The Brazilian Viewpoint to the Future of Aviation and Environment

Abstract

This paper presents the Brazilian viewpoint on the future of aviation and environment. It takes into consideration the technological improvements achieved in the past and new CAEP proposed standards on aircraft noise and also discusses the challenge and difficult work ahead that the aviation sector will face in the coming years.

The position of developing countries will be emphasized, in particular their needs to guarantee a substantial increase in aviation activities that are essential to support social and economic growth. How to continue reducing the impact of aircraft noise is a key issue to these countries. However, any proposed solution must assure their rights to trade goods and services flying in and out of different regions of the world.

Finally, this paper addresses essential aspects to deal with aircraft noise considering a broader scope – the source and the listener - and involving an ICAO framework on the Balanced Approach as well as issues related to the CAEP Working Group Programs, which can help to foresee different ways to make aviation more environmentally friendly.

Dr. Allemander J. Pereira Filho
Assistant of the Director General of Civil Aviation, Brazil

Mr. Pereira Filho is the CAEP Member for Brazil, and was one of the four members selected by CAEP to participate in its Noise Scenarios Group.

He graduated as an engineer and his post-graduate education included a Ph.D. in transportation engineering. He has lectured at Brazilian universities, on air transport planning and other subjects, and has published a wide range of papers including several on land-use planning around airports.

He has worked for the Brazilian Department of Civil Aviation for the past 20 years and has Air Force experience since 1975.

COLLOQUIUM ON ENVIRONMENTAL ASPECTS OF AVIATION

Montreal, 09 to 11 April 2001

Session 5: **Aircraft noise – The way forward**

THE BRAZILIAN VIEWPOINT TO THE FUTURE OF AVIATION AND ENVIRONMENT

(Presented by Dr. Allemander J. Pereira Filho, Ph.D. – CAEP Member, Brazil)

SUMMARY

This paper presents the Brazilian viewpoint to the future of aviation and environment. It takes into consideration the technological improvements achieved in the past and new CAEP proposed standards to aircraft noise and also discusses the challenge and difficult work ahead that the aviation sector will face in the coming years.
The position of developing countries will be emphasized; in particular their needs to guarantee great increase in aviation activities that are essential to support social development and economic growth. How to continue reducing the impact of aircraft noise is a key issue to these countries. However, any proposed solution must assure their rights to trade goods and services flying in and out of different regions of the world.
Finally, this paper addresses essential aspects to deal with aircraft noise considering a broader scope – the source and the listener - and involving an ICAO framework to the Balanced Approach as well as issues related to the CAEP Working Group Programs, which can help to foresee different ways to make aviation more environmentally friend.

1 INTRODUCTION

1.1 Brazil has participated in the CAEP since the early 1980's contributing to the technical discussions on the environmental problems of aviation. For many years, as the sole CAEP member from developing countries, Brazil's arguments in the CAEP process have always considered the issues faced by these States. In recent years, CAEP has welcome Egypt, Singapore and South Africa, which have brought more emphasis on the need to pay special attention to their environmental problems related to aviation. CAEP has also been enriched by new observers like the Arab Civil Aviation Commission (ACAC) that represents many developing States.

1.2 Noise has become, since the early 50's, the major problem of aviation, annoying people and communities around airports. To deal with this problem throughout the years, many technological improvements to reduce noise at the source have been accomplished. Noise reduction at the source has required a lot of research and efforts from the manufactures that have built quieter aircraft. However, the aircraft fleet renewal has also required heavy investments by the air transport industry. In the last decades, the Standards set by ICAO, which are contained in Volume I of Annex 16 to the Convention on International Civil Aviation, have evolved bringing more stringency levels to aircraft noise.

1.3 Over the years, noise policies such as the withdrawal from service of Chapter 2 aircraft to be accomplished by the year 2002 and the recently standards proposed by CAEP 5, as a new Chapter 4, have already obtained significant results and are expected to reduce even more overall noise levels around airports (noise curves) and the number of people exposed to aircraft noise.

1.4 Noise reduction at source has been pursued by the Committee on Aviation Environmental Protection (CAEP) as the main way to deal with aircraft noise. However, it has lately been noted that, in the future, further reductions by means of continuing the replacement of noisier aircraft will bring worldwide costs of fleet renewal to hundred of billions dollars (US) per year (Figure 1). According to the different levels of stringency and several options analyzed by CAEP 5, overall costs related to these noise scenarios could reach such value if adopted a minus 14 EPNdB with a rapid phase out to non compliance aircraft. This figure can indicate a clear trend if further aircraft noise reduction with a more stringency option is implemented and can also give an idea of the financial burden to the air transport industry.

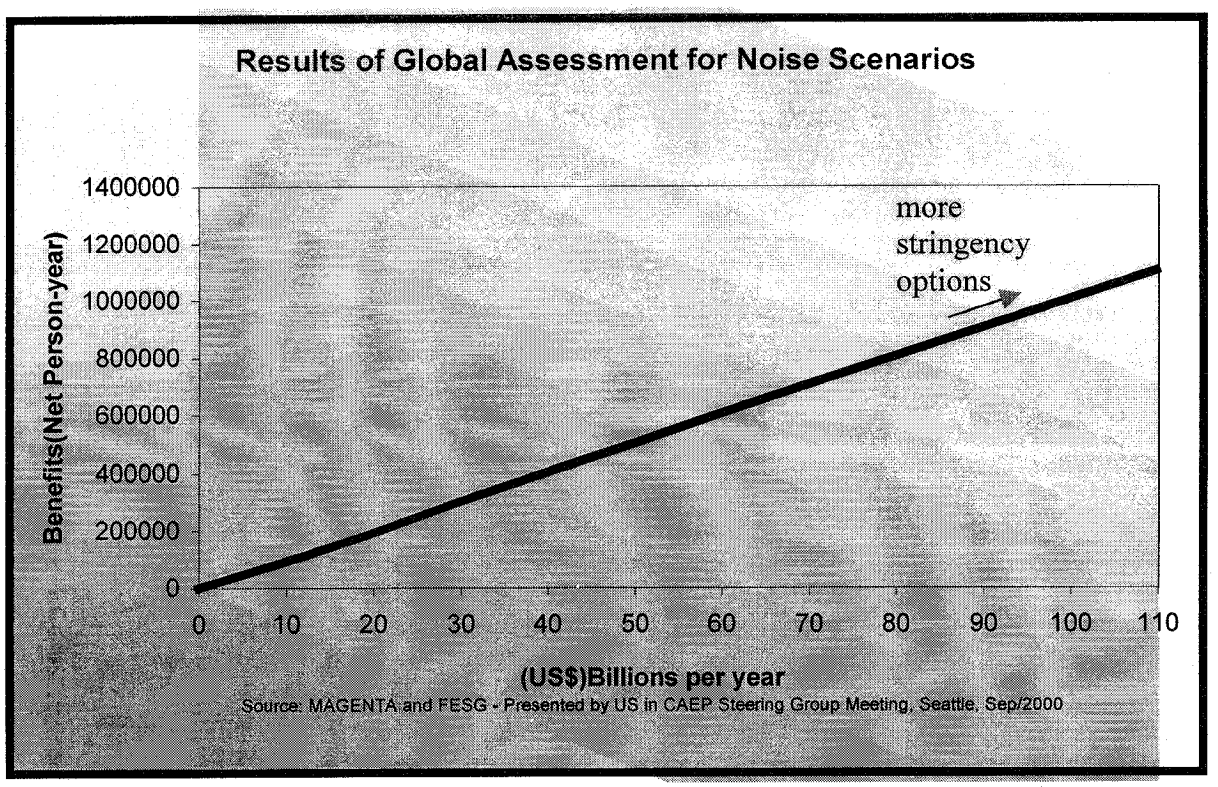

Figure 1 – Results of Global Assessment for Noise Scenarios

1.5 The global assessment for noise scenarios shown in Figure 1 resulted from several studies carried out by CAEP since 1998, within its Work Program, in particular by the Forecasting and Economic Support Group (FESG) and by the WG2 Task Force (FIR/WILE Lab.) - Model for Assessing Global Exposure to the Noise of Transport Aircraft (MAGENTA). These studies evaluated the effects of a new noise standard for jet aircraft with more stringent levels than the present Chapter 3, for different scenarios. It is important to point out that these studies did not considered the need of developing countries to fly in and out non-exemption regions (Europe and North America). However, based on FESG and MAGENTA reports, CAEP 5 members unanimously agreed:

> **"to recommend an amendment to Annex 16, Volume I involving an increase in stringency of 10 EPNdB relative to the current Chapter 3 cumulative levels. Trade-off would not be permitted and the sum of the certification margins at any two points should be at least 2 dB".**

When supporting this recommendation, members from developing States reiterated their objection to any phase out and particularly to the possibility that operation restrictions could be impose to their airlines flying in and out the European region. It was emphasized by the CAEP 5 meeting that this new noise standard was only intended for certification purposes and that it will not be used as the basis for any new operational restrictions such as phase out. In answering these concerns, members from European States mentioned "there had been several statements at a political level in Europe indicating that, whatever action is taken, the situation of developing States would be taken into account". CAEP members from Brazil, Egypt and South Africa are strongly opposed to the implementation of operational restrictions based on this new aircraft noise certification standard because the significant economic impact to developing countries.

1.6 Another essential issue raised in CAEP 5 referred to the population growth in areas around airports. Uncontrolled population growth near airports is a matter of particular importance when considering a balance approach since aircraft noise is a pollution that does not accumulate in the environment and dissipates when the listeners are far from the source. In particular, the MAGENTA report considered as a key assumption that population distributions do not change with time, meaning there will not occur any growth in the future within 55 DNL noise contours. Thus, it becomes necessary to follow very close the pace of residential developments in these areas to guarantee that the gains in aircraft noise reductions will not be off set by further housing encroachment on areas adjacent to airports.

1.7 In fact, aircraft noise has been mostly affecting and annoying people and communities around some European airports. However, overall data presented in the MAGENTA report indicates an average improvement in the noise climate. As shown in Figure 2, even with no further action by ICAO, world noise climate around airports will be better off during the next 20 years with the retirement of noisy Chapter 2 aircraft than before 1998, assuming that population will not change and aircraft fleet will be replaced by age and cycles in a natural retirement process.

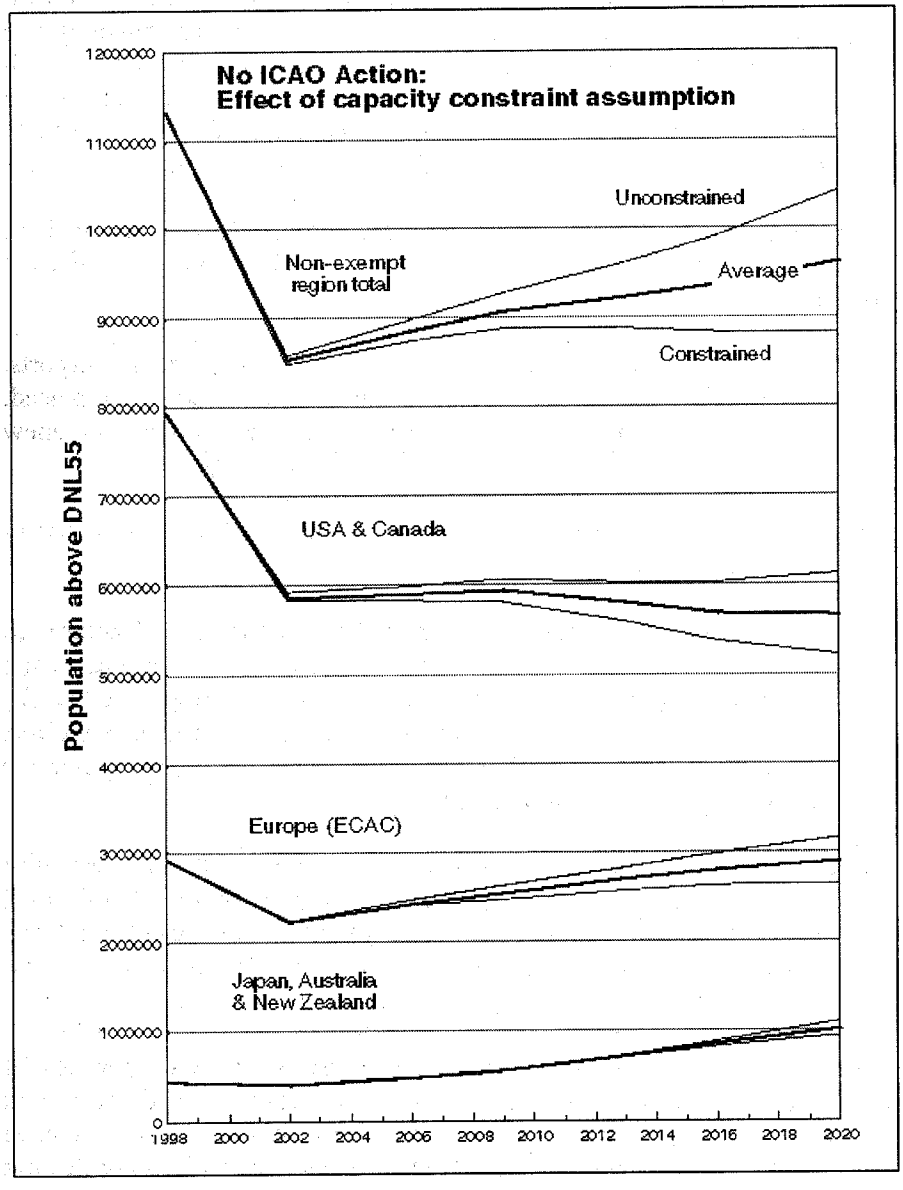

Figure 2 – MAGENTA Assessment of Noise Policy Scenarios - No ICAO Action: Effect of Capacity Constraint Assumption

1.8 The concerns related to increasing population around airports are well funded since it comprises the other side of the equation to solve the aircraft noise problem. For many years, the emphasis has been on reducing aircraft noise at the

source. It is now time to really address the listener side of that equation. As shown before in this presentation, continuing efforts to reduce aircraft noise will be extremely expensive, and for this reason, compatible land-use planning and control is a vital tool in ensuring that the gains achieved by the reduced noise of the latest generation of aircraft are not offset by further residential developments around airports. Enforcement of proper land use policy by local authorities will help to prevent an increase in the number of people affected by aircraft noise as a consequence of unsuitable development. A compatible land use planning and control also helps to avoid unreasonable constraints upon airport capacity and air transport. Local authorities need to be also involved since land use is usually under the jurisdiction of municipal government.

2 THE BALANCED APPROACH

2.1 The challenge for civil aviation is how to deal with continuous growth of air transport in an environmentally sound way. It will probably require a comprehensive strategy that allows a balanced approach to the aircraft noise problem including its four distinct and complementary elements: reduction of noise at the source, improved land use planning and control, wide use of operational procedures and operating restrictions. It seems that three of the four elements of such balanced approach have received fair attention. Now, the fourth element - land use planning and control - needs to become the focal point for future CAEP action. Despite differences among States, regions and localities, CAEP should seek to explore and develop an internationally agreed ICAO framework to deal with aircraft noise in a broader scope.

2.2 The balanced approach with an internationally agreed ICAO framework is needed to standardize, as much as possible the process within which Contracting States will deal with noise issues, eliminating the proliferation of local noise restrictions that has been applied in different ways by airports.

2.3 Noise reduction at the source is the most efficient way to diminish community noise annoyance around airports. However, it is a long-term solution that will only produce full results when current aircraft are retired and replaced. Furthermore, this solution puts the burden of noise reduction mainly on airlines, particularly when accelerating fleet renew by phasing out noisier aircraft.

2.4 As another means of providing noise reduction, operational measures and curfews may impose airport capacity constraints and significant costs to the international commercial air services.

2.5 Besides reducing noise at the source and by operational procedures, proper land-use planning and control to prevent inappropriate developments around airports, such as residential, is an important issue towards a balanced approach to address community noise exposure and should be emphasized. Communities should also take responsibility for measures that can guarantee and harmonize the aviation activities and noise climate around airports. An intensive effort should pull together aviation and local authorities to avoid further residential encroachment when planning new or extending roads and utilities that support and foster housing projects towards airport boundaries.

2.6 It is widely known that many airports in the world have been encroached by incompatible uses because local authorities have not taken early action denying applications to residential development. That lack of commitment has led to a number of situations where the only solution left is to adopt costly operating restrictions. Land-use planning and control have to be viewed as a powerful tool in preventing or reducing the number of people exposed to aircraft noise and so avoiding pressure for administrative constraints and operational restrictions on airport capacity.

2.7 As an example, since 1984 Brazil has been implementing "Noise Compatibility Plans" with the cooperation of local authorities for most of its major and medium size airports. Since these plans establish restrictions to land-use around airports, they have managed, in many cases, not only to prevent incompatible developments around airports, but also have kept population density near the same level when the plan was first enforced. In some cases, where local authorities did not implement "Noise Compatibility Plans" and people started making complaints after moving in those noisy areas, there was a clear argument for the airport authority to show that the problem was not well taken into consideration by local officials.

2.8 States and local authorities should strive to find reasonable and practical measures for dealing with aircraft noise in which land use planning and control will have to be carefully recognized as one possible solution. An internationally agreed ICAO framework can bring the basis to consider all options and to ensure a fair weighting of both sides of the

aircraft noise equation – the source and the listener. When considering the listener, people living around airports plays an essential role and population growth and distribution needs to be well controlled.

3 POPULATION GROWTH CONTROL

3.1 The proper development of land uses around airports depend on planning activities which usually are not committed to airport authorities but primarily the responsibility of local authorities, although its implications go beyond the local level, affecting airport capacity and consequently the international air transport.

3.2 Keeping population growth from restricting airport operations is then an international concern, since a large number of airports in the world that have little or no noise problems would be affected by the implementation of new noise rules for the benefit of a much limited number of airports. The adoption of a new noise certification standard, as the new Chapter 4, will certainly impose additional costs to international air transport.

3.3 The demand for imposing noise limits or operating restrictions to Chapter 3 aircraft based on environmental pressure must be supported by the States' commitment to develop actions aiming at the prevention and control of population density around jet airports in the world.

3.4 Population growth around airports has not occurred in the same way in all regions of the world and varies in different States and localities. Thus, it is clearly necessary to assess population density evolution around the world's jet airports to identify the regions where the problem of airport encroachment has been most serious, since in some cases land-use planning and control have not been applied properly.

4. CONCLUSIONS

4.1 In the interest of ensuring that aircraft noise reduction gains are not offset by inappropriate noise sensitive development around airports, BRAZIL would like to propose that:

a) ICAO should pursue a Balanced Approach strategy by developing an internationally agreed framework that could provide Contracting States with the necessary tools to address in a broader scope aircraft noise problems with very clear steps to consider all possible options to deal with it in a cost-effective manner and allowing operating restrictions just as a last resource measure after a full consideration of other possible alternatives included in the ICAO framework on an airport-by-airport basis.

b) CAEP should include in its work program an assessment of population growth around the world's jet airports. This work program should help identify and monitor cases where this problem is most severe, allowing further discussions of the Balanced Approach and reviewing the ICAO's international agreed framework based on deeper studies concerning not only aircraft noise (source) but also including the communities and people (listeners) exposed to it;

c) Develop continuous research efforts within CAEP's work program to identify and monitor noise sensitive airports in the world, through the elaboration of historical and up to date analysis of these airports, reporting all measures taken to deal with aircraft noise at the source and from the listeners point of view.

- END –