are based on harmonized indicators, assessment methods and noise mapping. For aviation, a reference is made to the relevant international guidance material[126].

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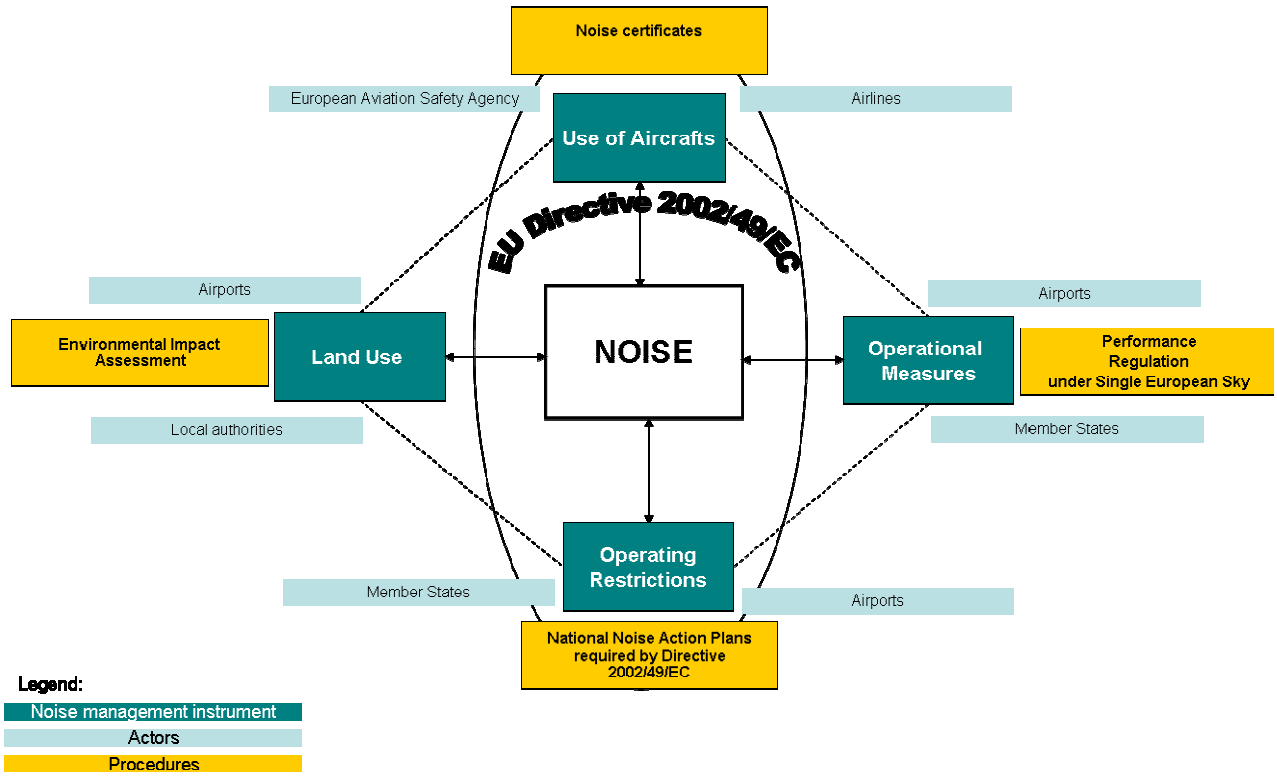
125 Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.

126 ECAC document 29. – report on standard method of computing noise contours around civil airports.

Figure 10: Interaction between the Directive and other EU policies



11. Every ICAO Assembly adopts a consolidated resolution on environmental policies. The last Assembly adopted resolution A37-19. The European policy is strictly aligned with this ICAO policy.

12. The most relevant clauses of this resolution are the following:

- States are urged to refrain from environmental measures that would adversely affect the orderly and sustainable development of international civil aviation.

- It is ultimately the responsibility of individual states to develop appropriate solutions to the noise problems at their airports, with due regard to ICAO rules and policies;

- States are urged to adopt the Balanced Approach, taking full account of ICAO guidance (Doc 9829), relevant legal obligation, existing agreements, current laws and established practices, when addressing noise problems;

- Not apply operating restrictions as a first resort but only after consideration of the benefits to be gained from other elements of the balanced approach;

- States are urged not to introduce measures to phase out aircraft which comply with the noise certification standards of chapters 3 and 4 (phase-out being a withdrawal of a noise-based category of aircraft from international operational at all airports in one or more states);

- States are urged not to impose any operations restrictions on chapter 3 compliant aircraft except as part of the balanced approach to noise management.

13. It should be noted that ICAO respects current laws and practices, which includes in Europe particular measures focusing on the noisiest aircraft, as set out by the Directive on 'marginally compliant aircraft'.

2. THE PHENOMENON OF AVIATION NOISE

14. Europe is promoting a strong aviation industry. The decades' long growth of air traffic is forecasted to continue. The current level of 10 million flights in Europe is forecasted to nearly double to 18 million by 2030.

15. Noise is an important external cost generated by transport. Firstly, unlike emissions, noise as such is not a problem. Noise only becomes a problem when it translates into annoyance. Aviation noise appears to create higher levels of annoyance than noise from other main transport sources. The degree of annoyance depends on a range of factors: time, duration, frequency, tone, etc. It is the noise stemming from approaching and departing flights which creates a problem in the vicinity of the airports, not noise from aircraft in cruising altitude.

16. Annoyance is also relative, in the sense that people who are used to a certain exposure to noise will react in function of this relative level. As a public consultation showed, "*A whole new group of people suddenly find their peace shattered and their houses devalued. Aircraft noise is even more strongly resented when people feel treated unjustly and unable to escape.…… but for those people adversely affected the situation has become intolerable. They feel it is totally unfair that they should be made to suffer the whole burden. Frequent lower levels of noise are considered worse than the occasional higher noise: constant*

noise brings the feeling that there is no escape from it, and for some this leads to desperation." [127]

17. Secondly, in order to adequately address the challenges of noise, technical modelling is needed. Modelling of noise impacts is becoming however more and more complicated due to the use of a broader range of aircraft, the emergence of new operational measures, but also due to the increasing need to assess the interdependence with GHG and pollutant emissions.

18. Thirdly, deciding on the ways to address noise problems generates intense discussions among stakeholders and is a standing issue on the local political agenda of communities in the vicinity of airports.

19. Finally, the measures taken at the local level can have wider repercussions. Aviation is a global industry. Aircraft visit European airports from all corners of the world. At the same time, local measures may affect the efficiency of the network as a whole, or the operations of a neighbouring state in case an airport located near borders. Noise is therefore one of the standing issues in international (bilateral) discussions.

3. AVIATION AS AN ENGINE TO INCLUSIVE GROWTH

20. Beyond the invaluable freedom to mobility and travel, aviation is an engine to local and regional growth. The following figures give an idea of the general employment effects, calculated [128] per 1,000,000 passengers 'airport throughput' (with nearly 800 million passengers in European airports:

- 950 jobs on site;
- plus 475 additional jobs in the sub-region;
- plus 570 regional jobs;
- plus 950 national jobs, so in total nearly 3,000 jobs[129].

21. These general estimates can be refined per specific airport. So is the employment per 1,000,000 passengers 'airport throughput' in Paris CDG calculated as follows: 1,300 direct jobs and a total of 4,727 jobs (including indirect and induced employment).

22. For freight transport, 12,300 jobs have been created in the EU by freight between midnight and 5.00 am (2004 figures) due to the following effects:

- 272 tons of general cargo and mail produces one direct, one indirect and one induced job;

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127 Gatwick Area Conservation Campaign, 2011, "A response to the consultation on the future air space strategy", p. 3.

128 MPD Group Ltd in association with ERM,(2005), *Assessing the economic costs of night flight restrictions*, London, 138p.

129 MPD Group Ltd in association with ERM,(2005), p. 80.

- 24 tonnes of express cargo also creates three jobs;

23. Especially catalytic effects must be considered in view of the local characteristics. In particular tourist destinations have higher catalytic employment effects. For instance, the catalytic effect for Amsterdam estimated at 700 per million passengers, 882 in Brussels, but 16,000 for Malaga.

4. HEALTH IMPACTS OF AVIATION NOISE AND ANNOYANCE

24. Noise is a serious public health threat in industrialised countries. More and more scientific evidence becomes available demonstrating the link between serious health impacts and excessive noise levels. Therefore, the abatement of noise is necessary not only for comfort, but also to prevent other important health effects such as cardiovascular problems and cognitive impairment[130].

25. In this context, the contribution of aviation to noise pollution is important. Taking the 55 dB L_{den} noise measure (which corresponds to the noise level of a normal conversation at 1 m distance, averaged over day, evening and night), the bulk of people living in agglomerations is affected by road transport noise (67 millions), whereas 3.2 million citizens are daily exposed to aircraft noise of that level[131]. Concerning night exposure, the numbers of people affected by 50 dB L_n are shown in Table 14.

Table 14: EU population exposed to L_{night} > 50 dB, by source[132]

Source of Exposure	*Number of people exposed*
Major Roads	29,244,500
Major Railways	5,616,800
Major Airports	348,400

26. The WHO has recently adopted an authoritative report on the burden of disease from environmental noise. The burden of noise is expressed in 'Disability-Adjusted Life Years' (DALY) stemming from ischaemic heart disease, sleep disturbance, tinnitus and annoyance in general. Table 15 gives the estimated DALYs for air traffic.

130 European Environmental Agency, 2009, Transport at a crossroads, EEA Report 3/2009, p. 23. However, the scientific evidence for aviation noise to affect mental health, performance, cognitive performance of children and foetal effects is far from conclusive. (Source: UK CAA, Environmental Research and Consultancy Department, 2010, "*Environmental Noise and Health: a Review*", London, 46p.)

131 See glossary for the explanation of these terms. Information taken from the EEA Report 3/2009, 23pp.

132 Source: Milieu-RPA-TNO, (2010), Impact Assessment and Proposal of Action Plan, p. 7.

Table 15: Estimated Disability Adjusted Life Years for air traffic noise in the EU [133]

Exposure Category	*Highly annoyed per million*	*Number of people exposed*	*Days lost if DW 0.01*	*Days lost if DW 0.02*	*Days lost if DW 0.12*
< 55 dB(A)	30,237	29,244,500	33,360	66,719	400,315
55 – 59 dB(A)	4,098	5,616,800	11,679	23,358	140,147
60 - 64 dB(A)	2,176	348,400	6,201	12,401	74,408
65 - 69 dB(A)	0				

27. Recent studies have also attempted to quantify the social and health effects of aviation noise. Based on the value of a "disability adjusted life years" of €40,000, the cost of noise during the night would amount to about €690 per person.[134]

28. These effects should be compared with the health effects of unemployment due to missed employment opportunities, also for low-skilled workers. Especially groundhandling or express carriers require a great number of low qualified workers. There is scientific evidence showing that unemployment tends to have a negative health impact.[135]

5. THE ICAO NOISE STANDARD SETTING PROCESS

29. The challenge of setting noise policy for policy-makers is to balance the protection of citizens against nuisances from air transport, whilst maintaining aviation activities as a motor for economic growth to the advantage of the wider community. The complexity of this challenge implies that noise can only be adequately tackled through a range of measures within an international framework.

30. The International Civil Aviation Organisation (ICAO), the specific UN organisation dealing with civil aviation, ICAO, has since the 1970s been working on standard setting for aircraft noise. Firstly, a specific annex on environmental protection was attached to the Chicago Convention, specifying the noise standards and completed by a technical manual on noise certification, so as to ensure that the noise certification process is harmonized at the global level. Specific noise standards are included in "chapters" in this annex. Chapter 2 covers aircraft designed before 1977.

31. Chapter 3 was adopted in 1988, improving the noise requirements 10dB(A) cumulatively (for the three certification points) and leading to a progressive phasing-out of chapter 2 aircraft. Chapter 4 was adopted in 2001 and became applicable in 2006. It allowed for a more general ban of the eldest chapter 2 aircraft. Meanwhile, ICAO has decided to develop a new noise standards ("chapter 5") which should become applicable between 2017 and 2020[136].

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133 WHO-European Commission, (2010), "*Burden of disease fromenironmental noise*", p. 95. DW means the 'Disability Weight' and determines

134 CE Delft, 2011, "*Ban on night flights at Heathrow Airport – A quick scan Social Cost Benefit Analysis*", (Delft), 47p.

135 http://www.bmj.com/content/338/bmj.b829.full

136 The technical group CAEP (Committee on Aviation Environmental Protection) is exploring the increase in noise stringency up to 10-12 dB below the current standard (cumulative on the three points of measurement). A standard could be adopted by 2017-20.

32. This continuous process of noise standards has reduced noise from individual aircraft by 75% over the last four decades. Meanwhile new technologies have made further noise reductions possible. For instance, the noise performance of the A380 is impressive for such big aircraft as the noise of the A380 at approach is comparable with a far smaller aircraft from the A320 family. Take-off causes much higher noise levels due to its 600 Tons take-off weight (about 10 times the take-off weight of the A320 family[137]), but are lower than noise levels of aircraft of comparable size (Figure **11**). In general, it is clear that the current technologies of new engines are capable of achieving substantial reductions in the noise footprint (Figure 12).

Figure 11: Maximum noise of arriving and departing flights, as measured with a microphone at about 1 km of the runway under the flight path – at Heathrow airport – 2010

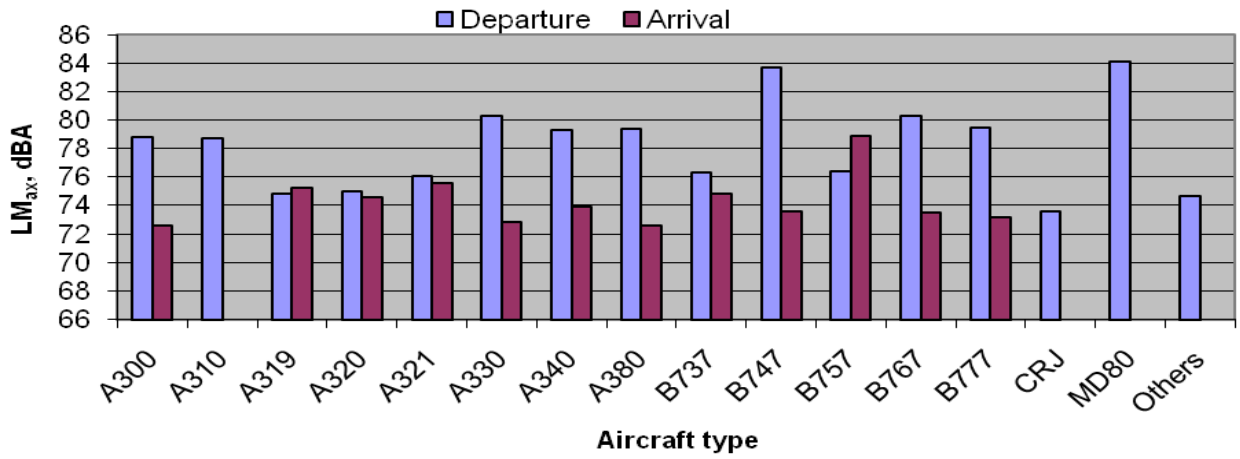
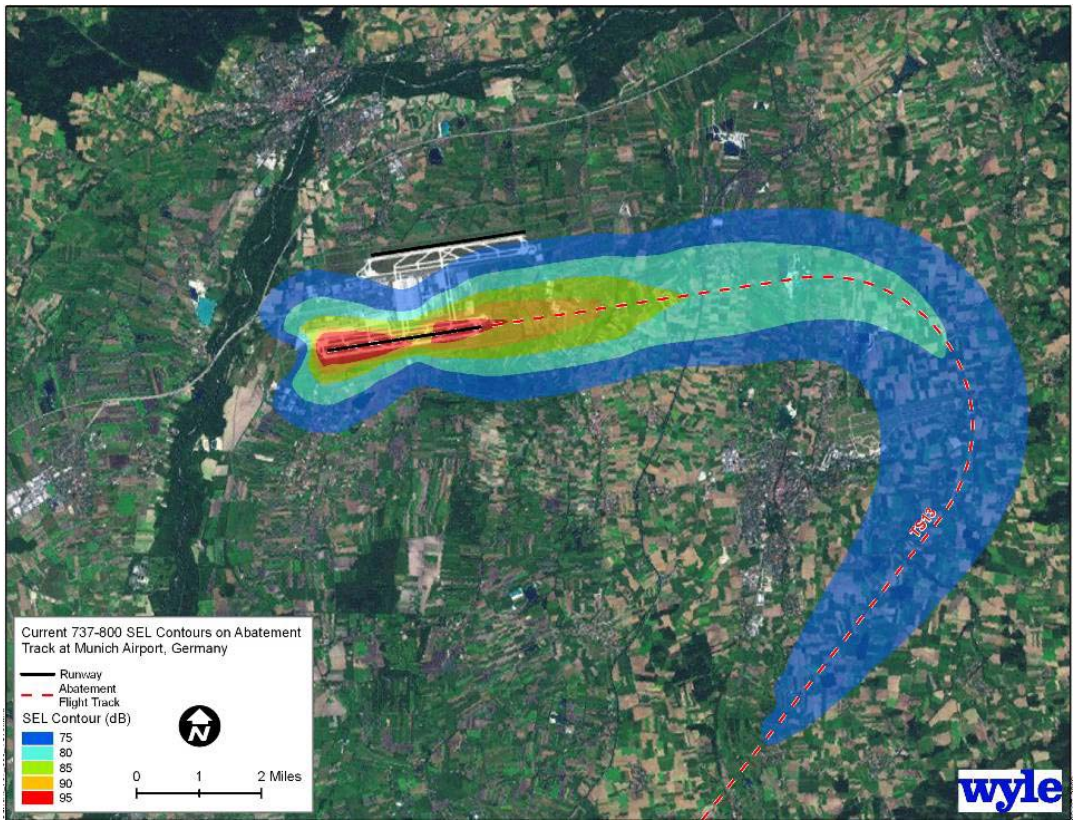
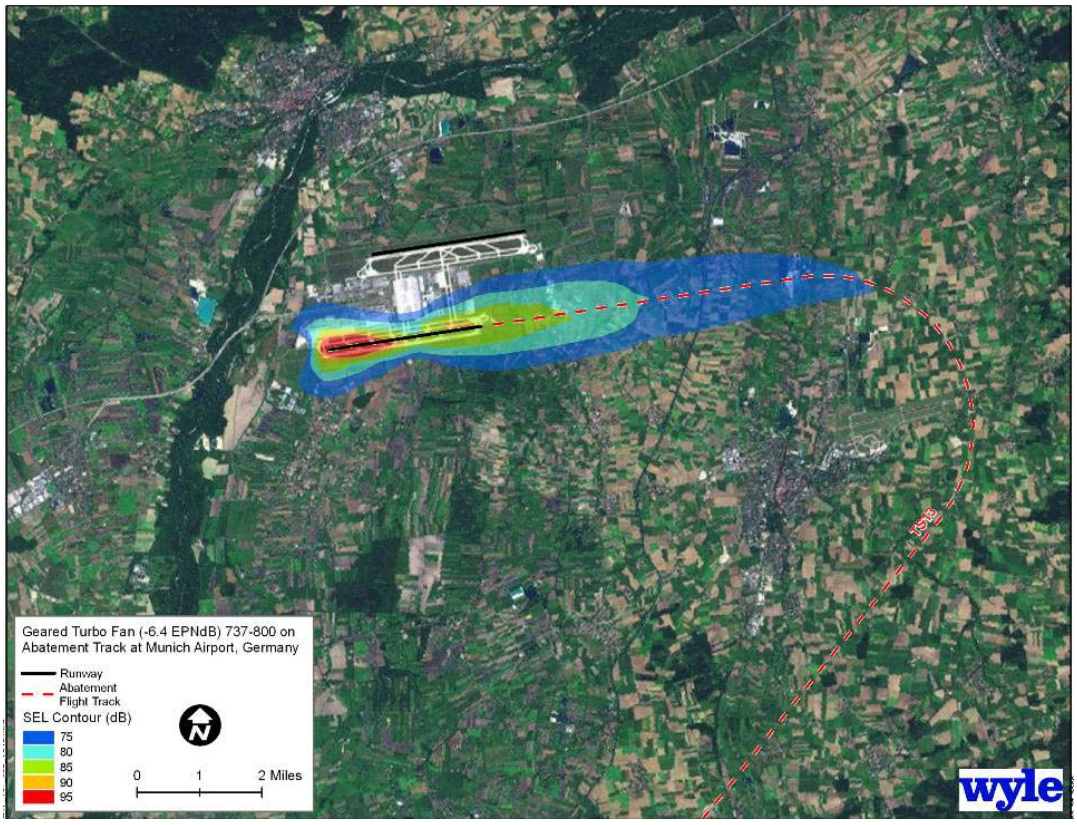


Figure 12: Reduction of noise footprint through Geared Turbofan technology – Munich airport

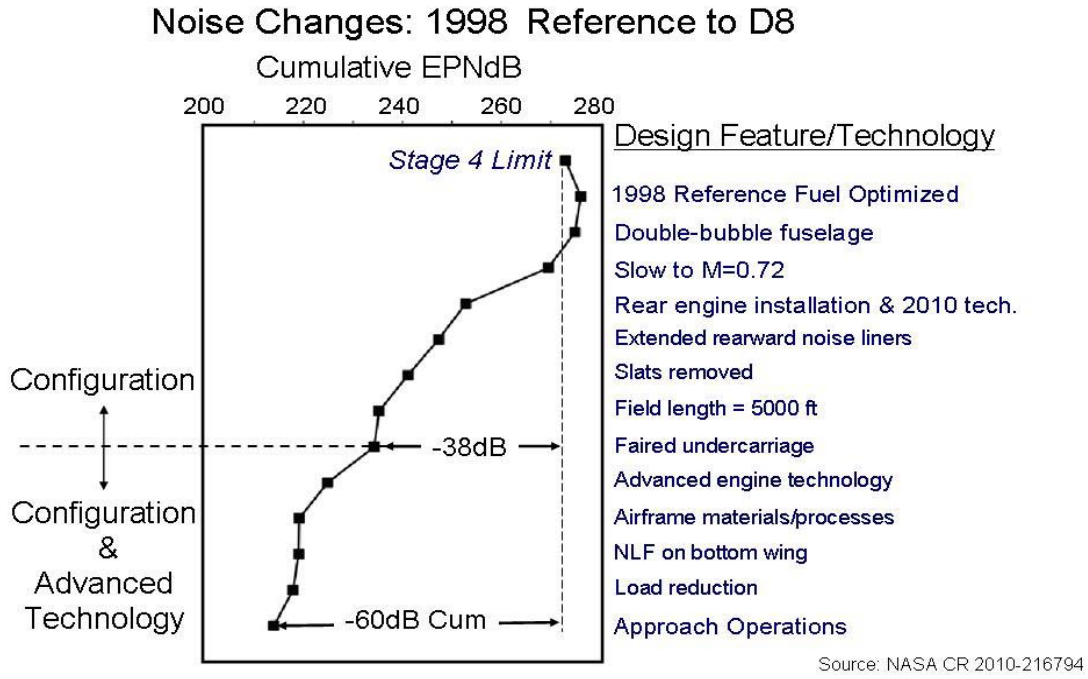
[137] The Maximum Take-Off Weights vary between 50 and 80 Tons.





33. The improvements in engine technology could be well combined with further airframe technologies and new operational procedures. This combination would lead to up to 60dB(A) reductions, hence about 20dB(A) noise reduction per movement.

Figure 13: Noise reduction potential of airframe technologies and operational measures



5. The ICAO Balanced Approach

34. The progress in noise performance of aircraft could not offset the noise generated by the growing air traffic. Increasing noise contours have created more annoyance and louder calls for more active noise policies. Operating restrictions mushroomed all over the globe. In order to provide for a coherent approach to applying operating restrictions and noise mitigation in general, ICAO adopted in 2001 a framework for noise decision-making, completing its traditional standard setting role. This "Balanced Approach" is an international requirement whereby ICAO Contracting States are:

- To mitigate aviation noise through a range of measures (1) reducing noise at source (introduce quieter aircraft), (2) making best use of land (plan and manage the land surrounding airports, i.e. determine conditions for issuing building permits, provide financial assistance for insulation programmes etc.); (3) introduce operational noise abatement procedures (like using specific runways or routes); and, as last resort, (4) imposing operational restrictions (such as a night ban or phasing of out noisier aircraft).

- To select the most cost-effective measure.

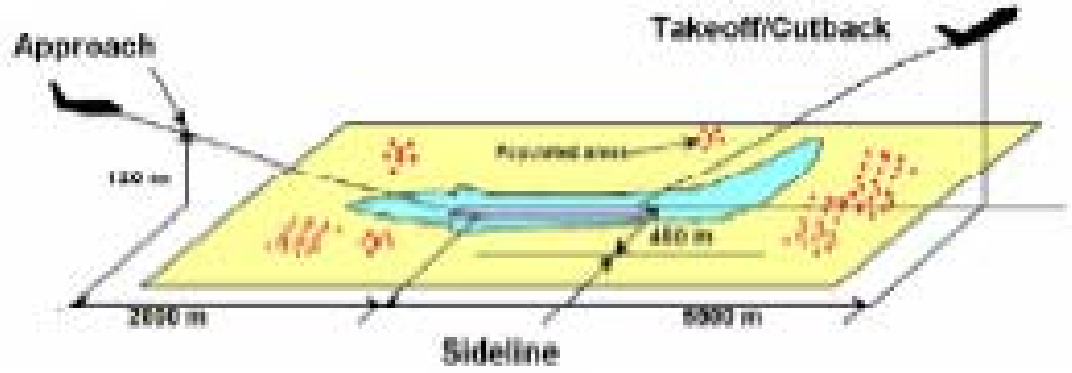
- Not to introduce operating restrictions, unless the authority is in a position, on basis of studies and consultations, to determine whether a noise problem exists.

35. The value added of the Balanced Approach is its harmonization at the global level, promoting consistency and transparency in decision-making on basis of evidence, so that economic growth is balanced by protection against nuisances. Beyond the requirement, ICAO has developed a suite of guidance material in support to the harmonized implementation of the Balanced Approach. As any international standard, Contracting States need to transpose this requirement into enforceable national/EU law to make it binding, and taking due account of existing laws.

Appendix 4: Glossary

1. **Aircraft noise certification:** The effectively perceived aircraft noise is measured in dB(A) on three different points (approach, lateral and fly-over, e.g. 105, 95 and 100 dB) and compared with noise standards (e.g. 108, 100 and 102dB). The respective margins (-3, -5 and -2) are added into a single number, representing the cumulative margin (here marginality of -10).

Figure 14: Phases of measurement



2. **Balanced Approach:** ICAO strategy of noise mitigating measures to deal with noise nuisances in a cost-effective way, adopted in 2001.

3. **Chapters 2, 3, 4:** Classification of aircraft on basis of 'noise levels', referring to the corresponding Chapters in Annex 16 to the Chicago Convention which describes the noise standards and the certification process; a higher Chapter number corresponds to less noisy aircraft. Chapter 2 aircraft are forbidden in European airspace. Currently most aircraft comply with chapter 4 or above.

4. **dB(A):** Logarithmic scale to measure noise, i.e. the sound pressure impinging on the ear, expressed in decibel (dB), adapted to the human hearing capacities (A) (humans better hear mid- and high frequency noise). Changes of less than 3dB(A) are hardly perceived; an increase of between 6 and 10dB(A) is perceived as a doubling loudness.

5. **ICAO:** International Civil Aviation Organisation, the UN body dealing with civil aviation, established in 1944 through the Chicago Convention, to which annexes are attached describing rules and guidance by topic. Annex 16 concerns environment (noise and emissions of aircraft).

6. **L_{den}:** Noise indicator which represents the average day-evening-night noise level over a period of one year, with a 5 dB weighting factor for evening and a 10 dB weighting factor for night.

7. **L_{night}:** Noise indicator which represents the average night noise level over a period of one year, where the night is an eight hour period.

8. **$L_{night\ -\ outside}$:** Noise indicators measure in principle outside noise. For health assessments, the WHO requires inside noise levels. Quality insulation reduces noise levels with some 15dB, hence the importance of the 55dB(A) standard outside, which would translate to 40dB(A) inside, level from which onwards adverse biological effects are observed.

9. **MCA:** Aircraft which only marginally (up to 5 dB) comply with the noise certification standard, currently Chapter 3 of annex 16.

10. **Noise Maps:** Line connecting points with the same noise levels indicating the noise contour around airports, the number of people and dwellings affected by this noise level.

11. **Noise Operating Restriction:** Any noise-related action that limits or reduces an aircraft's access to an airport.

12. **Standard Instrument Departure (SID):** is the departure procedure from an airport that has been established by air traffic control to simplify clearance delivery procedures. Such procedures may take noise abatement into account.

Appendix 5: Explanation on noise abatement measures applied at EU airports

1. APU (Auxiliary Power Unit = device to help starting the aircraft engines): use of the APU can be limited to avoid ground noise, with the necessary exceptions for extremely cold temperatures.

2. Curfews are restrictions during a defined period which may apply to all aircraft or to aircraft which do not satisfy specific noise criteria. These noise restrictions may be determined in function of the characteristics of the airport, e.g. to avoid noise for specific communities in the vicinity during approach or take-off.

Figure 15: Example of airport curfew provisions at Nice-Riviera Airport as extracted from the Boeing database[138]

AIRPORT CURFEWS

See AIP France AD 2 LFMN ENV 1

1. FRENCH MINISTERIAL DECREE MARCH 2nd, 2010

The French ministerial decree of March 2nd, 2010 (published April 2nd, 2010) concerns the regulations for noise abatement at NICE COTE D'AZUR airfield. Failure to comply with the provisions stated in this decree may result in the filing of an infringement report and may
lead the ACNUSA (Airport Noise Nuisance Control Authority) to issue a penalty in the form of an administrative fine for the maximum amount of 20 000 euros for a legal entity, in accordance with the provisions of Article L.227-4 of the Civil Aviation Code.

These provisions are the following:

1.1 Night flights
1.1.1 "The cumulative margin of a turbojet engine" is defined as the sum of the difference between the three points between the certified noise level and the admissible level as defined in the International Civil Aviation Organization (December 7th, 1944) Annexe 16, Volume I, Part II, Chapter 3 for each of the three measurement points as defined in this Annex.

1.1.2 All commercial flight companies arriving or departing from NICE COTE D'AZUR airfield must publish in their operating manuals the classification and the cumulative margin of their aircraft.

1.1.3 Turbojet aircraft not complying with standards specified in International Civil Aviation Organization Annex 16, Volume I, Part II, Chapter 3 or Chapter 4, are not allowed at NICE COTE D'AZUR airfield to:

- land between 2330 and 0615 local time for arrivals on the apron;
- depart between 2315 and 0600 local time for departures from the

1.1.4 Starting from October 31st, 2010 - NO jet aircraft whose noise certification
corresponds with the norms according to the International Civil Aviation Organisation (December 7th, 1944) Annex 16 Volume I, Part II, Chapter 3 with **a cumulative margin < 10 EPNdB can :**

- land between 2330 and 0615 (local time) for arrival on the apron;
- depart between 2315 and 0600 for departure from the apron.

From 30th October 2011 onwards, provided that provisions specified in Paragraph 7 are met, no aircraft equipped with turbojet engines the acoustic certification of which complies with the standards of Chapter 3 of the second part of the first volume of Appendix 16 of the Convention on International Civil Aviation dated 7th December 1944 with a cumulative margin **lower than 13 EPNdB** shall:

[138] 1. The "Boeing Noise Restrictions" database is the most authoritative information source of worldwide operating restrictions.

- land between 11:30 pm and 6:15 am local time of arrival on the parking area;
- take off between 11:15 pm and 6 am local time of departure from the parking area.

3. Run-ups are engine tests, which may be prohibited at specific times or places.

4. NAP = noise action plans, adopted by nearly all European airports, give an overview of the measures in place.

5. Noise Budget: the airport has to manage a -yearly- noise budget, where the authority gives every movement of an aircraft a noise classification. [139]

6. Noise limits restrict the use of particular aircraft in function of their noise performance and/or particular period of the day.

7. Noise charges are airport charges that are increased in function of aircraft noise performance.

8. Operating Quota: the number of (night) movements is restricted.

9. Preferential Runways: use of runways is restricted in function of time of the day.

10. Quota count: aircraft are given points in function of noise levels, giving incentives to use quieter aircraft.

11. Chapter 3 restrictions: specific restrictions apply to 'chapter 3' aircraft.

[139] Every aircraft arriving and departing at night from the Airport is given a noise classification, by the Civil Aviation Authority, known as a Quota Count (often referred to as QC) based on ICAO noise certification data. A modern quiet jet such as the Airbus A319 or Boeing 737-700 is classified as QC0.5 on arrival and departure whilst older more noisy aircraft such as the Boeing 747- 200 may be classified as QC8 on departure and QC4 on arrival. For every arrival and departure we deduct the Quota Count for the arrival or departure from the points budget. This process allows airlines to operate more quiet aircraft in exchange for less noisier aircraft.

Appendix 6: Data sources and limitations on information

12. Information on aircraft noise performance and modelling input data is scattered over several data banks.

13. EASA has a publicly available data bank on noise certification, for all EASA certificated aircraft types. Hence, per aircraft type and variant (different engines, modifications, weight variants etc), three certification values are given, one per certification point, as measured in accordance with the globally harmonized ICAO certification procedure. It covers all aircraft categories (jets, helicopters, propeller driven etc) to which noise certification is applicable. It is limited to those aircraft types variants that have obtained a Type Certificate in Europe. Its main purpose is to provide the data for individual aircraft on EU registers.

14. NoisedB – Aircraft Noise Performance is a database with global noise certification data. The French DGCA maintains this data bank on behalf of ICAO. It has for many ICAO Aircraft Type identifier the certified noise levels and several different records show a range (usually low, medium, high) of certified maximum landing and take-off weights. It does not cover all variants and is limited to jet and heavy propeller driven aircraft only. The NoisedB primarily provides noise data for civil jet aircraft plus a few military aircraft types. Many turbo-prop, piston engine and rotorcraft aircraft are not covered therein. Its main purpose is to inform the public and a subset of the database is normally used in impact assessment studies done in the environmental group of ICAO (CAEP).

15. The Aircraft Noise and Performance (ANP) Database contains, for noise modelling purposes, for a number of aircraft configurations, noise levels as a function of thrust/power and distance (so-called noise performance data (NPD) data) For noise modelling, this basic information is widened to give and the 'noise' flight profiles' for approach and take-off under different circumstances (e.g. full thrust or idle) (mainly different weights) per aircraft type. This data is basically provided by aircraft manufacturers, validated by VOLPE, a research centre attached to the US MoT. Eurocontrol maintains this database in its research centre in Brétigny.

16. Eurocontrol has a data warehouse (PRISME) where movement numbers, aircraft types, airports etc. are held per individual aircraft. On noise, the warehouse only states whether chapter 3 compliant or not, and hence does not precise noise information.

17. Airports and airlines have noise certification performance information per individual aircraft. A single aircraft may at different times have different noise certificates, depending on the weight, which may differ according to season (e.g. less seats shorter ranges for the winter season, hence lighter, hence quieter).

18. The specific problem is that there is no common key to link individual aircraft movements to noise certification levels ("noise performance") per aircraft. The proposals on marginally compliant aircraft are based on the best possible information, where the Eurocontrol data on movements was linked to noise performance ranges by aircraft type, with some cross-checking on basis of airport data.

19. In order to allow more robust noise assessments, these databanks should be linked through a common key. This work could be undertaken, with a relatively minor financial effort, in the framework of current arrangements between the Commission, EASA, SESAR Joint Undertaking and Eurocontrol, with the collaboration of airports, airlines and national

authorities. Airports and airlines would rationalize in the administrative burden, as they could be granted access to this central data bank instead of having to request noise certificates from each airline for each aircraft in operation.

Appendix 7: Revision of the Directive - assessment of administrative costs

1. Introduction

1. Administrative costs are defined as the costs incurred by different stakeholders in meeting legal obligations to provide information on their action or production either to public authorities or to private parties. Information is understood in a broad sense, i.e. including labelling, reporting, registration, monitoring and assessment needed to provide the information.

2. The administrative costs are calculated as changes in costs compared to the baseline scenario.

3. The identification and assessment of administrative costs have as far as possible been following the steps in the EU standard cost model and has been presented to the support cell for the calculation of administrative cost in the Secretariat-General.

2. Identification and calculation of administrative costs

4. The structure of the policy options considered in the revision of the Directive (2002/30/EC) operates on two elements. The first element is the updated definition of a marginal compliant aircraft (Article 2) with associated phasing out model (Article 6). The second element is provisions aimed at improving the quality of the Balanced Approach analysis.

2.1.First element

5. Updating the definition of the marginal compliant aircraft, and amending the associated phasing out period would not imply any measurable change in administrative costs, because the change in definition does not imply any changes in the reporting obligations of the airlines

2.2. Second element

6. The different measures aimed at improving the quality of the Balanced Approach analysis will most likely influence administrative costs. The measure by measure breakdown is shown below.

2.2.1. EU level support cell

7. Establishment of an EU-level support cell (new provision in all the policy options) for the implementation of the Balanced Approach is foreseen in Policy Options 2, 3 and 4. This cell would support national administrations and airports in the management of the noise measure analysis. It will imply a very modest initial data collection aiming at adjusting already existing data for this specific purpose, refinement of existing Eurocontrol data, and the validation and update of this information on a recurrent basis. Data has to be supplied by airports, aircraft manufacturers, international organisations and public authorities in

Member States. The baseline scenario does not contain administrative costs for this purpose.

8. Impact on business: The EU support cell would need to collect information from primarily airports, airlines, aircraft manufacturers and coordination with Eurocontrol. Airlines and aircraft manufacturers are private organisations, while approximately 25% of EU 27 airports are wholly or partly owned by the private sector[140]. Around ¾ of the publicly owned airports are managed in a corporatised form.

9. It is assumed that there will be a one time administrative cost setting up the database. It is estimated that around 60 private and 140 public companies will have to supply information using on average 30 hours to fill out the information forms from the support cell at an average hourly salary of € 20. The quantities are a qualified guess reflecting the assumption that the reporting probably to a large extent will consist in adjusting already reported data. This gives rise to € 120,000 Euros in administrative costs as a central estimate. As there is considerable uncertainty around the assumptions a safer estimate would be between € 100,000 and € 250,000 (1.a in Table 18). Around 30% of the cost is estimated to fall on the private sector. The deviation from the 25% is due to the involvement of airlines and aircraft manufacturers.

10. The annual update of the database is assumed to comprise the same number of units and it is assumed consisting in relatively uncomplicated minor adjustments to already existing reporting obligations. An informed guess would give a time consumption of 10 hours on average. This gives a central estimate for annual administrative cost for business around € 40,000 and a safe interval between € 25,000 and 100,000. (1. b in Table 18). Around 30% of the cost is estimated to fall on the private sector.

11. The services of the support cell is supposed to reduce costs for airports preparing a balanced approach analysis, as a result of proposals for introducing new operative restrictions or changing existing, compared to the baseline. In the calculation of the average annual savings it is assumed 20 airports on average would prepare a Balanced Approach analysis and could save 40 hours of work at an average rate of € 25. (1.c in Table 18). On average 25% of this cost reduction will fall on the private sector and 75% on public organisations, corresponding to the composition of ownership of Europe's Airports.

12. The assumption of 20 airports is due to the fact that it is assumed that around 100 airports in Europe would work with operating restrictions in the future and that they on average every 5 years have to major reassessment of their noise abatement programme due to the environmental noise directive. The figures of 40 hours and € 25 are assumption.

13. Mandatory utilisation of a noise modelling tool in assessing the impacts of the different noise abatement measures in all Policy Options will increase the costs. It is assumed that this will imply an average cost of € 50,000 for each assessment. This corresponds to the estimated cost of procuring this service from a consultant who would tailor the EU tool provided by the support cell to local conditions. (1.d. in Table 18). On average 25% of this cost will fall on the private sector and 75% on public organisations.

2.2.2. Stakeholder consultation

[140] "The ownership of Europe's Airports 2010", Airports Council International (ACI), 2010, p.7

14. All Policy Options foresee a widening and deepening of the scope of stakeholder consultation. This measure would imply more specific demands on the existing national rules, and would increase the cost per assessment for authorities in Member States due to information obligation, assessment of contributions and decision-making.

2.2.3. Change in notification procedure

15. The change in procedures in Policy Option 3 and Policy Option 4 compared to the Policy Option 1 will raise the quality of the analysis which the authorities have to deliver.

16. It is assumed that the Policy Option 3 (scrutiny) would give rise to extra cost for public authorities due to information exchange with Commission, preparation of supplementary material, meetings in Brussels etc. These activities would probably involve different specialists and management levels from the Member States, hence a close to average hourly rate can be assumed.

17. Policy Option 4 (prior authorisation) is assumed to give rise to the same type of extra costs as mentioned above, but it clearly would be more demanding on the Member States. The Commission would take greater responsibility and would probably have to ensure that the information and analysis supporting the decisions are correct. This will imply that Member States have to provide more detailed information and eventually independent validation of essential parts of the documentation.

18. In addition to a change in the annual costs, all Policy Options would imply a very modest initial data collection aiming at adjusting already existing data for this specific purpose, refinement of existing Eurocontrol data, and the validation and update of this information on a recurrent basis. Data has to be supplied by airports, aircraft manufacturers, international organisations and public authorities in Member States. The baseline scenario does not contain administrative costs for this purpose. The one time cost is assumed to be € 120,000. Around 30% of the cost is estimated to fall on the private sector.

Table 16: Administrative costs in Policy Options 2, 3 and 4

	Annual	*One time*
Policy Option 2	1,800,000	120,000
Policy Option 3	3,000,000	120,000
Policy Option 4	4,200,000	120,000

19. The distribution of administrative cost between the private and the public sector is shown in the table below. The numbers are based on the assumptions described above and reflect primarily the organisational form of airport activity in 2010. It is expected that the present trend for increased airport privatisation will continue in the future. This would influence the distribution of the administrative burden in the future.

Table 17: Distribution of administrative costs in Policy Options 2, 3 and 4

Euros/year	*Policy option 2*	*Policy option 3*	*Policy option 4*

Private sector	**252,000**	**252,000**	**252,000**
Public sector	**1,548,000**	**2,748,000**	**3,948,000**

Table 18: Calculation of administrative costs

	Type of obligation	*Description of required action*	*Affected*	*Rate (euro/hour)*	*Time (hours)*	*Price (per action)*	*Frequency*	*No of entities*	*Total administrative costs(euro/year)*
Support cell									
Establish support cell	Supply support cell with information	Filling forms and tables	Airports/ public authorities	20	30	600	One time	200	120.000
Annual update of support cell	Supply support cell with information	Filling forms and tables	Airports/ public authorities	20	10	200	Annual	200	40.000
Reduction of costs due to support cell		Receive information	Airports/ public authorities	25	-80	-2.000	Annual	20	-40.000
Mandatory modelling		Modelling				50.000		20	1.000.000
Stakeholder consultation	Additional rules on the scope and content	Information on new procedures	Public authorities			40.000	Annual	20	800.000
Notification procedure									
Change in notification procedures (policy option 3)	Increased quality		Airports/ public authorities	100	600	60.000	Annual	20	1.200.000
Change in notification procedures (policy option 4)	Increased quality		Airports/ public authorities	100	1.200	120.000	Annual	20	2.400.000

Appendix 8: Impact of defining MCA

Table 19: Impact of widening MCA definition in a major EU hub – list of most affected airlines

		Max Pax	Engine	Certified Levels			Chapter 3 Noise Limits			Chapter 3 Noise Margins			Cumulative	Ch 2	Ch 3 -5	Ch3 - 8	Ch3 -10	Ch3 -12
														13	28	58	27	23
LIBYAN ARAB AIRLINES	REGIONAL JET 900	75	CF34-8C5	89,0	94,3	98,3	89,0	94,3	98,3	0,0	0,0	0,0	0,0		5			
IRAN AIR	B747-100 Passenger	441	JT9D-7F	104,5	103,5	104,5	105,2	102,3	105,0	0,7	-1,2	0,5	0,0		7			
EL AL ISRAEL AIRLINES	B747-200 Freighter	0	JT9D-7Q	104,5	103,2	105,8	105,9	102,8	105,0	1,4	-0,4	-0,8	0,2		10			
IBERIA AIRLINES	A320-100/200	171	CFM56-5C4	95,4	96,1	96,9	91,4	96,7	100,5	-4,0	0,6	3,6	0,3		11			
ISRAIR	A320-100/200	180	CFM56-5-A1	91,7	96,9	100,1	91,7	96,9	100,7	0,0	0,0	0,6	0,6		12			
IRAN AIR	B747-200 Combi	447	JT9D-7F	103,5	102,0	106,9	105,5	102,5	105,0	2,0	0,5	-1,9	0,6		14			
CZECH AIR FORCE	AN-26B/32 Freighter	38	AI-24VT	90,6	92,0	96,6	89,0	94,0	98,0	-1,6	2,0	1,4	1,8		18			
EL AL ISRAEL AIRLINES	B747-200 Freighter	0	JT9D-7Q	103,2	103,5	104,9	105,9	102,8	105,0	2,7	-0,7	0,1	2,1		19			
AIR CHARTER EXPRESS LTD	DC-8-50 Freighter	0	JT3D-3B	97,8	101,3	102,0	101,0	99,6	103,1	3,2	-1,7	1,1	2,6		26			
AIR CONTRACTORS	L-100 HERCULES(C130) Freighter	0	Emissions matrix	95,4	93,9	98,8	96,2	96,6	100,3	0,8	2,7	1,5	5,0			2		
EL AL ISRAEL AIRLINES	B767-200 ER	192	PW4060	95,4	96,2	102,2	96,0	99,7	103,2	0,6	3,5	1,0	5,1			3		
AIR BERLIN	A321-100/200	210	CFM56-5B3/P	90,4	97,9	96,8	92,1	97,2	100,9	1,7	-0,7	4,1	5,1			5		
BRITISH AIRWAYS PLC	MD-82	167	JT8D-219	90,8	97,2	93,7	91,4	96,7	100,5	0,6	-0,5	6,8	6,8			21		
DUBROVNIK AIRLINES	MD-83	167	JT8D-219	90,8	97,2	93,7	91,4	96,7	100,5	0,6	-0,5	6,8	6,8			22		
IRAN AIR	B747SP	305	JT9D-7F	98,7	102,3	103,8	104,6	102,0	105,0	5,9	-0,3	1,2	6,8			23		

IRAN AIR	A300F4	0	CF6-50C2	92,8	97,3	102,0	96,1	99,7	103,2	3,3	2,4	1,2	6,9			27		
EUROPEAN AIR TRANSPORT	ABX	0	CF6-50C2	92,8	97,2	102,0	96,1	99,7	103,2	3,3	2,5	1,2	7,0			28		
BLUE PANORAMA AIRLINES	B737-400	167	CFM56-3C-1	87,1	93,1	100,2	91,0	96,5	100,2	3,9	3,4	0,0	7,3			32		
KUWAIT AIRWAYS	A320-100/200	36	CFM56-5A3	88,6	97,1	96,0	91,7	96,9	100,7	3,1	-0,2	4,7	7,6			38		
DUBROVNIK AIRLINES	MD-82	167	JT8D-217 series	90,0	96,4	93,1	90,9	96,4	100,2	0,9	0,0	7,1	7,9			55		
DUBROVNIK AIRLINES	MD-82	167	JT8D-217 series	90,0	96,4	93,1	90,9	96,4	100,2	0,9	0,0	7,1	7,9			56		
MONARCH AIRLINES LTD	MD-83	167	JT8D-217	90,0	96,4	93,1	90,9	96,4	100,2	0,9	0,0	7,1	7,9			57		
LUFTHANSA	B737-300	122	CFM56-3C-1	85,7	91,9	100,0	90,0	95,8	99,7	4,3	3,9	-0,3	8,0				1	
LUFTHANSA	B737-300	122	CFM56-3C-1	85,7	91,9	100,0	90,0	95,8	99,7	4,3	3,9	-0,3	8,0				2	
MALAYSIAN AIRLINE SYSTEM	B747-400 Passenger	359	PW4056	101,5	99,7	104,4	106,0	102,9	105,0	4,5	3,2	0,6	8,3				13	
CATHAY PACIFIC AIRWAYS	B747-400 Freighter	0	RB211-524G	100,6	98,1	104,1	106,0	102,9	105,0	5,4	4,9	0,9	11,2					1
CATHAY PACIFIC AIRWAYS	B747-400 Freighter	0	RB211-524G	100,6	98,1	104,1	106,0	102,9	105,0	5,4	4,9	0,9	11,2					6
AIR NEW ZEALAND LIMITED	#N/A	369	RB211-524G	101,1	98,1	103,5	106,0	103,0	105,0	4,9	4,9	1,5	11,3					7
CARGOLUX AIRLINES INTL SA	#N/A	0	RB211-524H	99,6	98,8	104,0	106,0	103,0	105,0	6,4	4,2	1,0	11,6					13
AEGEAN AIRLINES SA	#N/A	112	LF507-1F, -1H	90,3	88,1	97,6	93,7	95,0	98,9	3,4	6,9	1,3	11,7					19
AEGEAN AIRLINES SA	#N/A	112	LF507-1F, -1H	90,3	88,1	97,6	93,7	95,0	98,9	3,4	6,9	1,3	11,7					23
														### #	0,64%	1,33%	0,62%	0,53%

5.1.1. Parameters for the economic costs for airlines with the extended definition of marginal compliant aircraft

20. The economic impact of extending the definition of MCA cannot be calculated, as the final outcome depends on how the competent authorities will use this instrument. As for now, the range of factors determining the impact can be described:

21. As soon as the proposal becomes European law, competent authorities may start a noise assessment process and a cost-effectiveness process, consult interested parties, to use the revised definition.

22. If a competent authority decides on introducing the MCA tool as the most cost-effective measure, the concrete impact depends on the concrete modalities (day and/or night) and the phase-out regime. Also the difference between current practice and the new measure determines the impact. Some Member States already apply minus 10 at night. At least introducing the measure during the day will trigger a phase-out of a few years.

23. If the aircraft becomes marginally compliant, then the concrete impact will depend on the particular situation. If the aircraft still is relatively new and just below the standard, a recertification can be considered. If the aircraft is old – many aircraft types which would be affected date from the 80s- the aircraft could be used on airports where such measure is not applicable (or not at day time).

24. Only when the number of airports which apply the harmonized MCA definition becomes critical, the limitations to the operational flexibility of the aircraft may force the operators to abandon EU operations of the aircraft. Depending on the airline activities those aircraft may continue to operate outside the EU. In extreme cases the aircraft may have to be sold.

25. In any case, the proposal sets out a clear framework and allows the operators to adapt to expected decisions. Looking at the time line, the effective phase-out for MCA for a critical number of airports may be between 2017 and 2020. By then, the bulk of aircraft types expected to become MCA have an age of about 30 years.

26. The decision to renew the fleet depends on a range of factors, including noise. However, looking at the order of magnitude, the fuel and emissions savings from new aircraft are in the range of 25%. Hence, the emissions reduction may turn out to be the stronger incentive. The new noise standard may just be the trigger – not the cause.

Appendix 9: Overview of airlines-fleet composition

	Margin		***Air France***			***British Airways***				***Lufthansa***				***Iberia***			
Aircraft Type	**Range**	Margin	Act	Not act	Hist	Margin	Act	Not act	Hist	Margin	Act	Not act	Hist	Margin	Act	Not act	Hist
Airbus A300				**6**	**22**							**2**	**25**			**8**	**2**
Airbus A300 B2/B4				6	22								11			8	2
Airbus A300-600	13.7-18									13.7-19.4		2	14				
Airbus A310					**12**								**35**				
Airbus A310-200	14.0 to 15.1				8								17				
Airbus A310-300	14.0 to 21.5				4								18				

ATR 42/72																	
ATR 42-300	15.8-17.4																
ATR 42-500	31.4-31.3																
ATR 72	15.8-31.8																
Airbus A318	**23.9 to 25.4**	**23.9-25.4**	**18**			**23.9**	**2**										
Airbus A319	**18.3 to 23.4**	**23.5-25.1**	**44**		**4**	**23.0-23.8**	**33**			**20.1-24.3**	**22**		**16**		**21**	**1**	**2**
Airbus A320		**15.3-20.9**	**57**	**30**	**17**	18.2-23.5	**39**	**10**	**1**	**18.2**	**46**	**1**	**7**	**19.2-20.9**	**29**	**6**	**81**
Airbus A320-100	14.7 to 21.4			14				5									
Airbus A320-200	14.7 to 21.4		57	16	17		39	5	1		46	1	**7**		29	6	81
Airbus A321			**24**		**5**	**18.3**	**11**			**20.4**	**50**		**1**	**14.1-23.7**	**19**		**5**
Airbus A321-100	13.5 to 23.7		5								20						
Airbus A321-200	13.5 to 23.7		19		5		11				30		1		19		5
Airbus A330			**15**	**1**							**15**		**5**				
Airbus A330-200	18.3-18.7		15	1									5				
Airbus A330-300	18.5 to 27.9									23.8	15						
Airbus A340			16	2	12						**50**		**13**		**36**	**1**	**11**
Airbus A340-200	22.8			1	5								9				
Airbus A340-300	20.5 to 23.0		16	1	7						26		4		19		11
Airbus A340-600	22.9 to 24.2									23.3	24				17	1	
Airbus A380	**26,2 to 26,9**		**5**										**7**				
Boeing 737				**1**	**68**		**19**	**4**	**121**		**63**		**115**				**10**
Boeing 737-100													22				
Boeing 737-200				1	25				57				57				
Boeing 737-300	7.7 to 19,7				12	15.2		2	25	8.0-13.2	33		21				5
Boeing 737-400	7.3 to 20					13.3	19		26				7				5
Boeing 737-500	15.7 to 21				31	15.8		2	13	15.7	30		8				
Boeing 737 Next Gen	**16.5 to 21.8**												**2**				
Boeing 737-700	18.3-21												2				
Boeing 737-800	13.2-22.3																
Boeing 747			**13**	**24**	**62**		**51**	**20**	**38**		**30**	**5**	**34**			**7**	**18**
Boeing 747-100	0			7	27			10	10			1	3			1	3
Boeing 747-200	0.6-13.8			14	25			4	25			4	30			6	9
Boeing 747-300					2												4
Boeing 747-400	8,3-20.6	12.4	13	3		13.4-14.3	51	6	3	12.6	30		1				2

Boeing 757								**4**	**58**								**43**
Boeing 757-200	17.9-27.5					18.2-27.1		4	58								43
Boeing 757-300	22.3-22.9																
Boeing 767					**9**		**21**		**10**				**3**				**2**
Boeing 767-200	15.8-26.1				2				3								
Boeing 767-300	15.2-21.7				7	18.9-20.1	21		7				3				2
Boeing 777			61		1		**49**	**1**	**2**								
Boeing 777-200	20.2-27.9	26.0-27.3	25			20.3-27.9	46	1	2								
Boeing 777-300	20.0-21.2		34				3										
Boeing 777-Freighter	16.6		2														
BAe 146 / Avro RJ									**5**				**1**				
Avro RJ	16.4-17.6								1								
Bae 146	14.4-20.6								4	17.8-20.6			1				
McDonnell Douglas DC-10					**4**				**11**				**16**			**8**	**5**
McDonnell Douglas MD-11	**15.0-15.5**									**15.3**	**18**	**1**					
McDonnell Douglas MD-80/90																**20**	**48**
McDonnell Douglas MD-82	6.8-15.3																
McDonnell Douglas MD-83	6.8-28.4																**1**
McDonnell Douglas MD-87	15.1-15.5															7	46
McDonnell Douglas MD-88																13	**1**
Dash 8									**3**								
Dash 8-100									2								
Dash 8-300									1								
Dash 8-400	25.8-26.3																
Fokker 70/100					**5**												
Fokker 70	29.1-40.2																
Fokker 100	14.1-20.7				5												
Embraer																	
E145	23.2-25.5																
E195	17.6-19.5																
Lockheed L-1011 TriStar					**2**				**32**								**2**
Concorde				**7**	**1**			7									
TOTAL			**253**	**70**	**160**		**206**	**42**	**171**		**231**	**9**	**181**		**105**	**59**	**224**

	Margin	*FEDEX*				*DHL*				*Thomas Cook*				*Flybe*			
Aircraft Type	**Range**	Margin	Act	Not act	Hist	Margin	Act	Not act	Hist	Margin	Act	Not act	Hist	Margin	Act	Not act	Hist
Airbus A300			**71**		**1**												
Airbus A300 B2/B4																	
Airbus A300-600	13.7-18		29		1												
Airbus A310			**43**	**26**	**1**												
Airbus A310-200	14.0 to 15.1	14-15.1	26	23	1												
Airbus A310-300	14.0 to 21.5	14.0	17	3													
ATR 42/72			**23**	**15**	**15**												
ATR 42-300	15.8-17.4																
ATR 42-500	31.4-31.3		8	14	8												
ATR 72	15.8-31.8		15	1	7									16.1-26.5			
Airbus A318	**23.9 to 25.4**																
Airbus A319	**18.3 to 23.4**																
Airbus A320											**7**	**3**	**30**				
Airbus A320-100	14.7 to 21.4																
Airbus A320-200	14.7 to 21.4									24.1	7	3	30				
Airbus A321											**4**		1				
Airbus A321-100	13.5 to 23.7																
Airbus A321-200	13.5 to 23.7									23.9	4		1				
Airbus A330											**7**		**5**				
Airbus A330-200	18.3-18.7									24.1	7		4				
Airbus A330-300	18.5 to 27.9										0		1				
Airbus A340																	
Airbus A340-200	22.8																
Airbus A340-300	20.5 to 23.0																
Airbus A340-600	22.9 to 24.2																
Airbus A380	**26,2 to 26,9**																
Boeing 737					**5**												
Boeing 737-100																	
Boeing 737-200					5												
Boeing 737-300	7.7 to 19,7												1				4
Boeing 737-400	7.3 to 20																

Boeing 737-500	15.7 to 21													
Boeing 737 Next Gen	**16.5 to 21.8**													
Boeing 737-700	18.3-21													
Boeing 737-800	13.2-22.3													
Boeing 747					**23**									
Boeing 747-100	0				11									
Boeing 747-200	0.6-13.8				12									
Boeing 747-300														
Boeing 747-400	8,3-20.6													
Boeing 757			**36**	**13**	**20**		**21**		**1**		**21**			
Boeing 757-200	17.9-27.5		36	13	20	18.6	21		1	24.3-27.5	19			
Boeing 757-300	22.3-22.9									22.9	2			
Boeing 767							**3**				**3**			
Boeing 767-200	15.8-26.1													
Boeing 767-300	15.2-21.7						3			20.2	3			
Boeing 777			**13**		**1**									
Boeing 777-200	20.2-27.9													
Boeing 777-300	20.0-21.2													
Boeing 777-Freighter	16.6	16.6	13		1									
BAe 146 / Avro RJ														
Avro RJ	16.4-17.6													
Bae 146	14.4-20.6	14-15.1										26		10
McDonnell Douglas DC-10			**68**	**25**	**11**									
McDonnell Douglas MD-11	**15.0-15.5**	**15.5**	**64**	**3**	**11**									
McDonnell Douglas MD-80/90														
McDonnell Douglas MD-82	6.8-15.3													
McDonnell Douglas MD-83	6.8-28.4													
McDonnell Douglas MD-87	15.1-15.5													
McDonnell Douglas MD-88														
Dash 8														
Dash 8-100														
Dash 8-300														
Dash 8-400	25.8-26.3											26	55	4
Fokker 70/100														

Fokker 70	29.1-40.2															
Fokker 100	14.1-20.7															
Embraer																
E145	23.2-25.5														6	
E195	17.6-19.5												19.5	14		
Lockheed L-1011 TriStar																
Concorde																
TOTAL		**363**	**92**	**79**		**24**	**0**	**1**		**42**	**3**	**36**		**0**	**0**	**0**