Aviation and environmental pollution:

International efforts for cleaner and quieter skies

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ABSTRACT

The focus of this work is to evaluate the various efforts being made internationally, to address the issue of the aviation environmental pollution. There are inherent problems with the enforcement of rules created by the International Civil Aviation Organization. I have attempted to focus the discussion on the place these rules have within the framework of Public International Law. Secondly, I present the approach that is being taken by the states of the European Union, and how they deal with the problem of pollution caused by aviation activities. There is a discussion about the measures and legislations that are enacted by the Union and how that addresses local and international concerns related to aviation pollution.

I conclude the discussion with the new development of the EU's pushing for the inclusion of aviation within the Emissions Trading System. Emissions trading would be a better alternative to non-implementation of SARPS, due to the inability of the international community to apply them uniformly. However, Emissions Trading is not to be seen as a substitute for SARPs.

In my final evaluation there is a discussion of the best way forward for the international community. An integrated, international approach which takes the Emissions Trading initiative of the EU and complements that with other steps towards mitigating green house gas emissions and reducing noise pollution.

RESUME

Le but de cette étude est d'évaluer les différentes solutions proposées au niveau international pour répondre au problème posé par la pollution liée à l'activité aéronautique. L'Organisation de l'Aviation Civile Internationale a préconisé certaines mesures en la matière ; cependant la mise en place et l'exécution de ces normes présentent de nombreuses difficultés.

Dans un premier temps, mon étude s'orientera sur la portée de l'application de ces normes sur l'ensemble des règles du droit international public. Puis, je présenterai l'approche choisie par l'Union Européenne (UE) pour résoudre ce problème de pollution engendrée par les activités aéronautiques. Il existe un débat au sein de l'UE relatif aux mesures et règlementations adoptées récemment dans ce domaine, mettant en exergue les inquiétudes au niveau local et international.

En conclusion, je traiterai des dernières pressions exercées par l'UE pour inclure l'aviation dans 'le Système Communautaire d'Echange de Quotas d'Emissions (SCEQE)'. L'échange de quotas serait une meilleure alternative à la non-application des Normes et Pratiques Recommandées (SARP), en raison de l'incapacité de la communauté internationale d'appliquer ces dernières de manière uniforme. Cependant, les échanges de quotas ne doivent pas être considérés comme un substitut des SARP.

Dans la dernière partie, une discussion sera menée à propos de la meilleure voie à suivre par la communauté internationale. Une approche internationale intégrée qui prenne en compte l'initiative du système d'échange de quotas de l'UE et le complète avec des mesures permettant la réduction des émissions de gaz à effet de serre et de la pollution sonore.

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Introduction

Aviation has become an important force in the world of commerce, international politics, and various levels of national rulemaking. It is a very dynamic area of activity. This dynamism results in a constantly evolving world of international civil aviation. If we peek a little into the future, we can identify the factors that will determine the course aviation will take and where these changes will be rooted. This is important to understand the challenges that the future will bring.

The scope of activities in the aviation industry and their growth will be directly affected by the gross national products of states, international trade, world geo-politics, oil prices, environmental concerns, regional development policies, impact of new communication technologies, mobility, management of time and organization of production, technical aerospace developments, air transport organization and policy, deregulation policies of States, industry structure, airspace congestion, competition from high-speed trains and marketing innovations.[1] While all of these factors are important and should be a subject of analysis, this work will specifically focus on aviation and its impact on the environment. The discussion about aviation pollution has taken centre-stage over the past few years and is the focus of international civil aviation policy making. However, this focus has not made it possible for States to find mutually acceptable solutions to tackle the problem effectively.

I have divided this discussion into two principal parts: Part A and Part B. These parts look at two major directions that the world community is moving in, in terms of tackling the problem of aviation pollution. On one side, we have the International Civil

[1] Cornish J., J. Nicell and A.D. Groenwege (1996) 'The Greening of Aviation,' Transport Canada Publication No. TP 12543E/F 1996 at 5.

Aviation Organization (**ICAO-Organization**), which forms the bulk of my discussion in Part A. Then through Part B we look at the European Union (**EU-Community**) with its model legislations, and the current push for Emissions Trading. EU's fight against aviation pollution is the subject matter for Part B. Finally, I will try and evaluate which of the various employed means, to tackle aviation pollution, is the most effective.

Part A - Chapter ONE

Growth of the aviation industry and impact on the environment

Civil aviation has transformed itself to becoming the lifeline of modern day business and transportation. More than two billion people use aviation for both their commercial and personal needs to either get themselves or their goods from one place to another. This means that even though aviation is key to the development of the world economy, it still contributes its part to global greenhouse gas emissions. In addition to the problem of greenhouse gas emissions, aviation activities also create noise pollution, affect local air quality and contribute greatly to the creation of contrails in the upper atmosphere. This chapter will focus on outlining the contribution aviation activities make towards environmental pollution, augmenting the problem of climate change. Also, I will highlight how international aviations' attempts complement the world's commitment to fight the growing menace of climate change.

Chapter TWO

SARPs: effectiveness in addressing environmental impact through Annex 16

This Chapter evaluates the Standards and Recommended Practices (**SARPs**), which are found in the Annexes to the Chicago Convention of 1944 (**Convention)** as rules of

international law. SARPs are brought out by ICAO to combat various problems in civil aviation and provide a regulatory framework for its functioning. This chapter will present an overview of ICAO's work in the area of pollution mitigation, with focus on noise pollution control and greenhouse emission mitigation. The Organization was placed at the forefront of international regulation of civil air transport activities as early as 1944. Working through its Committee on Aviation Environmental Protection (**CAEP**) since the early 1980's, (which was mandated to work in the area of environmental protection) ICAO has done considerable work in trying to mitigate the impacts of pollution caused by aviation activities. However, SARPs need to be evaluated to ensure that exorbitant resources do not continue to be allocated to set these standards. These standards are not always enforced, as ICAO cannot guarantee their implementation. SARPs and their place within rules of public international law will be one of the focuses of discussion in this chapter.

Given the various initiatives across different organizations in continental Europe and other regional organizations around the world, there is a lot of re-thinking that has been happening within ICAO, especially about its role in the changing world environment. Newer initiatives, possible obstacles to implementing them, and ICAO's plans for the future will be summarized in this chapter.

Part B - Chapter THREE

Europe and emissions trading: a new way forward?

The EU has been somewhat of a model in terms of institutions and legislation that facilitate pollution mitigation efforts. The EU has over the past decade identified its existing and new concerns, put into place legislation and also emerged as a loud dissenting voice in the world community when it came to agreeing with its partners about aviation's non-inclusion in the ETS regime. Now that the EU has put its plans about the Emission Trading Scheme (**ETS**) for aviation into action, this chapter will provide an overview of EU's work in the area of noise and emissions. I will highlight how the EU has worked with and without ICAO to meet its pollution challenges. The 37th General Assembly of ICAO concluded with severe dissent over how to move forward with the issue of ETS. The EU will now be in the eye of the storm as it continues to progress with its ETS plans. The steps being taken within the Community will have diplomatic and economic repercussions, both of which are a concern in the EU and outside. I will also briefly look at the EU's attempts of enforcing environmental standards through its bilateral agreements. This chapter outlines initiatives, problems and methods that the EU will use to manage both its pollution concerns and its diplomatic aviation relationships with other States.

Chapter FOUR

Lessons for the future and the way forward

Having gone through the discussions on how international efforts, ICAO SARPs and newer initiatives by countries like those in the EU, have differing effectiveness on the problem of pollution, I will provide conclusions of what emerges as the best way forward. Finally, I will identify the strengths and possible benefits, which different approaches will

bring to dealing with the problem of aviation pollution. From completely opposing points of view of States on ETS, lack of effective implementation of SARPs and little role of international efforts, common ground is yet to be achieved in the fight against pollution. Pollution caused by international civil aviation is not a problem that can be tackled by one State, nor can efforts be spread in different directions as all States are interlinked in their aviation activities.

These recommendations will be an attempt to ensure that aviation's fight against pollution and the protection of the environment doesn't only remain a dream for the proponents of sustainability.

PART – A

CHAPTER ONE: Growth of the aviation industry and impact on the environment

Pollution is defined as:

"*The introduction by man, directly or indirectly, of substances or energy into the environment resulting in deleterious effects of such nature as to endanger human health, harm living resources and ecosystems, and impair or interface with amenities and other legitimate uses of the environment.*"[2]

The ecological systems we inhabit are governed by certain laws of nature and should be treated as one inter-connected whole. In addition to the laws of nature, human beings are bound by the continued development of science and technology, which results in the disturbance of these systems.[3] If economic development progresses unchecked and we are unable to find sustainable methods of conducting our activities, the environment will not be able to support life as we know it.

The 21st century saw the emergence of a very important human activity. In less than fifty years, aviation has positioned itself at the center of all activities, related to commerce and transport. To initiate a discussion about international regulation of aviation activities, we look at ICAO as the forum for negotiations and decision making. The institutional structure of ICAO has been in existence for over half a century.[4] The Organization was formed in

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[2] Article 1 (4) of *United Nations Convention on the Law of the Sea* 10 December 1982, 1833 UNTS 3; 21 ILM 1261and Part (A) Annex of the OECD Council Recommendation on Transfrontier Pollution (1974) *quoted in*: the Draft International Covenant on Development and the Environment, online < http://www.i-c-e-l.org/english/EPLP31EN_rev2.pdf> (date accessed: 10 May 2008).

[3] S Bhatt, *Environmental Law and Air Law* (Radiant New Delhi, 1980) at 141.

[4] ICAO was formed under the *Convention on International Civil Aviation*, (1994) 15 U.N.T.S. 295 signed at Chicago in 1944 (**Convention**).

attempts to place regulation of civil aviation activities on an international forum. There was an expectation that ICAO was going to be the place where consensus would be the norm and all states could work together for the development and regulation of this important economic sector.

Aviation has remained a major economic engine through the past five decades, and continues to greatly influence and support growth of economies. Since the mid-twentieth century, there has been such expansion and development in the aviation sector, from a merely nascent industry where only a few could afford the pleasures of flying, to the shape it has taken today. It is projected that by 2010, air travel will be the fastest growing means of travel,[5] and with least instances of accidents and loss of life, as compared to travel by road, train and the like, it will also be the safest means of travel.[6] What has not been achieved, however, is an international consensus and bringing everyone on board to achieve results when it comes to crucial issues surrounding aviation. Climate change and aviation's contribution to it is now emerging as one such urgent issue. Undoubtedly, there are many identifiable achievements of ICAO, but today the Organization is struggling to find a relevant space, as far as the framework of aviation in the twenty-first century is concerned. In addition to ICAO, we have seen many domestic initiatives and rules being made within the US, the EU and other states and groups thereof.

Scope of the discussion

This discussion will focus on the following aspects:

[5] Online: Research Wikis <http://www.researchwikis.com/Airline_Market_Research> (date accessed: 30 September 2008).
[6] Flying Safely into the 21st Century, The Theme for the 2007th edition of Intrnational Civil Aviation Day Montreal, 2 December 1998, online: ICAO <www.icao.int/icao/en/nr/1998/pio199814_e.pdf> (accessed: 10 June 2008).

1. ICAO and its role in aviation pollution mitigation and the contribution of the SARPs in this process; and
2. The other international initiatives that are directed to confront the aviation pollution problem.

Since the early 1980's, there has been a lot of movement in ICAO to address the problem of pollution reduction and mitigation; however the effectiveness of its work needs to be evaluated. Looking at this role, it would be very easy to point out the various problems that the organization faces. Its critique would be easily available. The areas where there is much to do, and what ICAO hasn't been able to achieve. Contrarily, the first two chapters will attempt to take a different route. They will focus on the problem of aviation's contribution to the problem of climate change, and ICAO's achievements in aviation pollution mitigation. Credit will be given where it is due and finally an evaluation will be made of what is its contribution, in the field of aviation emissions and noise mitigation.

ICAO presents a worthy case study of how effective rule making is by international institutions in the realm of public international law. Such an analysis will be a contribution to the rather scarce literature that is available in making a case, for what pragmatic and positive changes international rule making by institutions needs to bring about in the future. And specifically for aviation, how can existing mechanisms be modified to make environmental protection, one of the more important issues international aviation tackles. Subsequent to this evaluation, I will place the EU in contrast to ICAO and its efforts, and how the EU's efforts to introduce aviation in its ETS program will impact aviation's fight against pollution in future.

We can start with this recent acknowledgement of ICAO's role by the Former US Under-Secretary for Policy, Jeffrey N. Shane:

> *"For those of us who have spent years toiling in the vineyards of international aviation, ICAO occupies a special status, both as an organization instrumental to the success of international aviation, and as a place where we have formed so many lasting friendships with aviation leaders from around the globe. For me, ICAO embodies the best of international aviation - as an organization in which nations and aviation stakeholders work together towards common solutions, and where sharp disagreements are resolved agreeably."*[7]

This acknowledgement seems to present a unique role of the Organization. It gives a pretty fair overview of what ICAO has been doing for the past decades. With this as a backdrop, let us examine the nature of the problem that aviation and the environment confront, and how ICAO has in the past contributed and can in future help to tackle it.

Nature of the problem

Increase in the demand for aviation services:

The aviation industry is going to face a challenge, which will be mounted by the ever increasing demand for the services provided by it. Aviation transports two billion passengers annually, and 40% of interregional exported goods (by value), 40% of international tourists travel by air.[8] This is the existing nature and size of the market. The number of air travelers is expected to double by 2025.[9] But the number of passengers is merely a small aspect of the

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[7] Jeffrey N. Shane, Under Secretary for Policy, United States Department of Transportation, ICAO Symposium on Liberalization of Air Transport in Asia/Pacific, Shanghai, China 26 May 2005.
[8] 'The economic & social benefits of air transport' *Air Transport Action Group publication* at 18, online: IATA <https://www.iata.org/NR/rdonlyres/5C57FE77-67FF-499C-A071-4E5E2216D728/0/atag_economic_social_benefits_2008.pdf> (date accessed: 25 June 2008).
[9] Dan Elwell, Assistant Administrator for Aviation Policy, Planning and Environment, 'Aviation and the environment, managing the challenge of growth' Presented to the Premier of North American Stakeholders, 19 March 2008.

industry. The industry as a whole is made up of innumerable little pieces, which translate into people being flown from one destination to another. If we look at the recent examples of growth around the world, in terms of passenger growth and its impact on aviation's contribution to pollution, (to try and put into perspective what quantum of problems we will see in the future), the expansion has been very significant. The three indices for domestic air routes in China, (including routes to and from Hong Kong and Macao) for example, which is one of the fastest growing aviation markets, reached 10.95 billion/km, 78.815 million passengers and 1.32 million tons in the first half of 2007, rising 16.1%, 16.2% and 11.3% year on year. The international air routes stood at 5.75 billion tons/km, 7.884 million passengers and 508,000 tons, up 27.4%, 21.8% and 27.2%, respectively.[10]

Airfreight is also expected to grow rapidly in the future. One reason is that traditional patterns of supply, where local consumption is met by local production, are giving way to global supply chains. Another reason is that two of the world's most populous countries, China and India, are moving into strongly liberalized and deregulated styles of economic activity and growth, or at least headed in that direction. This robust growth means that the fumes that will be the by-product of flights in and out of China will need to be dealt with. The growth is not confined to China alone. Economic indicators, as will be discussed further, show, how the industry will continue on its path of higher growth, with booming economic strength across the developing world. This is the nature of the task, all the players in the aviation industry see themselves mandated to deal with.[11]

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[10] Civil aviation industry growth robust, Hong Kong Trade and Development Corporation 10 Sep 2007, online: HKTDC < http://www.hktdc.com/report/indprof/indprof_070904.htm> (date accessed: 1 June 2008).

[11] It is important to note that even though pollution caused by aviation activities have taken center-stage in the political aviation discourse now-a-days the Chicago Convention of 1944 mandated ICAO with several other

Growth across geographical boundaries

Most of the analysis that is done, focuses on what will be happening in India and China in the next couple of decades, is understandable, as both these economies are the fastest growing aviation industries in the world.[12] But what is also interesting is that, even if we look at the developed and more saturated aviation markets, it is evident that the present trajectory will take aviation to environmentally unsustainable levels, especially with the growth of emissions causing climate change.[13] Thus, the growth of the new economies in Asia, Africa and Latin America, are not the sole drivers of pollution contributing to climate change. The existing markets have their share in the problem.

Today out of the 4 %, of what aviation contributes to world emissions, of greenhouse gasses, the majority come from the crowded skies on both sides of the Atlantic.[14] Additionally, between 2005 and 2050, emissions are expected to grow fastest from aviation, tripling over the period, compared to a doubling of road transport emissions.[15]

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roles. Most of ICAO's work is outlined in the Convention through its various articles. Reporting of aircraft registrations (Article 21), Air navigation (Articles 22-28), Certification and licenses (Article 31-33) among others.

[12] Economic growth will not be greatly impacted in India and China, even though there is a downturn across the developed world. The World Economic Outlook predicts that both countries will continue to register growths of 8.0 and 9.5% respectively. *Global Prospects and Policies*, Chapter 1 at 2, online: BBC News < http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/09_04_08_imf_full.pdf> (date accessed: 10 June 2008).

[13] FAA annual reports on aviation fuel burn and NOx emissions clearly provides that the share of North American and Western European emissions is bigger than the rest of the world. Over the first six years of the 21st Century, there has been a constant increase in emissions and with the exception of Asia, no other part of the world has been able to compete with the American and European dominance in aviation fuel burn. *Source*: FAA: Global Aviation Emissions Inventories September 2006.

[14] Niklas Tessesm, *EU fights aircraft pollution* (Bellona Foundation) 26 June 2006, online: Bellona <gaseshttp://www.bellona.org/articles/articles_2007/paris_emissions> (date accessed: 25 May 2008).

[15] Emissions from the transport sector, *source:* Government of the UK, online: Treasury Gov UK <www.hm-treasury.gov.uk/media/8/D/Transport_annex.pdf> (date accessed: 10 June 2008).

When we look at the byproducts of aviation activities that cause damage to the environment, we can identify a few major culprits.

In the case of aviation, it is not just carbon dioxide emissions but condensation trails, cirrus cloud formation, and nitrogen dioxide emissions at high altitude, which are matters of grave concern. There is great uncertainty about the cumulative impact that aviation emissions have, on the broader problem of climate change, but the best estimate is two to four times the effect of carbon dioxide alone.[16] The environmental issues stemming from aviation activities can be categorized into: noise, emissions, fuel efficiency, waste of energy, materials and water, congestion and tourism and conservation. ICAO has been the leader through its international and regional work, in the area of environmental protection and concentrated to deal with emissions, noise and contrails formation. I will briefly introduce these problems and what work ICAO is doing, in dealing with them.

Important Aspects of Aviation Pollution

Aircraft noise:

The ICAO Environmental Report of 2007 (**ENV Report**) notes that aircraft noise is becoming the most important cause of adverse populace reaction related to the operation and expansion of the aviation industry, [17] whether it is infrastructural or related to air traffic. A broad analysis of aviation trends has revealed that, this will be the case in most of the parts

[16] Grayling, 'Building a Sustainable Aviation Policy' Tony Publication, *United Kingdom Environment News*, 1 June 2003.
[17] ICAO Environment Report 2007 at 20 (**ENV Report**).

of the world in future, in consonance with growth in the industry.[18] Looking at the evolving nature of the problem, ICAO has identified noise as one of its major thrust areas in terms of applying its mitigation efforts. Additionally, in the discourse that is taking place within the EU and the US aviation markets, noise has long been a major concern.[19] What is encouraging is that the levels of noise emanating from aircraft have gone down considerably over the past few decades. Some estimates suggest, that aircraft are over 75% quieter when they come out of manufacturing today, than their counterparts two decades ago.[20] As an introduction of what ICAO has done to deal with the issue of noise mitigation, it has identified four major areas of concern:

1. mechanisms to reduce noise at source;
2. land-use planning and management;
3. noise abatement operational procedures; and
4. operating restrictions.[21]

ICAO through its specialized secretariat in the Environmental Unit (**ENV**) has adopted something called the 'Balanced-Approach', to deal with the problem. A detailed discussion of this approach and how it has contributed in tackling the problem of aircraft noise, shall be undertaken in Chapter Two.

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[18] *Ibid.*
[19] For detailed discussion see Chapter 3.
[20] Manufacturing giant Airbus has been at the forefront of aircraft technology. It has always produced cleaner and quieter engines. The example of its A 380 is being marketed as a more fuel efficient and quieter aircraft, in comparison to its many predecessors: A380 Cleaner, greener, quieter and smarter May 2008, online: Airbus < http://www.airbus.com/en/aircraftfamilies/a380/index2.html> (date accessed: 15 June 2008).
[21] *Doc 9829 AN/451 revised in 2007*, ICAO balanced approach analysis to aircraft noise. Guidance document was developed by ICAO and published in 2004.

Greenhouse gas emissions:

The second problem that aviation activities cause is the contribution of greenhouse gases into the atmosphere, which are emitted as a result of burning carbon fuels. A quick perusal of the Intergovernmental Panel on Climate Change's (**IPCC**) Report on Climate Change[22] suggests, that even though aviation's contribution to greenhouse gas emissions is not markedly pronounced, there is definitely an urgency to deal with the situation. This need stems from projections that aviation emissions will only increase, in future.[23] Thus, it has become essential for all sectors of the industry to work together and try to bring a reduction in the levels of emissions.

ICAO's work in the area of emissions has not been solitary. It has established links and collaborations with many organizations within the United Nations (**UN**) family and outside, to participate in the battle against pollution. The ENV has been consolidating its work in the area, as emissions are seen to be the most pressing of all problems. The increase in greenhouse emissions has been monumental. In the last few decades, greenhouse gas emissions from human activities, has resulted in quantum leaps in the rise of global temperatures. Global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly since 1750 and now far exceed pre-industrial values over the

[22] Climate Change 2007, the Fourth Assessment Report (AR4) of the United Nations Intergovernmental Panel on Climate Change (IPCC), is the fourth in a series of such reports, the Report was adopted section by section at the IPCC Plenary XXVII (Valencia, Spain, 12-17 November 2007), represents the formally agreed statement of the IPCC concerning key findings and uncertainties contained in the Working Group contributions to the Fourth Assessment Report. *See*: Synthesis Report, at 59, online: IPCC <http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf> (date accessed: 15 November 2007).

[23] Contrails have contributed to an increase in temperature and are one of the precursors to cirrus cloud formation. *See*: Yaw Otu Mankata Nyampong, *The Regulation of Aircraft Engine Emissions from International Civil Aviation* (LLM Thesis submitted to McGill University 2005) at 11. (**Nyampong**). *Also see*: Increase in passenger numbers are expected to be 6-7 % over the next decade while aviation's contribution to emissions will be more than 5% by 2050, Volker Mohnen, Aircraft Emissions and Air Quality, BIAS meeting WDC, March 2008.

past 650,000 years.[24] This finding by the IPCC has resulted in a wake up call for global political and industry leaders. The problem is now very real.

Formation of contrails:

Contrails are line-shaped clouds or 'condensation trails,' composed of ice particles that are visible behind jet aircraft engines, typically at cruise altitudes[25] in the upper atmosphere.[26] Contrails have been a normal effect of jet aviation since its earliest days. Aircraft engines emit water vapor, carbon dioxide (**CO2**), small amounts of nitrogen oxides (**NOx**), hydrocarbons, carbon monoxide, sulphur gases, soot and metal particles formed by the high-temperature combustion of jet fuel during flight. Even though certain atmospheric conditions are necessary for the formation of contrails, there are certain key factors that include aircraft engine technologies that affect emissions and conditions in the exhaust plume; amounts and locations of air traffic and background atmospheric humidity conditions. Thus, future aircraft technologies will need to be improved to tackle the problem of contrail formation. There have been constant attempts of bringing contrail formations and the use of bunker fuels on the international environment agenda.[27] As of today, the discussion around bunker fuels has been inconclusive.[28] We will need to keep watching for developments in this area given that the Kyoto Protocol is up for renewal in 2012.

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[24] Evidence of Human-caused Global Warming 'Unequivocal', says IPCC, 2 February 2007, online: UNEP < http://www.unep.org/Documents.Multilingual/Default.asp?ArticleID=5506&DocumentID=499&l=en> (date accessed: 15 May 2008).
[25] A level determined by vertical measurement from mean sea level, maintained during a flight, online: Airliners <http://www.airliners.net/aviation-forums/tech_ops/read.main/111489/> (date accessed: 30 May 2008).
[26] Space Science and Engineering Center, University of Wisconsin-Madison, online: CIMSS <http://cimss.ssec.wisc.edu/wxwise/class/contrail.html> (date accessed 30 May 2008).
[27] Bunker Fuels Under Scrutiny at Shipping, Climate Meetings, *Bridges* Vol. 8, April 2008 International Center for Trade and Sustainable Development, online: ITCSD <http://www.ictsd.org/biores/08-04-18/story1.htm> (date accessed: 15 May 2008).
[28] Background information on the work of the Subsidiary Body for Scientific and Technological Advice (SBSTA), online: UNFCCC

How much does aviation contribute to the overall environmental damage?

Aviation emissions are 0.7 billion tonnes of CO_2 annually, that is approximately 2.6% of global green house gas emissions. [29] Aviation's contribution to climate change is two to four times greater than these CO_2 numbers suggest, because greenhouse gases are more potent when released higher up in the atmosphere. Taking into account non-CO_2 effects, aviation would account for some 5 % of total global warming by 2050.[30] In identifying what areas of our lives are affected by these emissions, we can shortlist what is under threat by the toxic fumes by flying airplanes:

1. preservation of natural resource wetlands, wildlife and ecosystems;
2. preservation of cultural and archaeological resources;
3. air quality, water quality and hydrology;
4. aesthetics and visual quality;
5. hazardous materials transport; and
6. energy management and alternative fuels.

As the world moves towards a more affluent way of life in the development of our societies, energy consumption is going to continue to rise steeply, based mainly on burning fossil fuels.[31] As the world economic growth impacts aviation directly, estimates suggest a

<http://unfccc.int/adaptation/methodologies_for/vulnerability_and_adaptation/items/3416.php> (date accessed: 15 May 2008).

[29] World Resources Institute 2005, online: Gristmill <http://gristmill.grist.org/story/2006/12/20/164722/11> (date accessed: 15 May 2008).

[30] Increase in passenger numbers are expected to be 6-7 % over the next decade while aviation's contribution to emissions will be more than 5% by 2050, Volker Mohnen, Aircraft Emissions and Air Quality, BIAS meeting WDC, March 2008.

[31] Mariano Bauer, 'Transport and the environment: can technology provide the answers?' (1996) 24 no. 8 *Energy Policy* at 685.

5% annual increase in demand for aviation services over the next two decades.[32] This means a sustained maintenance of pollution levels. We can now look at how these pollution levels shall continue to sustain and the direct co-relation between pollution and uncontrolled economic development.

Economic development and the aviation industry

The aviation industry's growth is directly tied to the economic growth worldwide. In the past decades, most of the capital flows and growth was seen in the Western hemisphere, and thus the markets in this geographical area were flooded with booming industries. The aviation markets in Western Europe and North America saw a huge boom for many decades, till they reached saturation and the economic growth of these industrialized nations stagnated at around 2% and its whereabouts for the past decade. Aviation too began to see the effects. This of course doesn't entirely have to do with good or bad business; it's merely a part of the economic cycle, which has saturated in terms of growth of passengers, routes and discovery of newer markets.

As economic growth engines move to the East, the countries in Asia, Africa will see considerable growth in their aviation sectors, and as explained above, this growth is directly tied to the robust economic activity that is happening there. It is not merely the number of passengers and the additional number of aircraft, flights per day, it is a combination of

[32] Haywel Davis, 'The sky's the limit' (2000) 2 no. 3 Air and Space Europe at 13.

number of passengers, cargo, tertiary industries, airport infrastructure etc., which brings about this push.[33]

Asia is expected to spearhead the growth in the world's travel industry in the next years. And where growth is concerned, there is always conflict between environmentalists and business leaders of how much growth can be sacrificed or stemmed to make sure it does not threaten the sustainability of our resources.[34] The International Air Transport Association's (**IATA**) forecast in October 2007 has projected consistent growth in all sectors of the aviation industry over the next five years. Passenger numbers are expected to rise between 5-7 % with the highest increase expected in the Middle East (6.8 %), pushed greatly by regional economic strength, while the freight increase will be in the range of 3.5 – 4 %. The least rise is focused around North America, owing majorly to the rise in fuel costs and the sluggish economy. However, the report forecasts very strong global air traffic growth well into the next decade. IATA also goes on to identify the key risks that will befall the industry with this sustained growth, even in times of economic distress and often times lop sided geographical advances.

[33] 2008 saw Hyderabad (India) open a new airport with an initial capacity of 12 million passengers. A 17 million passenger capacity airport opened in Bangalore a few weeks after its Hyderabad counterpart (May 2008). The Indian government is upgrading 50 airports around the country. China, now the worlds second-largest air travel market, is spending $62 billion on building 97 new airports by 2020, up from about 147 airports now. Both Shanghai and Beijing have built additional airport capacity to meet both the expected rising demand this year and for the future. *See*: Rob Corben, 'Aviation Industry Looks to China, India for Growth' (February 2008) online: Voice of America <http://www.voanews.com/english/archive/2008-02/2008-02-08-voa10.cfm?CFID=8909184&CFTOKEN=38875579> (date accessed: 15 March 2008).

[34] Frank Jordans, Aviation industry says it will address climate change, but reject targets, 22 April 2008, online: CNEWS <http://cnews.canoe.ca/CNEWS/World/2008/04/22/5358371-ap.html> (date accessed: 15 May 2008).

IATA recognizes that airlines have made significant progress in reducing their environmental impact but, as a growing industry, the impact on the environment remains a serious issue.[35] While on the one hand we have a booming industry, and on the other we have international regimes, which are struggling to remain effective when it comes to pollution mitigation and imposition of high technology and efficiency standards.

During the writing of this work, there have been some drastic changes in the economic situation of world economies and all industrial activities have been negatively affected. There has been a complete slowdown in economic productivity and the aviation industry, like all other economic sectors, has had to face sudden falls in passenger demand and a shrinking of the world aviation market.

It is not uncommon to see economies go through cycles of boom and recession, and these cyclical changes affect the output and forecasts of all industrial activities. The aviation industry is not immune to these changes and thus the past six months have seen its forecasts changing drastically.[36] But in all these fluctuations it is important to underline that regardless of the growth and periodic recession in world markets (presuming that like all other recessions, this one will also be short-lived), the problem of pollution caused by aviation activities is not greatly altered. The fall in demand and fluctuations in the aviation industry is not sufficient to make us overlook the long-term impact of the problem of pollution caused by aviation. The key is to make note of the fluctuations in the market, yet measure and keep focus on long-term trends and impacts of activities and the resulting pollution.

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[35] IATA Economic briefing, passenger and freight forecasts, 2007 -2011, brought out in October 2007 by the International Air Transport Association at 3, online: IATA <www.iata.org/economics> (date accessed: 15 May 2008).

[36] IATA Financial Forecast March 2009, online: IATA <www.iata.org/NR/rdonlyres/DA8ACB38-676F-4DB1-A2AC-F5BCEF74CB2C/0/Industry_Outlook_Mar09.pdf> (date accessed: 2 April 2009).

Technological developments not always able to cope with growth in the industry

Focus on fuel efficient aircraft technology:

Over the past decades aircraft technology has improved to the extent that new aircraft are 70% more fuel efficient than 40 years ago. There is a definite thrust by airlines to further achieve 25% more fuel efficiency by 2020. Modern aircraft achieve fuel efficiencies of 3.5 litres per 100 passenger km.[37] But in all these efforts there are problems of product development cycles, which range from around 15-20 years. With the way aviation is growing and pollution likely to follow an upward trend, such timelines are detrimental to achievement of sustainability in environmentally friendly flying. Also, as technologies improve, it becomes more expensive for companies to invest in further perfection of existing standards thus the inherent reluctance to push for further improvement in aircraft.

Long haul flights are environmentally friendly:

The increase in long-haul flights often becomes a subject of critique. However, in terms of fuel use and emission levels per passenger, short range planes are found to consume more fuel per kilometer, which owes itself to occurrences of take off and landing and lower passenger intake.[38] Since medium and long-haul aircrafts tend to take in near full passenger capacity, in practice it is seen that they can achieve better fuel efficiency per passenger per kilometer.[39] There is definitely a general thrust by both aircraft manufacturers and airlines to shift to better technologies and newer aircraft. Most airlines already use

[37] Environment and fuel efficiency, International Air Transport Association, online: IATA <http://www.iata.org/whatwedo/environment/fuel_efficiency.htm> (date accessed: 20 June 2008).
[38] *Ibid.*
[39] Does the type of aircraft matter? Ecotraveling.co.uk, online: Eco Traveling <http://www.ecotravelling.co.uk/DoesTheTypeOfAircraftMatter.html> (date accessed: 20 may 2008).

advanced technology and processes, technology being the key to reducing aviation's environmental impact and increasing eco-friendly flying in the future.[40] With big legacy carriers buying larger, latest technology, long haul aircraft, we can expect that the future will see better days in terms of environmentally friendly skies. The balance which still needs to be achieved would be faster paced technology, in line with growth of the industry.[41]

Need for a balanced approach in analyzing aviation pollution mitigation efforts

Whenever we look at any international organization or the initiatives and responsibilities undertaken by it, the context in which they work needs to be clarified. There is always an unfortunate burden of innumerable expectations that are placed on any international organization and its initiatives. ICAO hasn't been left unscathed by this phenomenon either. The element of political will and the desire of States to actually back rhetoric with action are always left out of any critique or discourse. There has to be recognition that, whenever anything is being undertaken on an international forum, there will be an underlying principle for all States to protect what is inherently their right and national interest. This national interest can be political, merely economic or even diplomatic sometimes, when for some reason relations with other States dictate foreign policy. The context in which any analysis of international policy making is attempted, has to be filled

[40] Boeing and Airbus join forces to improve aviation's environmental performance, 22 April 2008, online: Airbus <http://www.airbus.com/en/presscentre/pressreleases/pressreleases_items/08_04_22_boeing_airbus_join_forces.html> (date accessed: 15 May 2008).
[41] British Airways to buy 12 Airbus A380 aircraft for long haul fleet, 27 September 2007, online: Airbus <http://www.airbus.com/en/presscentre/pressreleases/pressreleases_items/07_09_27_british_airways_12_a380.html> (date accessed: 7 December 2007).

with the reasonable dose of bravado, realistic domestic constraints and diplomatic twists and turns. The simplest example of this is the decision of the US to stay out of the Kyoto framework and not ratify the treaty. On the other hand, we have legislation that is made within the EU that stems out of the will of the members of the group, thus making it workable. And even within the EU there is never complete uniformity, and member states continue to go their own way on issues they find national interest compromised.

Perusal of statistics on aviation helps us understand the economic strength of this industry. Aviation is a multi-billion dollar conglomerate of enterprises and activities. The determination of where the industry must go, in terms of both technology and decisions about regulatory mechanisms, will be controlled by its economic drivers. The challenge for aviation is to keep its many benefits, such as unprecedented global mobility supporting 32 million jobs and USD 3.5 trillion worth of economic activity, and eliminate as far as possible its negative impacts.[42]

Interestingly, the big business enterprises that are at the foundation of resources and wealth in the industry, and constant determinants of its direction, are beginning to link economic growth with sustainability. There is a direct link between improved performance and sustainable growth.[43] There is steady realization that is beginning to dawn that the continuity of growth in civil air transport is at risk unless airlines continue to minimize and

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[42] A sustainable vision for the aviation industry, Climate Action, 27 November 2007, online: Climate Action Programme <http://www.climateactionprogramme.org/features/article/a_sustainable_vision_for_the_aviation_industry/ > (date accessed: 15 December 2007).

[43] *See:* IBM Report on Attaining Sustainable Growth Through Corporate Responsibility, IBM Institute for Business Value, by George Pohle and Jeff Hittner, 2008, online: 935IBM < http://www-935.ibm.com/services/us/gbs/bus/pdf/gbe03019-usen-01.pdf>

possibly reduce the environmental impacts of their operations.[44] But in analyzing these attempts, as pointed out before, we will also have to keep in mind the inherent obstacles that don't allow a free flow of ideas and developmental strategies, constantly chained by national and industry interest parameters. Not surprisingly, there is very little work that has been done to evaluate the attempts and making aviation activities more sustainable, and analyze what impact these attempts have had or can have on the environment in the future.[45]

Conclusion

Given the overview provided above, we find that the growth of aviation will come at the cost of continued pollution and contribution to the process of climate change. There has to be recognition that environmental issues are no longer abandoned issues trying to find a forum of recognition. They are now being linked to their economic, political and social contexts, which will give them the needed analysis. This will enable the initiation of a reasoned debate of the achievement of sustainability in aviation using the most effective tools available.[46]

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[44] Billy Glover, Managing Director, Environmental Strategy for Boeing Commercial Airplanes, The Boeing Company, 'Aviation: Responsible growth for a global industry' OECD Observer.com, No 267 (May-June 2008), online: OECD <http://www.oecdobserver.org/news/fullstory.php/aid/2597/Aviation:_Responsible_growth_for_a_global_industry.html> (date accessed: 25 August 2008).

[45] Sophie Walker, *The Contested Discourse of Sustainable Aviation*, (Cranfield University, 2007) at 21, online: D Space Lib <https://dspace.lib.cranfield.ac.uk/bitstream/1826/2483/1/SophieWalker-2007.pdf> (date accessed: 10 May 2008).

[46] R. Abeyratne, 'Some recent developments in aviation and environmental regulation, Environmental Policy and the Law' XXXI-1 2001 Ann. Air & Sp. L. at 39. (**Abeyratne policy and law**)

CHAPTER TWO

SARPS: effectiveness in addressing environmental impact through Annex 16

Rulemaking at ICAO to deal with issues of aviation pollution

The Convention is the fundamental source, which gives regulatory powers to the international community on matters relating to international civil aviation. The Convention also established ICAO, which was mandated to spearhead and foster the planning and development of international civil aviation policy throughout the world.[47] The continued growth of the aviation industry and the resources applied to it necessitates that sustainability find place in the mandate of ICAO.[48] Thus, when ICAO indulges in policymaking and also, as part of its work, provides standards for the industry, it needs to make sure that those standards support sustainability for both the service providers (airlines) and the customers (passengers). But sustainability of the industry is also tied to ICAO's ability to enforce its rules and standards.

In the end, the more ICAO struggles to enforce rules and have the principles of sustainability as the core attributes of its work, it will be difficult for ICAO to carry on wearing its mantle, as the regulator of international civil aviation activities.

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[47] R. Abeyratne, *Legal and Regulatory Issues in International Aviation*, (Transnational Publishers, 1996) at 280.

[48] At the Second Aviation & Environment Summit (Geneva, Switzerland - 25 April 2006) ICAO's Council President Dr. Assad Kotaite made the following comments while addressing the problem of pollution caused by aviation activities, and how essential it was for sustainability to be at the core of all efforts that were made to combat the problem: '*As we pursue the dialogue this year, I would also propose that we reflect and act on a dilemma with which we have wrestled for some time. On the one hand, air transport is a critical element of our global society, a catalyst for economic, social and cultural development around the world. On the other hand, air transport is a source of pollution in terms of aircraft noise and engine emissions, the latter contributing to climate change and other negative effects. [….] The industry has contributed substantially to aviation environmental protection. By working together, by acting as one, solutions will come more quickly and will be more sustainable.*'

ICAO under the Convention is required to create standards for the civil aviation industry. ICAO periodically revises SARPS,[49] which are technical guidelines for almost all aspects of civil aviation. Through this, I will begin with an analysis of the work done by the arm of ICAO that tackles the problems related to climate change (CAEP). I will identify the specific work that has been done in the areas of noise and emissions. Further, I will look at the nature of SARPs, how they have been used over the years and whether they are an effective mechanism in enforcing environmental compliances by ICAO and its member States. I will explore the enforcement of SARPs through the lens of international law and what status SARPs enjoy within that framework. At the end of this discussion there will be an evaluation of how effective ICAO has been in tackling the problem of aviation pollution.

CAEP's – ICAO's hub for fight against climate change

There was no mention of environmental protection as a mandate area for ICAO in Article 37 of the Convention. Noise control and its abatement found its way into ICAO's discourse in the 70s, and at the 18th session of the ICAO Council, the standards for greenhouse gas emissions found place in its framework.[50] The realization finally dawned that greenhouse gas emissions are an integral part of any dialogue that goes on to introduce

[49] Article 37 of the Convention provides the following language regarding the revision and amendments of the SARPs. '[..]To this end the International Civil Aviation Organization shall adopt and amend from time to time, as may be necessary.' SARPS go through periodic reviews to keep them updated as per the latest technological and industry developments.

[50] The standards for Annex 16, which includes Noise and Greenhouse gas emissions, were first adopted in 1981 and have had subsequently, have been made more stringent. The new standards that will become applicable from this year will be over 12% more stringent from their predecessors. *See:* Jane Hupe, Presentation to the Ad-hoc working group on further commitments for Annex 1 parties under Kyoto, 36th session of the ICAO Assembly, September 2007.

pollution mitigation measures in international aviation. ICAO finally established the Committee on Aircraft Engine Emissions (**CAEE**) in 1977, to pursue the subject further. By 1983 CAEP had superseded the Committee on Aircraft Noise (**CAN**) and the CAEE.[51] CAEP was to become the focal point of all environmental protection initiatives of ICAO.

CAEP is composed of 22 members, which include states and other intergovernmental and international organizations.[52] It also has 11 participants with 'Observer' status.[53] CAEP's primary mandate is to assist the ICAO Council in formulating new policies and adopting new standards on aircraft noise and aircraft engine emissions. CAEP's Terms of Reference[54] and Work Programme[55] are established by the Council. Currently, the CAEP structure has been divided into three working groups, two task forces

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[51] CAEP is mandated to recommend to the ICAO Council the standards and practices that are applicable to noise and engine emissions. The Committee meets every three years, just before the meeting of the Assembly. Also, there is an annual steering group meeting that meets to evaluate all the work being carried out by the various working groups. International Cooperation, ENV Report, *supra* note 17 at 216.

[52] Argentina, Australia, Brazil, Canada, China, Egypt, France, Germany, India, Italy, Japan, the Netherlands,, Poland, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Tunisia, United Kingdom, United States.

[53] Greece, Norway, Airports Council International – ACI, Arab Civil Aviation Commission – ACDC, European Commission – EC, International Coalition for Sustainable Aviation – ICSA, International Air Transport Association – IATA, International Business Aviation Council – IBAC, International Coordinating Council of Aerospace Industries Associations – ICCAIA, International Federation of Air Line Pilots' Association – IFALPA, UNFCCC Secretariat, World Meteorological Organization (WMO).

[54] CAEP SEVENTH MEETING, Montreal 5 - 16 February 2007, CAEP/7-WP/1, 30/10/06.

"To undertake specific studies, as approved by the Council, related to control of aircraft noise and gaseous emissions from aircraft engines. In its work the Committee shall take into account the following:

- *effectiveness and reliability of certification schemes from the viewpoint of technical feasibility, economic reasonableness and environmental benefit to be achieved;*
- *developments in other associated fields, e.g. land use planning, noise abatement operating procedures, emission control through operational practices, etc.;*
- *international and national programmes of research into control of aircraft noise and control of gaseous emissions from aircraft engines; and*
- *the potential interdependence of measures taken to control noise and to control engine emissions."* .

[55] CAEP has had seven formal meetings. For the past decade or so CAEP has met every three years to bring out its revised work programme and recommendations to the ICAO Council. The work programme is established by the ICAO Council. The latest work programme of CAEP was the one that led to CAEP/7. This work programme identifies the deliverables of CAEP till 2010. For details of the work programme, online: ICAO <http://www.icao.int/icao/en/env/WorkProgramme_Caep6.pdf > (date accessed: 15 Jan 2008).

and one support group.[56] These working and support groups provide specialized services to the CAEP secretariat, in the development of policies and new standards.

While noise and emissions remain at the core of CAEP's work, it has also been branching out to coordinate international efforts and creating databases[57] for environmental goals and their assessment.[58] Its terms of reference in the area of noise control and mitigation are:

1. effectiveness and reliability of certification schemes from viewpoint of technical feasibility;
2. economic reasonableness; and
3. environmental benefit to be achieved.

Work in other associated fields e.g. land--use planning,[59] noise abatement operating procedures,[60] emission control through operational measures,[61] international and national

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[56] Working Group 1 - Aircraft Noise Technical Issues: the main focus of the Working Group is to keep ICAO noise certifications up to date and effective. The Working Group has been divided into two sub groups: one that deals with aircraft technology and the other that focuses on supersonic aircraft noise. Working Group 2 – Operations: It addresses issues related to airports and operations. It has four tasks groups working under it: Task Group 1: airport and land use planning and management; Task Group 2: air traffic management; Task Group 3: operational measures; Task Group 4: local air quality. Working Group 3: it deals with emissions and the updating of Annex 16. It has three sub-groups: Certification Task Group, the Characterization of Emissions Task Group, and the Long Term Technology Goals Task Group. Market Based Measures Task Force: carries out study of issues related to emissions trading system involving international aviation. Modeling and Databases Task Force: carries out modeling efforts in support of activities of other CAEP groups. Forecasting and Economic Analysis Task Force: provides support to all technical groups.

[57] CAEP has been relying heavily on the databases and models that are made available by the participating States and international organizations. These models and databases then present various options in terms of implementation of mechanisms which help in the reduction of noise and engine emissions. For more information on the Modeling and Database Task Force and its work within CAEP, see: Modeling and Databases Overview, ENV Report, *supra* note 17 at 186.

[58] For the assessment of goals ICAO uses various models: for noise – the Aviation Environmental Design Tool and the Model for Assessing Global Exposure from Noise of Transport Airplanes. ON the gas emission and local air quality – ICAO is evaluating the following models for evaluation – AEDT/SAGE (US FAA), AEM (Euro Control) Aero UK (UK/Qinetio) and FAST (UK- MUMM).

[59] Resolution A35-5 Appendix F is dedicated to land use planning and management. While ICAO Doc 9184 is the Airport Planning Manual, - Part 2 – Land use and environmental control. This manual was created to provide guidelines and materials to help with land use planning and management of areas around airports. For a detailed update of ICAO's work in the field please see: ICAO's Balanced Approach to Aircraft Noise Management. – Part – 2 Aircraft Noise – ENV Report, *supra* note 17 at 34.

programmes of research into control of aircraft noise, is also part of the work profile that CAEP has developed.

In the past, ICAO's policy-making attempts to address the environmental impact of aircraft engine emissions focused primarily on the ground level effects of emissions. In recent years, the scope has been expanded to include the global impact of aircraft engine emissions. In 2007, the ICAO Assembly requested the Council, through resolution A36-22,[62] to continue the development of policies, which provide ways to limit or at least achieve the reduction of adverse impacts of emissions on the environment, and to develop concrete proposals and provide advice to the Conference of the Parties to the United Nations Framework Convention on Climate Change (**UNFCCC**). Now lets look at a detailed analysis of the two main areas of CAEP's work and accomplishments therein.

Aircraft Noise

ICAO noise certification standards reflect the best noise reduction technology that can be integrated into a fleet of aircraft.[63] This places ICAO in a very special place in terms of providing the lead in noise mitigation initiatives across the world. ICAO's work in this field dates back to the 1960's. The first standard under the Convention was published in

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[60] ICAO's guidance document for Noise Abatement Procedures is Aircraft Operations (PANS OPS) Volume I – flight Procedures (Doc 8168) part I, Section 7.

[61] Circular 303 Operational Opportunities To Minimize Fuel Use And Reduce Emissions, which focuses on issues of quantification of benefits of CNS/ATM measures, increased liasoning with other ICAO planning and implementation groups, and exploring operational opportunities for the reduction of fuel burn (**Circular**).

[62] The Assembly declared that: "ICAO as the lead United Nations Agency in matters involving international civil aviation, was conscious of and will continue to address the adverse environmental impacts that may be related to civil aviation activity and acknowledges its responsibility and that of its Contracting States to achieve maximum compatibility between the safe and orderly development of civil aviation and the quality of the environment."

[63] International Air Transport Association - Environmental Review 2004 at 9, online: IATA <http://www.iata.org/NR/rdonlyres/B73AF136-9824-4149-80F2-E5A5BAD0C89E/34687/IATAEnvironmentalReview2004.pdf> (date accessed: 15 January 2008) (**IATA Rev.**).

1971. The Annex for noise came out of the 16th session of the ICAO Assembly.[64] The important issues that were identified by ICAO when noise became part of the discussion at the organization were:

1. procedures for describing and measuring aircraft noise;
2. human tolerance to aircraft noise;
3. aircraft noise certification;
4. criteria for establishment of aircraft noise abatement operating procedures;
5. land use control; and
6. ground run-up noise abatement procedures.[65]

Subsequently, through the two decades that followed, there have been many resolutions and recommendations that have been brought out by ICAO to deal with the problem of aircraft noise.[66] At the 33rd session of the Assembly, in 2001, the problem was given a 'Balanced Approach Analysis', in which ICAO identified a four step apparatus to deal with it. The focus through this approach has changed to airport specific measures to tackle the problem of aircraft noise.[67]

The four elements that have been identified in this new Balanced Approach Analysis are briefly explained:

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[64] R. Abeyratne, 'Legal and Regulatory Aspects of Aircraft Noise' (2000) XXV Ann. Air & Sp. L. at 24. (**Abeyratne Aircraft Noise).**

[65] *Ibid.*

[66] *Ibid.*

[67] Assembly Resolutions in force as of October 8, 2004, ICAO Doc 9848, Appendix C, Policies and programmes based on a 'balanced approach' to aircraft noise management, para 4: 'the balanced approach to noise management developed by ICAO consists of identifying the noise problem at an airport and then analyzing the various measures available to reduce noise through the exploration of four principal elements, namely reduction at source, land-use planning and management, noise abatement operational procedures and operating restrictions, with the goal of addressing the noise problem in the most cost-effective manner.'

A. Reduction of noise at source:

There are primarily compliance requirements that each newly produced aircraft has. The compliance parameters have been specified in the updated SARPs, in the case of aircraft noise, Annex 16 Vol. I to the Convention.

B. Land use planning and management:

As its next focus, the approach recommends the proper use of land that surrounds airports. There are various activities that any society indulges in. There are hospitals, schools, and places of worships etc., which need to be effectively and efficiently used. This requires that they must not be placed near airports, which would avoid detrimental impact that aircraft noise may have on the users of these institutions.

C. Operational tools:

The next suggested step is to use operational tools and make decisions during the flying of an aircraft, which will reduce the noise that is created. Noise abatement procedures have been provided by ICAO, which will help by providing alternatives to make use of, for better and sustainable flying.

D. Operating restrictions:

The balanced approach tries to take a less proactive role when it comes to applying operating restrictions. The balanced approach recommends that first the other possible mechanisms should be exhausted, prior to taking resort to this one. From limiting access to airports at certain specific times, to prohibiting movement at specific geographical areas, is all part of this initiative.

Additionally, in June 2001, on the basis of recommendations made by CAEP, ICAO adopted a new, more stringent noise standard, that imposes a cumulative increased stringency of -10 dB relative to current limits. Commencing January 1, 2006, the new standard was applied to newly certificated airplanes and to airplanes for which re-certification is requested.

Another contribution by CAEP, which is hailed as being really positive, is the development of a new chapter in Annex 16, which contains a noise certification scheme for light helicopters.[68] Much of ICAO's effort to address aircraft noise over the past few decades has been aimed at reducing noise at source (engine noise), although land use planning and management around airports, and noise abatement procedures for take-off, approach and landing, have also become prominent and attract some attention. With this new approach ICAO is attempting to nip the problem, where it causes the most impact.

There have been moderate successes through noise mitigation measures and ICAO's efforts surely have to be credited. Over the last two to three decades aircraft have been required to become less noisy. However, technological developments will slowly reach a point of saturation, and further noise reduction may not be possible.[69] The number of people exposed to unacceptably high aircraft noise has dropped significantly. Thus, technological developments have been contributing towards noise mitigation. In 1978, six to seven million people inhabited areas exposed to average cumulative noise levels of 65

[68] Abeyratne Aircraft Noise, *supra* note 64 at 24.
[69] British Parliamentary Office, Science and Technology, *postnote* No. 197, June 2003 at 3.

decibels or higher. By the year 2000, that number had fallen to around 500,000.[70] These figures have to be kept in mind and the increase in the numbers of airports over the same time frame. Aircraft entering today's fleet are 20 dbs quieter than comparable aircraft 30 years ago. This corresponds in practice, to a reduction in noise by 75% while air traffic has increased fivefold in the same period. There is going to be increased noise reduction during takeoff and landing and better levels achieved by 2050.[71]

The newly identified Balanced Approach formula encompasses the addressing of local noise problems on an individual basis. It also identifies the noise related measures that achieve maximum environmental benefit most cost-effectively using objective and measurable criteria.[72] Airlines that have a quiet aircraft fleet are most likely to benefit in the longer term from greater flexibility and increased operational opportunities, especially at noise sensitive airports.[73] Additionally, we will also see newer areas, like supersonic aircraft, falling under the scanner at ICAO.[74]

Greenhouse gas emissions

From the time of the adoption of Annex 16 Vol. II, when engine emissions became part of ICAO's fight against aviation pollution, there has been constant broadening of the

[70] Global Express Association and the Environment, Aircraft noise, online: Global Express < http://www.global-express.org/environment.php> (date accessed: 5 August 2008).
[71] IATA Rev., *supra* note 63 at 2, online: IATA <http://www.iata.org/ps/publications/9486.htm> (date accessed: 5 August 2008).
[72] CAEP/7-WP/17 13/10/06, ICAO Doc. 9829, 5 to 16 February 2007 Update of the Balanced Approach Guidance, online <http://www.tc.gc.ca/AviationCivile/Internationale/OACI/comites/pdf/working/Jan-22-07/CAEP7_WP17.pdf> (date accessed: 15 January 2008).
[73] ICAO Assembly – 35th Session Executive Committee Agenda Item 15: "Environmental protection airports and the environment," Presented by Airports Council International.
[74] ENV Report, *supra* note 17 at 23.

work that is being undertaken by CAEP. Over the past years other emission indicators like emissions trading, market levies, market based and voluntary measures have also become the focus of CAEP's work.[75] Further, most of the work ICAO does through CAEP in the area of emissions and climate change is in collaboration with and within the framework set by the UNFCCC and IPCC.[76] It was this collaboration that resulted in the IPCC report entitled "Aviation and the Global Atmosphere"[77]. In its latest resolution in 2007 the ICAO Assembly urged its member States to conduct and support the scientific research that will address the uncertainties that have been identified in the IPCC report. There are also efforts being made to provide correct and updated information, so that future endeavors by bodies like the IPCC, to judge the impact of emissions on the climate, are more useful.[78]

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[75] Nyampong, *supra* note 23 at 82.

[76] ENV Report, *supra* note 17 at 104.

[77] The report was the first such comprehensive analysis of Aviation and its contribution to climate change. The report reexamined all the aspects of pollution crated by aviation. The various results that were presented through the report included current inventories of engine emissions and the future scenarios that would result with the current pace of green house gas emissions. The report presented both socio-economic and scientific areas of concern that are caused by the growing contribution of aviation activities to climate change:

There are a number of key areas of scientific uncertainty that limit our ability to project aviation impacts on climate and ozone:

- *The influence of contrails and aerosols on cirrus clouds*
- *The role of NO_x in changing ozone and methane concentrations*
- *The ability of aerosols to alter chemical processes*
- *The transport of atmospheric gases and particles in the upper troposphere/lower stratosphere*
- *The climate response to regional forcings and stratospheric perturbations.*

There are a number of key socio-economic and technological issues that need greater definition, including inter alia the following:

- *Characterization of demand for commercial aviation services, including airport and airway infrastructure constraints and associated technological change*
- *Methods to assess external costs and the environmental benefits of regulatory and market-based options*
- *Assessment of the macroeconomic effects of emission reductions in the aviation industry that might result from mitigation measures*
- *Technological capabilities and operational practices to reduce emissions leading to the formation of contrails and increased cloudiness*

The understanding of the economic and environmental effects of meeting potential stabilization scenarios (for atmospheric concentrations of greenhouse gases), including measures to reduce emissions from aviation and also including such issues as the relative environmental impacts of different transportation modes. See online: <http://www.grida.no/Climate/ipcc/aviation/index.htm>

[78] ICAO Resolution A36-22 Appendix - I, September 2007 Aviation impact on global climate - Scientific understanding.

Now I will give a quick overview of CAEP's work and achievements in the area of engine emissions. All engines are required to follow the certification standards that have been adopted under Annex 16. The continuous review of these standards is undertaken by CAEP. CAEP sets emissions standards for oxides of nitrogen, carbon monoxide and unburned hydrocarbons. The latest review of medium- and long-term technology goals for NO_x (*Independent Experts NO_x Review and the Establishment of Medium and Long Term Technology Goals for NO_x*), was published in 2008. CAEP also has put into place a comprehensive database of aircraft jet engine emissions certification data. CAEP also produced Circular 303, which provides the best standards in terms of fuel consumption minimizing, most of which have been a considerable part of industry dialogue, as a collective method of both targeting savings on fuel costs and bettering technologies.[79]

There is emerging some recognition within CAEP and generally ICAO, that market forces greatly determine and affect the decision-making within the aviation industry in the area of aviation technology. The often spiraling fuel costs are one such glaring factor.[80] These fuel prices have been forcing manufacturers and other industry players to focus on less fuel dependent technology; this seems essential for the long-term sustenance of profitability in the industry.[81] However, with profitability some focus should also be given to the need to be sustainable in the future. Aviation is such an ever expanding industry and the number of people who depend on it continues to grow. Also, there is no viable and more efficient alternative form of transportation. Thus, this level of dependence on the industry

[79] *See:* Circular, *supra* note 61 Operational Opportunities To Minimize Fuel Use and Reduce Emissions.
[80] Fuel costs continue to fluctuate, since the writing of this fuel costs have dropped to 60 dollars a barrel in the US. Which again suggests that fuel costs continue to affect considerable decision making in aviation investment.
[81] Nyampong, *supra* note 23 at 82.

requires that measures be taken for sustainability to be at the core of all technological developments in the future.[82]

The issue of CAEP's use of market instruments for its fight against greenhouse gas emissions has drawn some criticism. The focus of these market instruments have only been CO_2 emissions; however, emissions from aviation differ from those emitted on the ground, in that they are emitted directly in the higher atmosphere and thus have a higher global warming potential. The total global warming potential of aviation is thus three times that of CO_2 alone. The world's major industrialised nations are both members of ICAO and have agreed under the Kyoto Protocol to reduce their emissions by 5% between 2008-2012. However, the question of allocation of international emissions is not one that can find easy solutions. There is always reluctance among States to incur clear responsibility for their contribution.[83]

With this background of ICAO's work through CAEP, let's move to the basics of how SARPs are created and how effectively they can be implemented to fight the menace of climate change.

Creation of SARPs: Article 37 of Chicago

Article 37 is the mandate given to ICAO to produce standards and practices for all actors participating in aviation activities. The perusal of Article 37 of the Convention

[82] Improving the sustainability of aviation, DG Environment, European Commission 19 June 2008, online: Environmental Expert <http://www.environmental-expert.com/resultEachPressRelease.aspx?cid=8819&codi=33098&idproducttype=8> (date accessed: 10 August 2008).

[83] Aviation and its impacts on the Global Atmosphere a position paper of the International Coalition for Sustainable Aviation, T&E is the European Federation for Transport and Environment. Formed in 1989 it is a network of about 40 organisations working in the field of transport and environment. Online <http://www.t-e.nu> (date accessed: 8 December 2008).

provides that ICAO is expected to work in line with the changes in the aviation industry, to make sure that it is up-to-date in its work and produces change driven standards.

Article 37 reads:

"Adoption of International Standards and Procedures - Each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve aviation and its activities. ICAO to this end adopts and amends from time to time, as may be necessary, international standards and recommended practices and procedures. This is the mandate of ICAO."

This responsibility then takes the shape of Annexes to the Convention, which detail the standards for various aspects of civil aviation. The relevant Annex for noise and engine emissions is Annex 16.[84] However, this Article and the corresponding Annexes cannot be read without the analysis of the next Article in the Convention (Article 38). This Article is what gives a perfect out to the member States of ICAO. The Article very simply takes away the teeth ICAO needs to make sure it can firmly implement SARPs under the Convention and remain relevant. Before beginning the discussion on SARPs, we need to browse through the text of the Convention and its provision that takes away the mandatory enforcement of SARPs by ICAO member states.

Article 38 reads:

"Any State which finds it impracticable to comply in all respects with any such international standards or procedure, or to bring its own regulations or practices into full accord with any international standard or procedure after amendment of the latter, or which deems it necessary to adopt regulations or practices differing in any particular respect from those established by an international standard, shall give immediate notification to the International Civil Aviation Organization of the differences between its own practice and that established by the international standard. In the case of amendments to international standards, any State which does not make the appropriate amendments to its own regulations or practices shall give notice to the Council within sixty days of the adoption of the amendment to the international standard, or indicate the action which it proposes to take. In any such case, the difference which exists between one or more features of an international standard and the corresponding national practice of that State."

[84] Convention, *supra* note 4, Annex 16 Vol. 1: provides the Standards and Recommended Practices (SARPs) for Aircraft Noise, and Vol. II for Aircraft Engine Emissions.

Introduction to SARPs

It wasn't till 1971, when the first SARPs for aircraft noise designated as Annex 16 to the Convention were adopted. The standards for emissions came in the early 1980's, and set limits for the emissions produced by aircraft.[85] SARPs are continuously evolving and being developed. The process involves revisions and updating of the standards and practices at regular intervals.[86]

The creation of SARPs is a well drawn out and thorough process. After the SARPs go through continuous and periodic review they are presented to the ICAO Council, which adopts them in the form of resolutions. These resolutions find their way as Annexes and become part of the Convention. All member States are then recommended to follow and enforce them domestically. This is usually brought about through relevant legislation by the member States. However, over the past few years there has been some movement to ensure that the standards are not merely suggestive and less open to avoidance.[87] ICAO performs its primary task of continually revising and updating SARPs through a broad consultative process with its member States, international aviation organizations and industry

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[85] *Ibid* Annex 16, online: ICAO <www.icao.int/eshop/pub/anx_info/an16_info_en.pdf> (date accessed: 15 November 2007).

[86] Even though there are no specific timeframes for the development of the SARPs, ordinarily from the stage of development to the adoption of any SARP, it takes between 0-5 years. Online: ICAO <http://www.icao.int/icao/en/anb/images/timeline.jpg> (date accessed: 15 November 2007).

[87] The USAOP was the first step taken by ICAO to deal with the problem of better implementation of SARPs. More domestically, in the United States the Federal Aviation Administration established the International Aviation Safety Assessment (IASA) program in August 1992. The aim of the program was focused on the ability of states, not individual air carriers, to adhere to international SARPs for aircraft operations and maintenance established by the ICAO. *See*: Audrey Clarke *et al*, "Conforming with ICAO safety oversight standards" (July 2004) 10 issue 4 Journal of Air Transport Management pp. 249-255. Also online: <http://www.faa.gov/safety/programs_initiatives/oversight/iasa/more/more/> Through the IASA program the FAA is working to determine that each country meets its obligations under ICAO and to provide proper oversight to each air carrier operating into the U.S. The program's objectives include a lower number of safety-related problems, including accidents, incidents, and an improved level of safety to the flying public.

representatives. This culminates in a broad consensus on new or updated SARPs.[88] The critique of the Convention and the implementation mechanism of SARPs is based in the inherent 'opt out' option for states. Giving states the option to inform ICAO that they are unable to implement the necessary SARPS, for various reasons, has resulted in the non-achievement of substantial movement in aviation's fight against pollution. What is strange and needs discussion at an international level, is the fact that when there is such a consultative mechanism in place, why is there the 'opt out' available to members of the international community.

Given the participation of all the key players of the aviation industry in the process of drafting, negotiating and finally updating the SARPs, it should be reason enough for all member States to apply standards that have been agreed upon.

Drafting of Annexes (Including Annex 16) – ICAO's tools in the fight against climate change

Specific rules for aviation:

ICAO's member States impose on themselves an affirmative obligation to conform their domestic laws, rules and regulations to the standards adopted by ICAO.[89] The nature of SARPs is such that they are technical specifications, which are determined and revised, based on the developments of technology in the aviation industry. There is very little room for political posturing or influences, in terms of drafting the list of standards and practices, that need to be applied by member States. This is what the Convention had foreseen when

[88] ICAO News Release PI0 12/00 'Implementing SARPs - The Key to Aviation Safety and Efficiency' The Theme for the 2000 edition of International Civil Aviation Day, Montreal – 6 December 2000.
[89] Paul S Dempsey, 'Blacklisting: Banning the unfit from the heavens' (2007) XXXII Ann. Air & Sp. L. 29 at 34 (**Dempsey Blacklisting**).

the making of these standards was contemplated at the time of drafting the Convention.[90] The idea was to make ICAO independently set norms containing technical requirements for aviation communications systems and air navigation aids,[91] airports and landing areas,[92] air traffic control practices,[93] licensing of operating and mechanical personnel,[94] airworthiness of aircraft,[95] registration and identification of aircraft,[96] collection and exchange of meteorological information,[97] log books,[98] aeronautical maps and charts,[99] customs and immigration procedures,[100] aircraft in distress and investigation of accidents,[101] and such other matters concerned with the safety, regularity, and efficiency of air navigation as may from time to time appear appropriate.[102]

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[90] Proceedings of the International Civil Aviation Conference, Chicago Illinois November 1- December 7, 1944, Vol. I, the Department of State, US Government Printing Office, 1948 at 703. 'The obligations which might be assumed by states in the connection of universal standardization, the most common would be to supplant the terms of a national regulatory code by those of an international one, or to bring the national code into conformity with the international standard and keep it so. However, it may be seen that in some cases (like that of maintenance of facilities), desirable as it may be but the States cannot be expected to accept any general and continuing obligation to supply such facilities in connection with any general standard, especially if a facility be one subject to ready amendment from time to time. The most the Committee seems feasible for States is to conform to such recommendations as far as their particular situations may permit.'

[91] Convention, *supra* note 4 Article 37 (a).

[92] *Ibid* at (b).

[93] *Ibid* at (c).

[94] *Ibid* at (d).

[95] *Ibid* at (e).

[96] *Ibid* at (f).

[97] *Ibid* at (g).

[98] *Ibid* at (h).

[99] *Ibid* at (i).

[100] *Ibid* at (j).

[101] *Ibid* at (k).

[102] The making of the SARPs is a multi-step process, which involves all the parties within ICAO and outside it to come together in performing their roles. The lead in the making/review/adoption of SARPs is taken by the relevant office within ICAO (Air Transport Bureau/Air Navigation Commission/CAEP *et al* '**Commission**'). Firstly, the primary proposals are analyzes by the Commission and based on the nature of the SARPs that are being revised or updated they are referred to specialized working groups. There are various working groups that assist in the making and development of the SARPs. These working groups include specialists and professionals which have been pooled from all sectors of the industry and also all member states. The next step involves the consultation that goes on between all the member States and certain international organizations that have been invited by ICAO to participate in the process. This feedback is taken and a working paper is drafted by the ICAO Secretariat which is subsequently reviewed by the Commission before the draft texts of the SARPs come into being and are ready to be presented before the ICAO Council. For complete details of the making of the ICAO SARPs, online: ICAO :<http://www.icao.int/icao/en/anb/mais/> (date accessed: 15 November 2007).

A product of technical collaboration:

The task of setting these standards is usually given to technical Working Groups and Sub-committees, which have specialized individuals working on specific aspects of aviation activities.[103] However, this is not to say that member States have no role whatsoever in this whole process. Prior to the final adoption of SARPs by the ICAO Council, member States do have a role and give their comments, feedback, etc., before anything is finalized. There is a definite spirit of consensus, which is pursued prior to the adoption of the SARPs by the Council.[104] This process ensures that the States are in agreement before a standard is adopted. It also ensures that the political nature of the organization is not overlooked, and all States are on-board when any revisions to SARPs are being undertaken.

This of course in many ways is the theoretical part of ICAO's role.[105] When we talk about the implementation of these Annexes, which contain SARPs, states are not obligated by the Convention to follow them. The reading of the two provisions of the Convention provided above (Articles 37 and 38) gives ICAO the right to set these standards,[106] but with this right it also takes away any enforcement that is necessary for their practice and compliance.[107] The Convention only provides the States the duty to inform ICAO of the differences that they find between their national legislations and the SARPs, which ICAO

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[103] ICAO looks at the implementation of SARPs as a two pronged process, firstly the administrative process of bringing the regulations into force domestically by a State, and secondly, the infrastructural apparatus to have the implementation feasible in terms of personnel and equipment *See*: Thomas Buergenthal, *Law making in the International Civil Aviation Organization* (New York: Syracuse University Press, 1969) at 63.
[104] Dr. Assad Kotaite's message for the 'Worldwide celebration of the International Civil Aviation Day, Implementing SARPs – The key to aviation safety and efficiency' Montreal 7 December 2000.
[105] Thomas Buergenthal*, Law Making in ICAO* (Syracuse University Press, 1969) at 102. (**Buergenthal**)
[106] Convention, *supra* note 4 Article 37.
[107] *Ibid* Article 38.

has proposed.[108] Even though SARPs are set by ICAO, the use of the word 'proposed' seems appropriate, as even subsequent to the acceptance and adoption by the representative body of ICAO (the Assembly), SARPs are open to dispute and non-compliance by member States. This is what we have to deal with in terms of the tools that ICAO gives us to tackle problems like climate change, which has dabbled with problems of compliance and enforceability from the get go.[109]

The way the current regime is structured, a member State of ICAO is free to not comply with levels of pollution mitigation requirements, just because in its practical opinion such compliance was within the exceptions provided by Article 38. To understand the nature of the opt-out provision we will briefly discuss what Article 38 provides, and how it has in many respects left ICAO completely powerless in its role of regulating pollution mitigation practices in civil aviation. This will give us an overview of how effective the SARPs regime is, and how urgent is the need to evaluate its future use and enforcement mechanism; is an amendment to Chicago a way out.

SARPs and the 'opt-out' article

The perusal of the language of Article 38 makes it clear that the member States of ICAO are not obligated to apply the SARPs domestically.[110] Instead it gives them the option to merely inform ICAO of the differences, if their domestic laws and rules are not in line

[108] The Convention uses the following grounds which a State might use to opt-out of a relevant SARP: when referring to the mechanism where states have to report to ICAO 'shall give immediate notification to ICAO of the differences between its own practices differing in any particular respect from those established by an international standard. In case of amendments the notice period is sixty days from the date of the adoption of the Standard or indicate the action it proposes to take.'

[109] Peter D. Cameron and Donald Zillman, ed., *Kyoto: From Principles to Practice*, (Kluwer Law International, 2001) at 4, *also see* discussion on page 11.

[110] Dempsey PS, Public International Air Law, (McGill University 2008) at 53 (**Dempsey PIAL**). Also see Buergenthal, *supra* note 105 at 78.

with the recommended standards. This provides a clear indication that States are permitted to enact legislation, which may conflict with ICAO's regulations.[111]

In my analysis, the provision creates two problems:

A. Opt-out, and

B. non-uniformity.[112]

The founding principle on which ICAO was created was to attempt to bring some uniformity in practices of civil aviation activities.[113] ICAO very recently came out with the Consolidated Statement of Continuing ICAO Policies and Practices Related to Environmental Protection (**Statement**), restating the philosophy of its uniformity principle.[114] The Statement was used to ask member States to avoid creating alternative mechanisms that deal with the issue of aviation and climate change to the ones offered by ICAO. It recognized that such a unilateral measure would not be beneficial to a consolidated and collaborative effort to deal with the problem at an international level.[115] Keeping this in view the language of Article 38 is not in conformity with what ICAO was mandated to achieve.[116]

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[111] See *infra* note 112.

[112] Proceedings of the International Civil Aviation Conference, Chicago Illinois November 1- December 7, 1944, Vol. I, the Department of State, US Government Printing Office, 1948 at 705. Rules of the air: These should be fully standardized in practically every respect and national commitments should be assumed accordingly, subject only to the right of each nation to supplement the standard international rules with such national or local rules as its particular situation may require.

[113] Article 37 of the Convention, *supra* note 4. And Michael Milde, 'Aviation Safety Oversight: Audits and the Law' (2001) XXVI Ann. Air & Sp. L. 165 at 168.

[114] Appendix F to Resolution A32-8, Consolidated statement of continuing ICAO policies and practices related to Environmental protection.

[115] R. Abeyratne, 'Fuel Tax and emissions trading, as market based option in air transport' (1999) XXIV Ann. Air & Sp. L. at 19.

[116] Convention, *supra* note 4 Article 37. Also see: Foundation of the International Civil Aviation Organization, online <http://www.icao.int/cgi/goto_m.pl?icao/en/hist/history02.htm>, also Committee II, technical Standards and Procedures, report of the Committee II, Document 378 (366), Proceedings of the International Civil Aviation Conference, Chicago Illinois November 1- December 7, 1944, Vol. I, the Department of State, US Government Printing Office, 1948 p. 703. 'The obligations which might be assumed by states in the connection of universal standardization, the most common would be to supplant the terms of a national regulatory code by those of an international one, or to bring the national code into conformity with the

When we identify Article 38 as a means at non-compliance or more mildly 'opt-out', the implication is simple, as there are no effective ways to determine how many states are in strict compliance with ICAO and its standards. So, even if a state does not make its intention clear by informing ICAO of its difference (as required by the Convention), there is no method to conclude that silence connotes compliance, or there are any attempts being made to become compliant in the future. This is mostly because most often states do not always communicate to ICAO the differences which they have with the specific standard, in terms of applying it in their domestic jurisdiction.[117]

In 1993 ICAO noted that close to seventy-five percent of member States remain silent, in terms of whether they have been able to strictly apply the standards that are brought out.[118] Additionally, the numbers of differences that are being filed by States are innumerable. This is after SARPs go through the consultative process they do before being adopted.[119] And I am sure that if we take updated progress reports emanating out of ICAO, we can find marginal statistical improvements in compliances, but that doesn't address the problem at its root. The opt-out provision of Article 38 makes SARPs only soft law, within the framework of rules of international law, for they can hardly be deemed binding if the member States have the freedom to not implement them on the subjective self

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international standard and keep it so. However, it may be seen that in some cases (like that of maintenance of facilities), desirable as it may be but the States cannot be expected to accept any general and continuing obligation to supply such facilities in connection with any general standard, especially if a facility be one subject to ready amendment from time to time. The most the Committee seems feasible for States is to conform to such recommendations as far as their particular situations may permit.'

[117] Michael Milde, 'The Chicago Convention, Are Major Amendments Necessary or desirable 50 years later?' (1994) XIX-I Ann. Air & Sp. L. at 426 (**Milde Amendments**).

[118] ICAO Council, C-WP/9779 (7 June 1993) para 2:9 at 4.

[119] News from ICAO, Report of IAOPA Presence at ICAO 24 July 2007, online: < http://hoftec.blogspot.com/2007/07/news-from-icao.html> (date accessed: 10 August 2008).

determination that it would be 'impracticable to comply'.[120] We will see further in our discussion what essentials make a rule fall within the 'soft-law' category and how SARPs qualify as such. And given the urgency of the problem of climate change, the resources and time invested in the rule making by ICAO, mere soft law suggestions do not suffice as substantive measures by the sanctum of international civil aviation.

Reasons for non-compliance by States

A. The members of the world community are going through different stages of economic and political development. So, even though the intention behind having such provisions under the Convention was both thoughtful and visionary, these laws and regulations cannot always be applied uniformly across the board.[121] Even in terms of developing the infrastructure, when the specific standards have been brought out, it requires investment and political will to bring about changes on the ground. From appropriate technology for navigation, safety, aircraft manufacturing, to better and cleaner environmentally friendly fuels, airport infrastructure, ground maintenance etc., all need large amounts of investments from private business and governments.[122]

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[120] Michael Milde, 'Enforcement of aviation safety standards, problems of safety and oversight' (1996) 45 Ger. J. Air and Space Law at 5.

[121] Proceedings of the International Civil Aviation Conference, Chicago Illinois November 1- December 7, 1944, Vol. I, The Department of State, US Government Printing Office, 1948 at 703. 'The obligations which might be assumed by states in the connection of universal standardization, the most common would be to supplant the terms of a national regulatory code by those of an international one, or to bring the national code into conformity with the international standard and keep it so. However, it may be seen that in some cases (like that of maintenance of facilities), desirable as it may be but the States cannot be expected to accept any general and continuing obligation to supply such facilities in connection with any general standard, especially if a facility be one subject to ready amendment from time to time. The most the Committee seems feasible for States is to conform to such recommendations as far as their particular situations may permit.'

[122] Giovanni Bisignani, IATA Director on Aviation Sector Crisis, "[…] Despite the investment of over US$30 billion since 2001 to improve security measures, we still have an uncoordinated mess," *hotelsmag.com* (18 June 2008) online: Hotelsmag <http://www.hotelsmag.com/article/CA6571365.html> (date accessed: 16 October 2008).

No two states can be identical in where they are in terms of their social and political development. While some states enjoy more developed political, economic and social institutions, others are attempting to put more workable infrastructure in place. And more so there cannot be one model for any society. When rules of international law are made, it is simply impractical to take into account the far reaching disparities that exist among nation states and the various interests they need to preserve. As a result the disparities find states unable to always cope with what is expected of them by the international legal regime. When it comes to technological development, investment in protection of the environment, better navigation and aviation management techniques, all of which the SARPs regulate, there is the argument of inability to apply the laws that bodies like ICAO have created. Developing countries find these burdens politically and economically strenuous.[123]

B. In practice the requirements on countries to inform of non-compliance with SARPs are hollow and have been ignored by most.[124] The important aspect of ensuring enforcement is the consequence that would result if there were non-compliance with the applied rule.[125] We can't even imagine laws that don't attract a penalty in case of non-compliance. The capacity of laws to punish a wrong doer makes them a deterrent and assists

[123] Dunoff et al, *International Law, Norms, Actors and Process - A problem oriented approach* (Aspen law and Business, 2002) at 27.
[124] Dempsey Blacklisting, *supra* note 89 at 37.
[125] Grotius maintained that punishment was integral to all law. The very notion of justice for him was founded on the principle of punishing the wrong doer. He also argued that the orderly application of punishment was equally important. Without this essential, the enforcement of a law was not easily possible. *See:* Mary Ellen O'Connell, *The power and purpose of International Law, Insights from the theory and practice of enforcement* (Oxford University Press, 2008) at 28.

in the regulation of the conduct of relations between the subjects of the law.[126] Thus in the process of implementing any laws, if there were no consequences that resulted, non-compliance would become the norm. Non-compliance in international law is the norm, unless it is in the interest of states to comply, there are benefits from cooperation.[127] And as ICAO hasn't been able to introduce consequences for non-compliance, ignorance of rules continues.

C. The important aspect that affects the enforcement is the economic impact of the law. I have already noted in my first argument, how on a larger scale states are unable to comply with the various burdens that are placed on them internationally. [128] Domestically, law making goes through the rigors of the legislative and political process and is a product of the social and economic system that produces it.[129] This principle is tied into the principle of social theory and how in different economic systems, different breeds of laws exist and prosper. Similarly, as law making is impacted by the economic system that perpetuates it, so does its implementation.[130] The economic system determines the efficacy of the societal institutions it is able to sustain.[131] In implementing the laws, the infrastructure

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[126] Anthony Walsh and Craig Hemmens, *Law, Justice and Society, A sociological introduction* (Oxford University Press, 2008) at 217.

[127] The Mary Ellen O'Connell, *The power and purpose of International Law, Insights from the theory and practice of enforcement* (Oxford University Press, 2008) at 123.

[128] Manfred Nathan, *The Renascence of International Law* (The Grotius Society Publications, Sweet & Maxwell Limited, 1925) at 72.

[129] Discussing the origins and the evolution of the law, Spencer identifies the five sources which also correspond to the five evolutionary stages of any law making; He identifies the social and economic institutions of any socio-political existence of a community as the basis of any law making or evolution of laws: The consensus of the individual interests; Inherited customary rules which become a part of any community's life; The will of the living ruler or the sovereign; The consensus of individual interests in reconstituted form; and The basis of this law making in slowly industrializing societies is common interest and benefits of co-operation. *See*: A Javier Trevino, *The Sociology of Law, Classical and Contemporary Perspectives* (Transaction Publishers, 1996) at 25.

[130] *Ibid* at 98.

[131] Over many centuries, legal systems and the instruments that are used to make them functional have been determined by the economic system that they exist in. From primitive to modern legal systems, the changes that have been seen are attributed to the needs of the economic systems and the smooth functioning of it. *See:* Steven Vago and Adie Nelson, *Law and Society, Theoretical Perspectives* (Pearson Prentice Hall, 2004) pp. 33-35.

that any economic system has been able to create, influences what applications become possible. In the realm of international law, the distinction comes when the general and broadly accepted economic system principles are the ones that determine how the laws should be framed, as there is no one international economic system.[132]

This is why we find that even though over the past century, where international aviation has made strides in the area of law making, there is little that can be said about domestic progress on policies and legal structures that govern aviation laws across the world. There are political bottlenecks, resistance on the social and local level which completely impedes the steady application of internationally framed rules, and results in the lack of any domestic evolution of laws and legal processes.

ICAO SARPs, hard or soft law?

Professor Michael Milde when commenting about SARPs noted:

'The maxim 'law making without enforcement is not law' may have some validity. The legal status of the ICAO standards could be diluted into 'desirable guidance material' or even 'wishful thinking' if there were no authority insisting on compliance in the interests of aviation."[133]

[132] Ian Brownlie points out the opinion of the Principal Court of International Justice where the court noted that there should exist a duty of each State to bring its domestic laws in conformity with its international obligation. However, no such duty seems to be in existence and even when there is a breach by a State, the community of States only seek reparation of the breach and ignore reasons of such breach and the lack of compliance at the national level that leads to obstacles in rules being applied by states. *Exchange of Greek and Turkish Populations* [1925] PCIJ, Ser. B., No. 10. *See:* Ian Brownlie, *Principles of International Law* (6th edition, Oxford University Press, 2003) at 35.

[133] In this case Professor Milde's specific reference was to safety standards under the Convention, however given that the rules or lack thereof of implementation concerning the SARPs are the same, this statement summarizes the efficacy of the these standards, Michael Milde, 'Aviation Safety Oversight: Audits and the Law,' (2001) XXVI Ann. Air & Sp. L. at 170.

With this as a starting point we find that today most contemporary international organizations are semi or fully institutional rulemaking bodies.[134] The rules made by them are sometimes binding rules of law and thus fall within the category of 'hard law rules,' while others are not and have essentials of 'soft law rules.' As under any international organizational structure, the powers that are conferred to ICAO are done so by the various states that are its members.[135] In order to categorize the rules of ICAO between hard and soft laws we have to look at the nature of these rules, as that helps identify where they fall.[136]

We should begin by defining the two terms to have a basic idea of what essentials we are trying to look for in the rules of ICAO, for them to fall in either of these two categories. In attempting a comparative definition of hard laws and soft laws, there has to be a focus on the compliance or the binding nature of those rules. The best example of soft law and hard law rules are the rules made under the UN Charter. On the one hand we have rules stemming from the various UN declarations, which form the bulk of soft laws, while those resolutions which are more of a binding nature and brought out by the powerful United Nations Security Council, are examples of hard law rules.[137] This is because there is no compliance imperatives attached to them and the soft law essential is traceable. If a soft law norm meets the requirements of the doctrine of the sources of law, then it is hard law. We find that international agreements create different rules within them. While some create

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[134] International institutions have become considerably active in rule making around the world. States which are members to these bodies, have vested rule making authority in these international bodies: In addition to ICAO which brings out Annexes under Article 36 of the Chicago Convention, The WTO which was formed as a result of the Uruguay Round of Talks in 1995 has been effectively making trade rules through its decision making in trade dispute resolution. The European Union through the European Commission is an international rule making body, rules which are followed by all States part of the European Union.
[135] Milde Amendments, *supra* note 117 at 425-426.
[136] Georg Schwarzenberger, *Manual of International Law* (Professional Books Limited, 1976) at 16.
[137] Alan Boyle and Christine Chinkin, *Participants in International Law Making* (Oxford University Press, 2007) at 229.

obligatory rules, which need to be followed, others which lack sufficient normativity to create definite rights and obligations and thus they don't qualify as being hard law.[138]

Even though the legitimacy of UN actions and directives comes from the UN Charter, it is still difficult to attribute hard law and compulsory compliance by States to all UN actions. In this context, the Convention contains hard law principles where it mandates compliances by signatory States.[139] This is directly a consequence of international treaty obligations, which are seen as hard law rules. There are no choices in terms of compliance by the signatory States. Even where the International Court of Justice is concerned, it places all treaty obligations at the head of any hierarchy of international legal rules. Thus, on a *prima facie* level, the Convention, its rules and those stemming from it are treaty obligations and thus principles of hard law. Or at least they should be. There is very little argument as regards the main treaty provisions of the Convention and their enforceability. The question of enforcement and compliance only comes with the discussion of SARPs. Now to look at whether SARPs, as created by ICAO are treaty rules, hard law or soft law.

We can somewhat step away from the principles of the text of the Convention and look at more operative rules found in the SARPs. Given the language that disempowered the Convention from enforcing the SARPs, permitting non-compliance, the SARPs for the most

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[138] Jonathan L. Charney, 'From Commitment and Compliance, the Role of Non-binding Norms in International Legal System' in Dinah Shelton, ed., *Compliance with International Soft Law* (Oxford University Press, 2000) at 115 (**Compliance**).

[139] Many articles under the Convention are hard law 'treaty rules' under the Convention and binding on all signatories. Other than more institutional rules there are the fundamentals like Article 1 – Exclusive Sovereignty, Article 2 – Territory, Article – 3bis which was a very interesting addition to the Convention in response to the shooting down of the Korean Air aircraft by the Soviet Union, where the Convention mandated that no force would be used against a civilian aircraft. This example proves that when States need to make mandatory compliances regarding certain actions they take measures to do so.

part can be put in the category of soft laws. This also makes the implementation of SARPs one of the most challenging issues facing ICAO.[140] The primary attribute that would give them the status of hard law rules is not in existence,[141] that doesn't make them completely redundant.[142]

Generally speaking soft laws have many advantages in the regulation of activities in a globalized world. Its instruments are flexible, being able to take almost any form of global actors wish to see.[143] Soft laws can also be adopted rapidly because their non-binding character. They can be quickly amended or replaced if they fail to meet current challenges.[144] Additionally, it is also argued that soft law rules facilitate compliance, as they don't place an undue burden on states.[145] The international community is increasingly depending on soft law rules to address the common problems across different subject areas, some of the instruments are negotiated by governments, while others by private players. Given the growing dependence on soft law principles, it is important to identify and understand how many states comply and follow the non-binding principles.[146] And if their nature makes it easier for States to abide by them, then surely there is reason to support this identification for SARPs as well.

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[140] Nicolas Matte, 'The Chicago Convention, Where From and Where To, ICAO?' Vol. XIX-1, 1994 Ann. Air & Sp. L. at 392.
[141] Among many definitions of hard law rules, they are considered to be rules which are specific and legally binding in nature. *See:* Kenneth W. Abbott and Duncan Snidal, 'Hard and Soft Law in International Governance', *International Organization* (MIT) 54, 3, Summer 2000, 421–456 at 421. <http://journals.cambridge.org/download.php?file=%2FINO%2FINO54_03%2FS0020818300441111a.pdf&code=8acfa720b7da3cdc3592b187924f0996>
[142] For a discussion on ICAO SARPS and their hard and soft law credentials, Dempsey PIAL *supra* note 110 at 75.
[143] Compliance, *supra* note 138 at 109.
[144] *Ibid* at 13.
[145] *Ibid.*
[146] *Ibid* at 535.

Some writers argue that what we find in the international legal order is not perfect compliance; there will be varied levels of compliance by parties. The distinction of soft, hard laws and binding, non-binding obligations is to encourage all the members of the international community to merely participate in the larger good of the community of States.[147]

What has been encouraging is that there have been instances where the SARPs have shown signs of being hard law rules.[148] Interestingly, in various aspects of international rule making and practise, enforcement or sanction doesn't necessarily have to be on a global international level. Even in the interactions of States, if mechanisms are employed that states comply with rules, it helps in making rules more effective. Such methods of compliance are seen through policies like that of airline blacklisting by the US and the EU, where there is non-compliance with safety standards, airworthiness, pilots and airport certifications. When such rules of SARPs are used by individual States to require compliance by their commercial partners, it makes it a very effective method of enforcement and also helps in giving legitimacy to that rule. So in such cases it does show some characteristics of hard law principles.[149]

The Convention empowers ICAO to make rules that would be binding on all the signatories to the Convention. Thus, in measuring the force behind the rules that are made under the Convention, they carry the highest rank in the list of rules within the framework of Public International Law. It is impossible to indicate with any degree of accuracy or certainty what the state of implementation of regulatory Annex material really is, because a large number of contracting States have not notified ICAO of their compliance with differences

[147] Compliance, *supra* note 138 at 117.
[148] Dempsey Blacklisting, *supra* note 89 at 38.
[149] *Ibid.*

to Standards in the Annexes for some considerable time.[150] But if we argue that ICAO creates laws under the Convention and they qualify as being applicable rules of international law, we would have to distinguish them from SARPS, as they don't enjoy the same enforcement as the rules in the body of the Convention do.[151]

Contemporary law making on the international scene has needed diverse players. There are non-state actors that find that the state is unable to create relevant rules for them. While as a reaction to a lack of understanding of the needs of civil society, the state too has always participated in the process of rule making, which addresses its own diverse and oftentimes unaddressed interests.[152] Also, the increasing spread of globalization's wings means that any law making cannot just be confined to the realms of either domestic boundaries, or even international institutions, which have traditionally been the flag bearers of international law making.[153]

Other ICAO initiatives: USOAP

To deal with the problem of non-compliance at an international level, recently, ICAO came up with the Universal Safety Oversight Audit Program (**USOAP**) launched in 1999, and the Universal Security Audit Program (**USAP**) launched in 2002. These programs

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[150] ICAO, C-WP/10218 at 4.9.
[151] Ludwig Weber, *International Civil Aviation Organization, an Introduction* (Kluwer Law International, 2007) at 34.
[152] James Keye, 'Capitalism Without Rules,' 11 October 2008, online: Dissent Voice < http://www.dissidentvoice.org/2008/10/capitalism-without-rules/> (date accessed: 31 October 2008)
[153] *Statute of the International Court of Justice,* 3 Bevans 1179; 59 Stat. 1031; T.S. No. 993, Article 38: The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply: international conventions, whether general or particular, establishing rules expressly recognized by the contesting states; international custom, as evidence of a general practice accepted as law;
the general principles of law recognized by civilized nations; subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law. *See* online: ICJ <http://www.icj-cij.org/documents/index.php?p1=4&p2=2&p3=0#CHAPTER_I> (date accessed: 10 March 2008)

primarily focus on the safety and security SARPs respectively,[154] and attempt at forcing states to be more open about their regulations and safety standards. Concern over the low standards of compliance with SARPS and failure to notify ICAO under Article 38 by member States, led to the launch of these oversight programs. The programs provide for the facility to all members to have ICAO carry out a safety oversight assessment and security audits. Sometimes ICAO also extends direct assistance on a cost recovery basis.[155] The ICAO USOAP and USAP have raised awareness of the problems faced by many states in attempting to comply with their obligations under the Convention.[156]

These programs have identified areas of concern in many states, including failure to implement ICAO provisions systematically in national regulations and a lack of suitable systems for overseeing the safety standards of national operators. From the results of the USOAP to date, however, it is clear that many states are struggling to cope with the sheer number of ICAO provisions. The size and diversity of the aviation industry, coupled with the scope and sophistication of aviation systems in different countries, has created uncertainty in many states as to which provisions should apply to them. While, USAP is a new system that has only recently been put into place. It is encouraging to note that after USOAP, the security audit system was introduced. Whether systems on similar lines can be replicated and applied to other SARPs to make sure that some form of enforcement is

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[154] The Universal Safety Oversight Auditing mechanism looks at the level of compliance States have with the SARPs related to aviation safety, these SARPs primarily are contained in: Annex 1 (Personnel Licensing), Annex 6 (Operation of Aircraft) and Annex 8 (Airworthiness of Aircraft). Online <http://www.infrastructure.gov.au/aviation/international/universal.aspx> (date accessed: 15 November 2007).

[155] Tim Unmack, *Civil Aviation: Standards and Liabilities* (LLP Publishing, 1999) at 28.

[156] 36th Session of the Assembly of the International Civil Aviation Organization (ICAO) Montréal, September 18 to 28, 2007, Technical Commission Agenda Item 25: Follow-up of the DGCA/06 Conference on a Global Strategy for Aviation Safety. ICAO SARPs - A way forward.

brought about, is something that ICAO needs to consider. As of date the Safety and Security Audits Branch of ICAO both regulates and implements these audits. The Branch looks at the actual implementation and infrastructural potential of ICAO member States to implement the standards set under the SARPs.[157] Although ICAO's rules are not binding international legal rules, yet its steps and supervision mechanisms make its role more pertinent in international aviation.[158] Audit programs have set a precedent and it is important to make other SARPs to become more effectively applied in dealing with the problem of climate change. There is no statewide study relating to the manner or extent of SARPs compliance, and thus it is difficult to determine the level of implementation practice by states in domestic legislation.[159]

Current status of ICAO's work

ICAO has come a long way in its work in the area of environmental protection and mitigation. With its mixed bag of success in its areas of focus i.e. noise pollution and greenhouse gas emissions, through the ENV it continues to develop programs and mechanisms for pollution mitigation. The latest resolution A36-22 adopted by the ICAO Assembly in September 2007, *inter alia* identified the areas of concern for its operations in environmental protection and attempted to strengthen the SARPS that regulate noise and engine emissions.[160] The resolution (through Annexure K) specifically referred to the

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[157] Safety and Security Audit Branch ICAO, online: ICAO <http://www2.icao.int/en/ssa/Pages/default.aspx> (date accessed: 15 March 2009).
[158] Ludwig Weber and Arie Jakob, 'Activities of the International Civil Aviation Organization (ICAO),' Vol. XXIII Ann. Air & Sp. L. at 324.
[159] Buergenthal, *supra* note 105 at 104.
[160] Appendix K, ICAO Programme of Action on International Aviation and Climate Change. Online: ICAO < http://www.icao.int/env/meetings/Giacc/SD1_en.pdf> (date accessed: 16 September 2008).

problem of climate change and identified the areas of concern, which will be the focus of newer initiatives.[161]

"Whereas the sustainable growth of aviation is important for future economic growth and development, trade and commerce, cultural exchange and understanding among peoples and nations; therefore prompt action must be taken to ensure that it is compatible with the quality of the environment and develops in ways that alleviate adverse impacts."

Through Annexure K the ICAO Council has been asked to:

1. continue to take initiatives to promote information on scientific understanding of aviation's impact and action undertaken to address aviation emissions and continue to provide the forum to facilitate discussions on solutions to address aviation emissions; and
2. continue to cooperate closely with the IPCC and other organizations involved in the assessment of aviation's contribution to environmental impacts on the atmosphere.

In line with these commitments and to contribute towards addressing the issue of climate change on a proactive basis, recently, as a deliverable under the above noted resolution, a new initiative was launched. A group was formed to review the work being done by the organization in the area of pollution mitigation and focus on tangible and specific deliverables. The Group on International Aviation and Climate Change (**GIACC**) was approved by the ICAO Council, and has been tasked to develop and recommend to the

[161] *Ibid* Appendix B – preamble.

ICAO Council a Programme of Action and common strategy consistent with Resolution A36-22,[162] It is required to determine possible aspirational goals consistent with Appendix K of Resolution A36-22,[163] and identify a menu of options from which States can choose to limit or reduce greenhouse gas emissions attributable to international civil aviation: Determine means to measure progress.[164] The GIACC has met twice and has identified three goals that need to be tackled: a) goals and timeframes b) a framework of measures to limit or reduce green house gas emissions; and c) evaluating the progress in ICAO.[165]

The 36th Assembly concluded with unanimity on the way forward on majority of the issues that found voice in the adopted resolution, barring one. 42 European states entered their reservations to the voluntary emissions trading mechanisms that were being proposed at the Assembly, as opposed to the European emissions trading proposal.[166] The arguments surrounding the emissions trading debate will be discussed at length in Chapter Three, suffice to say, this will be a major area of international focus in all future initiatives directed towards the environment problem.

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[162] ICAO Assembly Resolution A36-22: Through Appendix K (2) the ICAO Council was requested to form a new group on International Aviation and Climate Change composed of senior government officials representative of all ICAO regions, with the equitable participation of developing and developed countries, with technical support provided by CAEP, for the purpose of developing and recommending to the Council an aggressive Programme of Action on International Climate Change, based on consensus, and reflecting the shared vision and strong will of all the Contracting States, online: ICAO <http://www.icao.int/icao/en/env/A36_Res22_Prov.pdf> (date accessed: 10 May 2008).

[163] *Supra* note 59 Appendix K also indentifies the areas of work for GIACC, which inter alia includes (1) developing and implementation framework consisting of economically efficient and technologically feasible strategies and measures that Contracting States can use to achieve emissions reductions, (2) identifying the means by which progress can be measured, (3) identification of possible global aspirational goals in the form of fuel efficiency for international aviation and possible options for their implementation (4) reporting progress resulting from the actions of Contracting States and stakeholders, online: ICAO <http://www.icao.int/icao/en/env/A36_Res22_Prov.pdf> (date accessed: 10 may 2008).

[164] Group on International Aviation and Climate Change (GIACC), First Meeting, Montréal, 25 to 27 February 2008, Terms of Reference: Working Paper: GIACC/1-WP/1, 5/2/08.

[165] Donald T Bliss, Modernizing the ICAO Responses, Issues in Aviation Law and Policy, Vol. 8 Autumn 2008 at 63.

[166] *Ibid.*

Strategic objectives of ICAO for 2005-2010: consolidated vision and mission statement

In 1996, ICAO requested the IPCC to assess the consequences of greenhouse emissions from aircraft engines. The study that was submitted by the IPCC concluded that aviation needed defined targets and timetables. A few sporadic measures here or there will not lead to tackling the giant of a problem in aviation's contribution to climate change. There will have to be technical, fiscal, regulatory measures and the like, that come together to address the problem and approach it with the needed seriousness. ICAO needs to act fast in order to maintain the special initiative it has been given in the Kyoto and UNFCCC framework, it being the center of all possible actions and activities that will be taken in the future, from within the aviation sector.[167] Additionally, the future for ICAO as defined in its strategic objectives for the next five years includes:

Development, adoption and promotion of new or amended measures to:

1. limit or reduce the number of people affected by significant aircraft noise;
2. limit or reduce the impact of aircraft engine emissions on local air quality; and
3. limit or reduce the impact of aviation greenhouse gas emissions on the global climate;

[167] Tim Johnson, Aviation Environment Federation (AEF), presentation at the Air Transport and the Environment, their future in an integrated transport policy,' June 29-30, 1999, London UK.

4. cooperate with other international bodies and in particular the UNFCCC in addressing aviation's contribution to global climate change.[168]

Conclusion

ICAO is in transition, trying to re-align itself with a new business plan, a reduced and reducing budget, trying to live with post World War II Articles which were developed by fifty-three states instead of the current 190.[169] With new staff and results of USOP audits indicating low level of compliance with SARPS, ICAO is in need of serious reassessment. Naturally civil aviation concerns are pushed into the background by these institutional concerns. In addition, states are always fearful that the information of their non-compliance is not made known to everyone.[170] Thus, yet again political interest puts institutional restructuring on the backburner.[171]

The UNFCCC framework has noted that to minimize the adverse environmental effects of global civil aviation activity: "notably aircraft noise and aircraft engine emissions" the following measures are necessary. To develop, adopt and promote new or amended measures to limit or reduce the number of people affected by significant aircraft noise. To

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[168] Strategic objectives of ICAO 2005-2010, consolidated vision and mission statement. Online: ICAO <www.icao.int/icao/en/strategic_objectives.htm> (date accessed: 10 November 2007).
[169] Creation of ICAO, online: ICAO <http://www.icao.int/icao/en/adb/wla/libinfo.htm> (date accessed: 10 November 2007).
[170] News from ICAO Report of IAOPA Presence at ICAO, Aviation Matters, Tuesday 24 July 2007, online <http://hoftec.blogspot.com/2007/07/news-from-icao.html> (date accessed: 20 January 2008).
[171] Professor Michael Milde, in his analysis of the fifty years of the Chicago Convention points out: "The Convention was adopted during the final year of World War II, in the shadow of the world conflict, and is the result of a consensus reached by only 52 States. Over the last fifty years aviation has profoundly changed, both technologically and in its economic and social impact on society. Moreover, the geopolitical picture of the world and the character of competing interests in the international community of States underwent changes unforeseeable at the time of the Chicago Conference of 1944. Today membership of the Convention is 183 States (subsequent to the writing of the Article the membership has changed and ICAO today boasts of 190 members), it is legally relevant to note that over 70% of the States had no role in the drafting of the Convention." Milde Amendments, *supra* note 117 at 403.

limit or reduce the impact of aircraft engine emissions on local air quality; and limit or reduce the impact of aviation greenhouse gas emissions on the global climate. Cooperate with other international bodies and in particular the UNFCCC in addressing aviation's contribution to global climate change."[172] In the same tone, the EU is now pushing for the inclusion of aviation emissions in its ETS regime. These contrasting agendas, which are pulling climate change efforts in different directions, and the conflict resulting there from is going to be a huge challenge for ICAO in the future.

The next chapter will focus on how the EU continues to step away from ICAO efforts and moves forward with its plans of ETS. The overview of ICAO's work through CAEP and putting in place updated SARPs seems like a wasteful exercise if mandatory compliances are not present to back such recommendations and efforts. There is unfortunately a strong perception that progress within ICAO in addressing environmental concerns is painstakingly slow, which gives much needed ground to arguments of other geographical groupings of states. Given strong public pressure to act on environmental issues, governments tend to look at more domestic initiatives to find quick fixes outside the ICAO process.[173] This seriously brings into questions ICAO's leadership role and eventual irrelevance, when it comes to dealing with problems surrounding international civil aviation.

[172] Strategic objectives of ICAO for 2005-2010, Consolidated Vision and Mission Statement, online <http://www.icao.int/icao/en/strategic_objectives_2005_2010_en.pdf> (date accessed: 20 January 2008).
[173] Lynne Osmus, Director of the Europe, Africa, Middle East Office of the Federal Aviation Administration USA, 'Aviation and the Environment, Constraint or Challenge,' keynote remarks, Air Transport and the Environment, their future in an integrated transport policy. 29-30 June 1999, London.

PART B

CHAPTER THREE Europe and Emissions Trading: a new way forward

In its attempts to find solutions for pollution mitigation in aviation, the EU has tried to take a leading role within the world community. The EU continuously examines the trends and changes in the aviation industry and seems to have come to the conclusion, that more needs to be done on the noise and emissions mitigation front, to ensure cleaner and quieter skies in future. It also finds itself confronted with the problem of lack of implementation mechanisms within the ICAO system. Thus, even though the EU continues to participate and support ICAO activities, there is considerable movement to follow an actively 'independent approach'.

In the process of identifying better ways to tackle the problem, the EU used its experience from the past and is now focusing on implementing the Emissions Trading Mechanism, as the most effective way to deal with the problem of aviation pollution and contribution to greenhouse gas emissions. The already existing ETS in the EU would be extended to the aviation sector. However, these attempts have not seen much support given the developments at the last concluded ICAO General Assembly.[174] In the area of noise pollution, new and improved legislations are being put into place to supplement ICAO's work in the area. This chapter will look at the concerns the EU has in relation to aviation

[174]At the 36th Assembly, ICAO identified its role in the area of aviation emissions as being that of looking at procedures, proposals and newer technologies to fight aviation emissions. And actively supporting the UNFCC's work in international aviation emissions mitigation. While as far as the Emissions Trading Mechanisms are concerned they are still within the "Voluntary" framework of ICAO and only recommendations to the member States in terms of adopting the same domestically. For details on ICAO"s work plan on environmental mitigation efforts *See*: A36-WP/39 EX/10 10/9/07 ICAO Assembly, 36th Session, ICAO Policy on Aviation Emissions, presented by the ICAO Council.

pollution and the initiatives it is taking in this regard. I will discuss the EU's stance at ICAO and its other international initiatives. Finally, I will conclude by summarizing what these initiatives mean for the future of implementing mechanisms to fight aviation pollution, as an alternative to ICAO's approach.

EU's environmental concerns and initiatives

The EU's environmental challenges are no different from those of other countries. Even though the EU remains one of the most saturated aviation markets, where growth is slow, it still has a high density of domestic and transit international traffic[175] Having said that, the EU continues to face very similar problems of sustainability of resources, environmental impacts of continuous economic activities, effects of the expanding EU community and physical movement of people around the continent; all of which put stress on the environment. As far as aviation is concerned the EU is trying to cope with growth in noise levels around airports, increasing emission levels, stress on navigation systems and the need to manage its airspace, which stands greatly divided between military and civil aviation needs.[176]

To specifically identify the problems and concerns that are related to aviation and the pollution caused there from, we need to highlight the growth the industry has seen within the Community. Europe has serious concerns regarding the sustainability of the

[175] Online: Belgo Control <www.belgocontrol.be/belgoweb/publishing.nsf/AttachmentsByTitle/FAB_Europe_Central-en-07.../FAB_Europe_Central-en-07-03.pdf> (date accessed: 15 January 2009).
[176] Civil Military Cooperation, online: EUROCONTROL <http://www.eurocontrol.be/epr/gallery/content/public/docs/skyway_spring_2008/SW47_12-14.pdf> (date accessed: 15 January 2009).

environment, while simultaneously being cognizant that it is competing with ever growing markets around it.[177] In addition to the problems at home, the EU also has concerns of safety, security in its aviation activities with other States. There is a lack of uniform security and safety standards applied by States and airlines across the world. Thus, when carriers fly into EU airspace it creates problems and conflicts with Community standards. All of these put together make the EU's aviation challenge a daunting one.

Europe has known growth in its aviation industry for some time now. Since it decided to deregulate its aviation sector in the middle of the nineties, the aviation industry has seen many years of boom.[178] Air traffic has grown close to three times in the past twenty years, while the period between 1994 and 2004 saw a staggering growth of 55 %. More than 700 million passengers departed or arrived at European airports in 2005, and the last five years have seen growth in the range of 5-8%. These figures are of course prior to the recent slump across world economies.[179] This affordability has greatly contributed to increased traffic. But as environmental concerns grow and international competition is getting ever tougher, the EU needed to simultaneously address a few key concerns to keep European airlines in business.[180] On the other side, to balance growth with sustainability, the EU decided to address both the menaces of aviation noise and emissions separately. Between 1990 and 2005, CO_2 emissions from domestic civil aviation increased by

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[177] Aviation patterns changing across Europe, online: Travel Daily News < http://www.traveldailynews.com/pages/show_page/20432> (date accessed: 16 January, 2009).
[178] The Geography of Deregulation in the European Aviation Market, Online: Outlook on Europe <http://www3.interscience.wiley.com/cgi-bin/fulltext/118910643/PDFSTART> (date accessed: 16 January 2009).
[179] Aviation Growth at an all time high, Travel Industry Wire, August 2007, online: < http://www.travelindustrywire.com/article27454-Aviation_Growth_Hits_All_Time_High.html>(date accessed: 15 April 2008).
[180] *Ibid.*

44%, while in 2000 and 2005 emissions increased by 15 %. Carbon dioxide emissions from domestic civil aviation contribute 0.6% to total EU greenhouse gas emission in 2005. The number of passengers increased by 125 % compared to 1990 and a further increase of about 170% compared to 1990 is projected in the next five years.[181] This is no uncertain terms, has been contributing to the anxiety being felt across the EU. The EU pledged in 2007 to cut its greenhouse gas emissions by at least 20 % below 1990 levels by 2020. But very recently the EU Environment Commissioner noted that emissions from aircraft have actually doubled since 1990 and would likely double again up to 2020 if there was no action that followed soon.[182]

As far as noise pollution is concerned, engines are much quieter today than the middle of the last century when aviation activities began. Also, most aircraft meet with the ICAO requirements for noise levels, there is definitely a need to push for more improved engine technology.[183] While noise standards applicable to individual aircraft have been strengthened, growing traffic levels and more regular traffic at increasing numbers of airports continue to give concern to local residents. As a result, there are demands for additional operating restrictions at individual airports to limit the impact of aircraft noise during the most sensitive periods (evening, night and weekend) or to limit the use of older, noisier aircraft that are only marginally compliant with ICAO standards.[184]

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[181] EEA report | No 5/2007 Greenhouse gas emission trends and projections in Europe 2007 Tracking progress towards Kyoto targets Annex: Additional information on greenhouse gas trends and projections by sector and by Member State.
[182] Statement by EU Environmental Commissioner Stavros Dimas, online: IHT <http://www.iht.com/articles/ap/2008/07/08/europe/EU-EU-Airlines-Carbon-Trading.php> (date accessed: 15 August 2008).
[183] Aviation noise, Online: Politics UK <http://www.politics.co.uk/briefings-guides/issue-briefs/public-services/aviation/aviation-noise/aviation-noise-$337603.htm> (date accessed: 11 September 2008).
[184] Report on the application of EU Directive 2002/30/EC at 2. (**Report EU 30**).

Green paper and Communication

A Green Paper[185] was formulated in 1996, which was directed to address the issue of noise pollution. The Green Paper identified that over 80 million people (which is close to 20 % of the population) in Europe suffer from noise related problems, not implying that all noise is created from aviation activities. However, the Green Paper identified that noise pollution was a problem that needed to be tackled.[186] It also noted that even though there was considerable improvement and the noise footprint had seen reduction around airports (by a factor of 9), there was a complete absence of mechanisms to collect proper data and information to identify focus areas related to aviation noise pollution that need improvement.[187] The result of these findings was recommendations to set up a new framework for better control and harmonization of assessment of noise exposure.[188] Further, focusing on the problems related to pollution caused by aviation, the European Commission (**EC**) in its Communication of December 1, 1999 (**Communication**)[189] recognized that the approach of applying ICAO standards through EC legislation, has not been able to completely relieve stress on airport infrastructure and proliferation on operational and production levels in the industry.[190] Even where there is difficulty in agreeing to more stringent noise certification levels at ICAO, the EC would have to go

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[185] A Green Paper is a discussion document, which is initiated by the Commission. The document invites all concerned parties to participate in discussions and sets into motion the consultation process on a particular issue. A Green Paper is sometimes followed by a White Paper that contains action proposals for the Community. *See* European Union Documents, online: Europa <http://europa.eu/documents/comm/index_en.htm?> (date accessed: 26 May 2009) (**Documents**).

[186] Commission *Green Paper* of 4 November *1996* on Future *Noise* Policy [COM (96)] at 2 (**Green Paper**).

[187] *Ibid* at 3.

[188] For detailed discussion on the suggestions for new mechanisms, please see Report EU 30, *supra* note 184.

[189] A Communication is a proposed legislation or other sets of proposals that are issued by the Commission to the European Council, Parliament or other institutions. A Communication usually includes all preparatory material etc., which goes into the making of that legislation. Documents, *supra* note 185.

[190] Communication of 1999, EC to the Parliament, etc. Brussels, 1 December 1999. COM (1999) 640 final Communication from the Commission to the Council, the European Parliament, Economic and Social Committee and the Committee of Regions. Air Transport and the Environment Towards meeting the Challenges of Sustainable Development at 3 (**EU Communication**).

ahead, propose and apply its own standards, in collaboration with other developed countries, and cognizant of economic difficulties of developing countries.[191] On the operational measures front, the Communication pointed out that, as the new emission control measure would apply only to new aircraft and would not considerably affect existing aircraft, the EC would need to develop better strategies to overcome that deficiency. [192]

On the specific problem of emissions, the EU has taken one step further than all of its international partners. The last ICAO General Assembly in 2007 became a flashpoint for EU's future plans to combat aviation emissions. Given that it wasn't able to garner much support for its ETS initiative, the EU has decided to go ahead and implement ETS for aviation by 2012. This initiative comes with its own set of concerns. Initiating ETS in the EU means that there will be extra costs to airlines.[193] And where there is little support forthcoming from other members of the world community, the EU will find it difficult to implement its ETS ambitions without external collaboration. I will be taking up a detailed discussion of ETS later in this Chapter.[194]

But the EU concerns aren't just confined to this. The EU is finding it difficult to enforce standards. Also, there is a strong feeling within the EU that mere ICAO standards are not enough to achieve environmental sustainability as far as aviation is concerned. The Communication recognized that the EU has to go a step further than what the ICAO

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[191] *Ibid* at 8.
[192] *Ibid* at 9.
[193] EU Parliament votes to include international aviation in emissions trading, 8 July 2008, online: IHT <http://www.iht.com/articles/ap/2008/07/08/europe/EU-EU-Airlines-Carbon-Trading.php> (date accessed: 17 September 2008).
[194] A detailed discussion on the EU and ETS will be taken up later in this Chapter, *Infra* note 210.

standards can achieve.[195] Even though attempts are made to develop newer technologies and better aircraft, fleet renewals will not keep pace with the growth of the industry.[196] In identifying what would be the pillars of the industry's ability to combat the menace of aviation pollution, it was noted that the necessary factors will be: the improvement of technical environmental standards on noise and emissions, giving more support to economic and regulatory market incentives, further assisting airports in their environmental programs and research and development, so that the environment agenda gets integrated into the process of developing sector specific policies.[197]

Two specific things seem to have emerged from within the EU: one, there has to be a coordinated approach in dealing with the problem of pollution, and two that ICAO may not be the only mechanism through which the EU agenda can be implemented. We will discuss the international consequences of the EU's plans further in this discussion. So both Community level and international initiatives have to work in tandem to achieve the goals the EU has set for itself. Now let's look at some of the initiatives that have been undertaken to deal with the problem of aviation pollution, and how the EU is trying to supplement for the failures of ICAO's efforts.

Initiatives emerging from the EU

Given the above noted concerns within the EU, there have been initiatives launched at the Community level and considerable infrastructure is being developed, to tackle

[195] EU Communication, *supra* note 190 at 5.
[196] *Ibid.*
[197] *Ibid* at 6.

pollution caused by aviation activities. Through the Green Paper on noise the Commission identified a three-point strategy to make air transport sustainable in the long term:

1. Strengthen air traffic management across the Community, by using the means of Single European Sky ATM Research (**SESAR**);
2. Technological development, through programs such as Clean Sky or studies on the use of biofuels;
3. And, putting into place economic mechanisms for trading emission rights.[198]

The SESAR system for air traffic control has been on its way to fruition, but needs a kick-start to really take off.[199] The EU needs to focus on finalizing the Single European Sky dream also, which will ensure efficient flying routes and better traffic flows across the continent. The Single European Sky essentially offers a huge opportunity to achieve considerable emission reductions, through optimized and efficient use of airspace across the EU. Regrettably, longstanding political hurdles continue to keep Air Navigation Service Providers (**ANSPs**) from realizing the maximum benefit of the Single European Sky project.[200]

The Single European Sky initiative is directed:

1. to restructure European airspace as a function of air traffic flows;

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[198] Green Paper, *supra* note 186 at 9.
[199] The system is has a three-stage implementation plan. The first stage 2004-08 has been the definition phase, which looks at providing a Master Plan for systems and infrastructure for ATM. The second stage 2008-2013 is expected to produce new technological tools as defined in the definition phase. And the 2012-2016 phase will focus on putting into place infrastructure across the European continent, Online: EC EUROPA <http://ec.europa.eu/transport/air/sesar/sesar_en.htm > (date accessed: 11 December 2008).
[200] CANSO online: < http://www.canso.org/Canso/Web/news/CANSO+press+releases/CANSO+Secretary+General+expresses+concern+at+EU+emissions+trading+vote.htm> (date accessed: 11 December 2008).

2. to create additional capacity; and [201]
3. to increase the overall efficiency of the European air traffic management system.
4. and finally, there are attempts within the EU to address the issue of congestion over airports, and the Commission has outlined an Action Plan on the issue.[202]

The great positives of working on initiatives like the Single European Sky are that independent intergovernmental agencies like EUROCONTROL, which work hand in hand with the EC, make it possible to implement an integrated approach. It allows for institutions outside the EU system to have policies of working together with it and achieving the goals collaboratively. This partial independence from the bulging bureaucracy of the EU makes semi governmental organizations like EUROCONTROL both accountable and free to function.

On 22 December 2003 EUROCONTROL and the European Commission signed a Memorandum of Cooperation that covers five areas of cooperation: implementation of the Single European Sky, research and development, data collection and analysis in the areas of air traffic and environmental statistics, satellite navigation including Galileo, and international cooperation in the field of aviation. The objective of the Single European Sky initiative is to enhance current safety standards and overall efficiency for general air traffic in Europe, to optimize capacity meeting the requirements of all airspace users and to minimize delays. In pursuit of this objective, the aim of this Regulation was to establish a harmonized regulatory

[201] EUROCONTROL, online: <http://www.eurocontrol.int/ses/public/subsite_homepage/homepage.html> (date accessed: 29 November 2008).
[202] *See:* Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Brussels, 24.1.2007, COM (2006) 819.

framework for the creation of the Single European Sky by 31 December 2004.[203] EUROCONTROL submitted its report on the implementation of the Single European Sky project in 2006, which highlighted steady movement in the implementation of the project. The positive that has resulted from this is that States outside the EU, who are members of EUROCONTROL, have become effective participants in the implementation program.[204]

In its fight against pollution, the EU has decided to go its own route where it is unable to get support from its international allies. This in no way means that it will not participate in multilateral efforts by ICAO to regulate aviation. The EU continues to support and participate in efforts, like when in 2004 the ICAO Assembly requested CAEP to provide guidance on the use of charges for emissions affecting local air quality, the EU participated in working groups of CAEP.[205] The analysis of the cost effectiveness of these charges did not give any conclusive results, in respect of the effects on overall emissions and on industry practice. However, it did highlight that the effect of these charges on developing countries, which raised this issue at the 2004 Assembly.[206]

Laying emphasis on its 'independence approach', in 2008 the EU launched the Clean Sky research project, which is directed to conduct research in aircraft technologies that will

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[203] For details see: Framework for the Single European Sky, Regulation (EC) No 549/2004 Of The European Parliament And Of The Council of 10 March 2004.
[204] For full discussion please see: EUROCONTROL Report a Factual Review of the Status of the Single European Sky Implementation: online <http://www.eurocontrol.int/ses/gallery/content/public/docs/SESFARR.pdf> (date accessed: 14 January 2009).
[205] Statement from ICAO to the 20th Session of the UNFCCC SBSTA 16-24 June 2004 at 2. Online: ICAO < http://www.icao.int/icao/en/env/sbsta-20.pdf> (date accessed: 6 July 2005).
[206] 36th Session of the Assembly of ICAO Montreal, 18 to 28 September 2007 Executive Committee Agenda Item 17: Environmental Protection Comprehensive Approach to Managing Aviation's Environmental Impacts Working Paper presented by Portugal, on behalf of the European Community and its Member States1, by the other States Members of the European Civil Aviation Conference2, and by EUROCONTROL at 5.

cut both emissions and noise levels by close to 50% in the next decade or so.[207] There is considerable effort within the Community to avoid multiple efforts and thus the Clean Sky project is one of six planned Joint-Technology Initiatives to avoid the fragmentation of research efforts. With focus on sustainability, two Joint Technology Initiatives[208] are envisaged to be launched in the early stages of this initiative. These will be in line with the recommendations addressing areas of environmental friendliness and cost efficient aircraft. The other one is on air traffic management. This initiative will, in essence, support the Single European Sky policy and SESAR Initiative of the Commission.[209] An overview of the deliverables of this initiative highlight the urgent need to focus on developing technologies for environmentally-friendly, cost efficient aircraft and advanced technical solutions to bring about a harmonized air traffic management system.[210]

The environmental challenge is twofold. The aviation industry (including all the participants involved) must reduce its impact on climate change, local noise and air quality, and the proponents of pollution control have to support both public and private

[207] EU launches clean sky research project, online: EurActiv <http://www.euractiv.com/en/transport/eu-launches-clean-sky-research-project-low-carbon-aircraft/article-170120> (date accessed: 14 December 2008).
[208] Business urges quick establishment, online: EurActiv <http://www.euractiv.com/en/science/business-urges-quick-establishment-jtis/article-162323> (date accessed: 14 December 2008).
[209] SESAR is an initiative of the EU which aims at developing Air Traffic Management systems across Europe. With focus on infrastructure and technological developments, SESAR will be technologically driven with a primary objective of safety for aviation. For details see: Air Transport Portal of the EU online: <http://ec.europa.eu/transport/air_portal/traffic_management/sesame/index_en.htm> (date accessed: 14 January 2009).
[210] Brussels, 10.6.2005 SEC (2005) 800 Commission Staff Working Document Report on European Technology Platforms and Joint Technology Initiatives: Fostering Public-Private R&D Partnerships to Boost Europe's Industrial Competitiveness at 16.

investments, to develop the breakthrough technologies that are required, if the aviation sector is to drastically reduce its greenhouse gas emissions.[211]

EC regulations on aviation: Binding on member states

ICAO has lawmaking authority over 70% of the Earth's surface, given to it by the Convention.[212] This is an interesting piece of law as its jurisdictional scope, and unparalleled by any other international organization.[213] However, in terms of applying the rules made by ICAO under the Convention, unlike the Paris Convention of 1919, where the technical standards were an integral part of the treaty, the Convention has the SARPs only as annexes and technically not part of it.[214] Thus, the only way any regulations, standards or international rules can be applied within the boundaries of states is through legislation.[215] As far as aviation goes, the states across the world don't have too much to show for, as there is little developed legislative and regulatory framework. However, the EU has legislations that provide tools for enforcement of both international rules, like SARPs, and domestically made rules within the EU.[216] Some of them that are directed to lay down regulations for aviation pollution mitigation are discussed herein:

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[211] Growing environment and security concerns prompt aeronautics research agenda update, online: CORDIS < http://cordis.europa.eu/search/index.cfm?fuseaction=news.document&N_RCN=30113> (date accessed: 20 November 2008).
[212] Dempsey Blacklisting, *supra* note 89 at 9.
[213] *Ibid.*
[214] Buergenthal, *supra* note 105 at 102.
[215] Mark Jennings, The relationship between treaty and domestic law, Australian Government Department of Foreign Affairs and Trade online: <http://www.dfat.gov.au/treaties/workshops/treaties_global/jennings.html> (date accessed: 14 January 2008).
[216] For noise: Directive 2002/49/EC and 2002/30/EC. For Emissions: Communication [COM (2005)459].

Directive 2002/30/EC of the European Parliament[217] (**Directive 30**) identifies the key objective of EU's common transport policy as being sustainable development. Directive 30 spells out that for the achievement of such sustainability, there is a need for an integrated approach aimed at balancing and ensuring the effective functioning of the EU transport systems and the protection of the environment.[218] This directive targets noise pollution as the culprit by providing 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. Directive 30 also foresees that such rules will help safeguard internal market requirements, by introducing similar operating restrictions at airports with broadly comparable noise problems. This 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.

Article 1 of Directive 30 looks to:

1. promote development of airport capacity in harmony with the environment; and
2. facilitate the achievement of specific noise abatement objectives at the level of individual airports of a partial nature, affecting the operation of civil subsonic airplanes according to time period. [219]

Further, Article 8 identifies the need for exempting aircraft registered aircraft in developing countries, and further exempts those that are registered in these countries and are only marginally compliant. The exemption for such aircraft registered in developing

[217] Directive of the EU Parliament and the Council - 26 March 2002 at 5.
[218] *Ibid* at 6.
[219] *Ibid.*

countries extends to a period of 10 years from the date of the relevant period under Directive 30. This forms the bedrock of EU legislation on noise pollution.

Further, Directive 2002/49/EC of the European Parliament (**Directive 49**)[220] has noise-mapping tools to provide assessment methods and information accessibility to address the problem of lack of proper data in noise control. Article 1 (1) (a) focuses on the determination of exposure to environmental noise, through noise mapping, by methods of assessment common to the EU Member States, (b) focuses on ensuring that information on environmental noise and its effects is made available to the public; and (c) directs the adoption of action plans by the Member States, based upon noise-mapping results. Directive 49 under Article 4 requires Member States to designate, at the appropriate levels, the competent authorities and bodies responsible for implementing this Directive, including the authorities responsible for: (a) making and, where relevant, approving noise maps and action plans for agglomerations, major roads, major railways and major airports. While Article 7 mandates noise mapping for all geographical locations with airports. Interestingly, under this legislation other forms of transport have specific caps for number of passengers before it becomes applicable, but for airports it applies to all.[221] Thus, under the heading of 'strategic noise mapping' it is seen as an important document to provide direction to domestic legislation, which puts noise control at the center of Community efforts in the area of pollution control. The Commission Decision on Directive 2004/156/EC required that under Article 14 the Commission was to elaborate guidelines for the monitoring and reporting of greenhouse gas emissions under ETS, further strengthening the legislative

[220] Directive of the EU Parliament and the Council of 25 June 2002 relating to the assessment and management of environmental noise.
[221] *Ibid* Article 7.

framework.[222] Within the framework of rulemaking in the EU, directives are guidelines that are provided to member States to apply domestically in the form of legislations. Though the manner of application and enforcement may be left to member States, the achievement of the objectives identified in the Directives is mandatory on all members. It is also important to note that these rules are law within the EU and enforceable by the European Court of Justice.[223]

Though the documents like the Communication to the European Parliament do not at initiation create rules or legislations unless they are adopted as such, they do identify the important tasks that have to be undertaken by the member States over the next coming years. These tasks under the Communication are outlined herein:[224]

1. reduction pathways for the group of developed countries of the order of 15-30% by 2020, compared to the baseline envisaged in the Kyoto Protocol, should be considered;
2. the Commission should continue its cost-benefit analysis of CO2 reduction strategies; and
3. international negotiations should be reinvigorated by exploring options for a post-2012 arrangement in the context of the UN climate change process.

[222] Directive of 29 January 2004 establishing Guidelines for the Monitoring and Reporting of Greenhouse Gas Emissions Pursuant to Directive 2003/87/EC of the European Parliament and of the Council (notified under document number C (2004) 130).
[223] Roger Longhorn, EU Directives, Regulations and Decisions: A comparison. Online: <www.agi.org.uk/SITE/UPLOAD/DOCUMENT/policy/Directives_Decisions_explanation.pdf> (date accessed: April 15, 2009).
[224] Brussels, 27.9.2005 COM (2005) 459 finally reducing the Climate Change Impact of Aviation.

Legislation for emissions control within the EU

The Communication Reducing the Climate Change Impact of Aviation set the tone for bringing aviation emissions within the ETS net.[225] The Communication re-asserted that ICAO and all its membership had not done enough to bring about a consensus to find ways to combat the problem of climate change.[226] The focus was on the inclusion of aviation emissions into the ETS mechanism as the most effective way forward. The EU argues that as ICAO has already been implementing independent voluntary emissions schemes, ETS is merely the next step forward. ETS will not create adverse situations for either passengers or airlines or other aviation players. There is no reason to not support the inclusion of aviation emissions in ETS.[227]

In December 2006, the Commission submitted its draft legislative proposals on this subject to the European Council and Parliament in its communication COM (2006) 818. The proposal includes the application of an aviation emissions trading scheme initially to intra-EU flights and then to flights to/from non-EU States.[228]

The EU consistently participates in and supports UNFCCC and ICAO activities, helping to maximize the efforts and participation in mitigation efforts worldwide.

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[225] Communication from the Commission to the Council, the European parliament, the European Economic and Social Committee and the Committee of the regions, Brussels, 27.9.2005 COM (2005) 459 final. (**Communication 05**).
[226] *Ibid* at 4.
[227] *Ibid* at 10.
[228] See European Civil Aviation Conference, online: <http://www.ecac-ceac.org/index.php?content=environement&idMenu=2&idSMenu=14> (date accessed: 5 January 2009).

However, the recognition is slowly dawning among all Community States, as is reflected by various policy statements, which finally led to the vote by the European Parliament to begin taking additional, yet complementary steps. The Community believes that it is not realistic to expect ICAO to take global decisions on uniform, specific measures to be implemented by all nations. There are reasons for this reluctance on the part of members of the EU. On the one hand, we have developing countries that are either unable or unwilling to commit themselves to more demanding policies before they see clear leadership from the developed world. While on the other, there is a complete lack of combined action from important industrialized partners who are not Parties to the Kyoto Protocol.[229] This has resulted in new initiatives by the Community, focusing on research on emissions and environment, energy taxation for aviation pollution and air traffic management.

The latest statistics from pre-2004 EU States show that the EU-15 (prior to the expansion of the EU) can meet, and may even overachieve, its 2008–2012 Kyoto targets in reducing greenhouse gas emissions to 8 % below 1990 levels. This however would be incumbent on member States implementing all additional policies being planned. If we look at the current projections, it is likely that existing policy measures will reduce EU-15 greenhouse gas emissions by a net effect of 4.0 % below base-year levels.[230] But the challenge of controlling emissions continues to grow and the EU feels compelled to take on the challenge of the IFCCC mandate for aviation to be regulated by its own players.

[229] Communication 05, *supra* note 225 at 5.
[230] Greenhouse gas emissions and trends in Europe 2007, online EEA: < http://www.eea.europa.eu/publications/eea_report_2007_5> (date accessed: 5 December 2008).

EU and Kyoto systems

The IFCCC left it to ICAO to deal with the problems of pollution caused by aviation.[231] Having been tasked to take the lead on this issue, there has been considerable debate in ICAO on what direction aviation's fight against climate change should take. The movement did not end with firm commitments, but veered more on the lines of voluntary efforts from member States. Cognizant of the emerging push for merely voluntary measures (specifically voluntary emissions schemes being supported by ICAO),[232] the EU began moving to push for bringing aviation emissions into the ETS fold. The last concluded session of ICAO's General Assembly was full of fireworks, when the EU refused to vote for the final resolution, given that no movement forward on ETS was made. It reserved its consent to the Resolution holding the view that it had not seen much movement forward on the issue of aviation's inclusion within the ETS framework.[233]

What does the ETS offer? ICAO noted that 'Emission trading is a flexible instrument that allows a limit to be set on emissions but leaves operators the freedom to decide how to meet the limit. It is therefore more cost-effective than other forms of regulation.' It also offers suitable incentives to industry players for their participation in the

[231] IFCCC mandates ICAO under Article 2 (2) of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, online: UNFCCC <http://unfccc.int/kyoto_protocol/items/2830.php> (date accessed: 15 January 2008).
[232] See Template and Guidance on Voluntary Measures, online: ICAO < http://www.icao.int/icao/en/env/measures.htm> (date accessed: 12 January 2008).
[233] See *infra* note 235.

process. [234] The EU ETS had already been established by Directive 2003/87/EC (**Directive 87**).[235] However, there have been some teething problems with the EU (Emissions Trading Scheme) related to the decentralized approach adopted. If aviation is to join the ETS then allocation and target setting should be imposed at an EU level, so that there is consistent treatment of aviation emissions across the EU.[236]

The EU holds the opinion and is arguing this across geographical forums, that as ETS within the framework of the IFCCC wasn't a sector specific measure, aviation's inclusion should be seriously considered.[237] Europe has been driving the agenda to incorporate aviation into the ETS, with plans to start including the sector in 2011. The European Parliament in June 2008, voted overwhelmingly in support of inclusion of aviation within the ETS regime.[238] But even though Europe is fully on-board with its plans to implement the ETS, there is grave concern about the EU's ability to sell this to the rest of the world. The concern also looks at the EU's legal standing to do so, i.e., to be able to apply ETS standards and caps across the board on all flights that are coming into the EU skies form abroad.[239]

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[234] Assembly 36th Session, Executive Committee, ICAO Working Paper A36-WP/70 EX 24.
[235] Greenhouse gas emission trends and projections in Europe 2007 EEA Report No 5/2007 Tracking progress towards Kyoto targets at 12.
[236] Including the Aviation Sector in the European Union Emissions Trading Scheme Report with Evidence HL 21st Report of Session 2005–06 European Union Committee of the House of Lords at 67. Online: < http://www.parliament.the-stationery-office.com/pa/ld200506/ldselect/ldeucom/107/107.pdf> (date accessed: 14 December 2008).
[237] Communication 05, *supra* note 225 at 14.
[238] The vote received 640 in support and 30 against. Online: Parliament votes to extend EU ETS to aviation, Carbon Finance online: < http://www.carbon-financeonline.com/index.cfm?section=lead&action=view&id=11361> (date accessed: 15 August 2008) (**Carbon Finance**).
[239] *Ibid.*

Highlights of EU ETS

The EU Directive 87 established the largest multi-country, multi-sector emission trading scheme seen so far. The European emissions trading scheme, covering greenhouse gas emissions from approximately 12,000 energy-intensive installations, began operation on 1 January 2005. Generally speaking, the broader the coverage of an emissions trading scheme, the lower the costs of achieving the same specific level of emissions reductions.[240]

The highlights of the EU ETS are to include aviation in the ETS mechanism from 2012. This was changed recently, when the one-year introductory phase was dropped. The cap for aviation will be 97% of their levels in 2004-06, there will be periodic decrease of this cap starting 2013. For the first year, airlines will get close to 85% of their emission allowances at no cost. Subsequent reduction to this level will begin from the second year of the implementation of the scheme. There are provisions to provide operators on low traffic routes or where emissions are low (like that of some developing countries) with exemptions from the scheme, but non-compliance by any other operator would incur a ban on their operation.[241]

In practice the ETS mechanism will work by imposing emission limits on airlines. The airlines would be permitted to buy emissions credits if they are unable to keep within

[240] Commission of the European Communities Brussels, 27.9.2005 Com(2005) 459 final communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions Reducing the Climate Change Impact of Aviation {sec(2005) 1184}.
[241] EU votes to include aviation in emissions trading, 10 July 2008 online: IHS <http://aero-defense.ihs.com/news/2008/eu-en-aviation-emissions-7-08.html> (date accessed: 15 November 2008).

the prescribed caps. The extraterritorial nature of this scheme is that it not only applies to carries in the EU, but also to foreign carriers who are flying in and out of the EU.

There have been concerns related to costs that have been expressed by The European Regions Airline Association (**ERA**), which estimated that the decision would cost European airlines €7 billion (USD11 billion) in the first two years of the scheme and said the figure would increase progressively as the scheme continued, reaching €90 billion over the 10 years to 2022.[242] There is also criticism that forcing airlines to buy emissions credits would impede other attempts by airlines to put into place measures to reduce aviation emissions.[243]

Resulting conflict with the US and other aviation players

The ETS push by the EU has resulted in protests from the US, developing countries and members of the airline industry. The EU is finding itself very alone in its battle to implement ETS internationally and have aviation included in it. The US and other members of the aviation community have taken strong exception to what they term the EU's 'unilateral behavior' to force aviation into the ETS framework. The protests advocate a global approach negotiated through ICAO. The economic impact, which is being debated by both sides, is the primary reason for continued opposition from the US and others. Contrary to the EU's proposal of a firm and committed ETS mechanism, the other side continues to

[242] Carbon Finance, *supra* note 238.
[243] 'EU plans to bring emissions trading to aviation' 3 April 2008 online: Climate Intel < http://climateintel.com/2008/04/03/eu-plans-to-bring-civil-aviation-into-the-emissions-trading-system-hit-more-turbulence/> (date accessed: 12 September 2008).

propose the adoption of only a voluntary blueprint.[244] This disconnect is because the EU is proposing that all flights to and from the EU pay for their emissions to EU entities. This is being seen as a complete violation of the terms of the Convention.[245] It is being argued that as the Convention provides complete sovereign rights to States over their airspace, the EU cannot regulate and impose emissions caps on airlines, which are not based within the EU.

Speaking at the end of ICAO's triennial Assembly session in 2007, European representative Luis Fonseca de Almeida expressed considerable disappointment at what had come out of the meetings during the ICAO Assembly, calling the conclusion as 'ICAO having abdicated its leadership role given to it under the Kyoto Protocol.'[246] ICAO continues to counter that by reiterating its commitment to 'aggressive action' on aircraft emissions.[247]

At the end of the ICAO Assembly in Montreal, a resolution was adopted which was strongly backed by the USA, with support from Canada, Australia and Japan. The Resolution[248] sought to introduce a 'mutual agreement' clause saying any ICAO member would have to sign a separate agreement with all countries operating in its airspace before

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[244] Little environmental progress expected at ICAO, online: Aviation Week <http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=awst&id=news/aw091707p3.xml&headline=Little%20environmental%20progress%20expected%20at%20ICAO> (date accessed: 15 February 2008).
[245] ATA declares European ETS illegal, tax grab, Air Transport Association online: < http://www.airlines.org/news/releases/2008/news_7-8-08.htm> (date accessed: 15 November 2008).
[246] EU attacks ICAO over aviation emissions, 2 October 07. Online: ECEEE <http://www.eceee.org/news/news_2007/2007-10-02a/> (date accessed: 17 November 2008).
[247] *Ibid.*
[248] Assembly — 36th Session Montréal, 18–28 September 2007 ICAO, Appendix L.

applying emissions trading. The resolution was passed, but the EU says it does not have legal implications for the EU plans, and aviation's entry into the ETS will go ahead.[249]

It was interesting to note that the World Wildlife Fund ("**WWF**") came out in complete support of the EU initiative. In its position statement the WWF outlined its support initiative, given of course if the ETS inclusion came with a larger mandate.[250] 'Improved air traffic management systems and more direct routing to tackle the formation of contrails and cirrus clouds would be the best way forward,' was the view coming out of the WWF. There were also suggestions to introduce newer measures like the ending of the VAT exemptions on air tickets, introduction of kerosene tax to internalize carbon emissions and en-route emissions charges. All of these would be to complement the push for ETS.[251]

Representing the voice of navigation service providers, CANSO noted, 'While we accept that economic incentives have a part to play in driving reductions in emissions in all industries, including aviation, we have some concerns at the shape of the current proposal for the EU ETS.'[252] So while CANSO supported the ETS route to additional taxation of aviation activities, it expressed concern that if the participation wasn't global the success of such an initiative would be very uncertain. Environmentalists counter this by noting that, ICAO's buckling to the US insistence on 'mutual agreement by third parties' before the EU

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[249] EU says ICAO Assembly Resolution won't stop ETS, Transport and Environment online: <http://www.transportenvironment.org/News/2007/10/EU-says-Icao-assembly-resolution-wont-stop-ETS/> (date accessed: 15 November 2008).
[250] World Wildlife Federation, position on including aviation into the EU Emissions Trading Scheme, online: < assets.panda.org/downloads/wwf_aviation_position_statement__final_.pdf> (date accessed 14 November 2008).
[251] *Ibid.*
[252] CANSO Secretary General Expresses Concern at EU ETS vote. CANSO online: < http://www.canso.org/Canso/Web/news/CANSO+press+releases/CANSO+Secretary+General+expresses+concern+at+EU+emissions+trading+vote.htm> (date accessed: 14 November 2008).

emissions trading scheme can be applied, is merely the latest in a decade of stalling and denial […], ICAO's decision to make a reservation against the ICAO resolution signals the end for ICAO role on the environment.[253] Thus, arguments working for a global consensus and apathy at ICAO's inaction make the ETS debate very volatile. The airline industry has its set of legitimate concerns, where the ones with newer fleets will have to cut emissions and will not be able to rely on newer aircraft to cut their emissions, and will be disadvantaged as opposed to their international competitors. But there is also strong support that ETS should be part of a global initiative, possibly in the post 2013 Kyoto framework.[254]

Conflict with Article 15

The Convention prohibits unilateral limitation of the volumes of traffic, frequency and regularity of service or aircraft types operated by airlines of the other party, except as may be required by environmental reasons, 'under uniform conditions consistent with Article 15 of the Convention'.[255] Given this obligation under the Convention, it becomes necessary that the ETS regime being promoted by the EU is evaluated for its 'violation', as it were, of the principles of this international treaty.

Every airport in a contracting state, which is open to public use by its national aircraft shall likewise, subject to the provisions of Article 68 of the Convention, be open

[253] International Aviation Body Fails to Act on Climate Change Plans, friends of the Earth online: <http://csrwire.ca/article/780/Friends-of-the-Earth-Canada/28-9-07-International-aviation-body-fails-to-act-on-climate-plans.html> (date accessed: 14 February 2008).
[254] Emissions Trading and European Aviation, online: TRUCOST <www.trucost.com/aviation20040323.pdf> (date accessed: 14 February 2008).
[255] EU action on Aviation & Climate Change Responsible, constructive and pragmatic action needed to tackle the impact of aviation on climate change, online: ACI <www.aci-europe.org/upload/Aviation%20%20Climate%20Change_ACI%20EUROPE%20position%20Nov06%20_FINAL_.pdf> (date accessed: 15 September 2008).

under uniform conditions to the aircraft of all the other contracting states. The like condition shall apply to the use by aircraft of every contracting state of all air navigation facilities including: radio, meteorological servers, which may be provided for public use for the safety, and expedition of air navigation. [256] When the ETS regime will impose adverse obligations on airlines, which cause more emissions than they are allowed to, that raises question of non-compliance with the Convention. This is the argument being raised by the US. It criticizes the EU proposal as unlawful under Article 15 of the Convention.[257] The US strongly protests any attempt by the EU to impose ETS emissions caps on non-EU airlines, saying that unless consent has been obtained from the third party airline there cannot be an imposition of emissions caps. But even within the EU there is some consensus that to fight the competitive disadvantage the European airlines will face, if ETS is not universally applied it would be a cause for economic impacts. [258] Even legal academics have vociferous opposition to the inclusion on aviation emissions with ETS, arguing violation of non-discrimination Articles 11 and 15 under the Convention.[259]

Realizing the complex nature of the ETS puzzle, and the disagreements that exist between States, it is an uphill task to get all parties on board. As early as 2001, the IATA report on Emissions Trading ruled out any possibility for discussions or achievement of a middle ground on aviation and ETS, prior to the 2012 deadline for Kyoto and its renewal.

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[256] Convention, *supra* note 4 at Article 28.
[257] Stephan R Stegich, The EU ETS and Aviation, 16th Annual Aero-Engine Cost Management Conference February 6-7, 2008 San Antonio, Texas, online: < www.condonlaw.com/attachments/ets_aviation.ppt> (date accessed: 14 November 2008).
[258] Aviation and Emissions Trading, EurActiv, online: <http://www.euractiv.com/en/climate-change/aviation-emissions-trading/article-139728> (date accessed: 14 November 2008).
[259] Brian F Havel, Aviation Safety, Security and the Environment, the way forward, presentation at the McGill-ICAO Conference on Aviation Safety and Security, Montreal, September 2007 online: <www.mcgill.ca/files/iasl/Brian_Havel.ppt> (date accessed: April 15, 2009).

As of now ICAO supports voluntary emissions schemes, where the existing schemes have been set up in many countries of the world, and these schemes are supported by ICAO.[260] Additionally, ICAO also supports the future setting up of voluntary emissions schemes. However, that is as far as ICAO is willing to go. And given that the EU has moved to an inflexible spot also, the future of ETS and fight against aviation pollution is going to be one of volatility. We can only hope that this disagreement doesn't prove to be detrimental to the already weak global initiative for aviation pollution mitigation.

Aviation bilateral agreements

I was tasked by the Environmental Unit at ICAO to review all aviation bilateral agreements that were in existence *interse* Member States of the Organization. Specifically, the review of the bilateral agreements was to identify which of the agreements had environmental compliance provisions in them, and if Member States of ICAO had agreed to include environmental compliances in their bilateral arrangements.

A bilateral agreement is, very simply, an arrangement between two contracting states, who agree to be bound by certain principles, which are spelt out in the content of the agreement. These principles usually dictate the activity in question. When states contract aviation bilateral agreements they agree on various aspects of their aviation activities like air transport, promotion of aviation safety. There are agreements to determine standards of certificate of airworthiness of aircraft in reciprocation. Agreements often address issues of routes and cabotage in each other's state. The US open skies agreements, for example, have

[260] Report On Voluntary Emissions Trading For Aviation (Vets Report) *Approved by the Secretary General and published under his authority* Preliminary Edition – 2007, at 24.

aspects of user charges, competition law compliances, customs laws, designation of airlines, routes for air services, frequency of flights, capacity, grant of charter rights, and pretty much all aspects of air transport.[261] In addition to the air services and air transport agreements, there was also a review of promotion of air safety agreements, which the United States, in particular, has signed with other states to promote compliance with safety standards in civil aviation.[262] ICAO mandates that all agreements be registered with the Organization for reasons keeping watch on progress of relations among its member States, in aviation related matters. However, compliance with this requirement is very minimal. Finally, the conclusions that came out of my review of the bilateral agreements were as follows:

1. Generally, bilateral agreements don't have provisions on environmental protection and pollution reduction mechanisms in them.[263]
2. The only language that is found in agreements is generic in nature and focuses on larger aviation standards and compliances, with no specific mention of emissions control or noise reduction.
3. The EU seems to have emerged a leader in including these provisions in some of its air transport bilateral agreements.
4. Under the Convention, all aviation agreements between States need to be registered with ICAO. There is a lack of enforcement of this provision and thus

[261] US Model Open Skies Agreement, XXX (1) 2005 Ann. Air & Sp. L. at 283.
[262] US Romania Agreement dated 24 September 2002, where under Article 2.4 provides Romanian compliance with FAA environmental standards and testing, while the Russia US agreement of 9 December 1998 provides for reciprocal compliance by both states of Aviation Safety standards.
[263] EU-Mediterranean agreement with Morocco of December 2006. Under Annex VI – Part C the agreement provides for implementation and enforcement of the EU's environmental standards in Morocco. The US-Canada agreement of March 2007 provided for compliance requirements of Security and Safety Annexes under SARPs, but no environmental compliances were specifically agreed.

the information available with ICAO about registered agreements is not complete.[264]

5. Additionally, agreements which go through subsequent amendments don't find reviewed texts submitted to ICAO, and thus updated versions are not available.[265]

EU and aviation bilateral agreements

The EU has been using aviation bilateral agreements to facilitate adoption of its standards by different states.[266] The bilateral arrangement that is put into place brings with it commitments by states to bring their aviation laws in harmonization with EU law, thus spreading the rules governing aviation in Europe, to other states. The EU seems to be taking cue from the lack of implementation tools at the disposal of ICAO.[267] As ICAO's ability is restricted to just making the rules, the enforcement has to be the responsibility of individual member states, given that domestic application of rules is tied to national jurisdictions.[268]

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[264] Percentage of filings with ICAO of the bilateral agreements, non-compliance by states causes lack of proper database maintenance and more so ATConf/5-WP/16 3/9/02 Worldwide Air Transport Conference Challenges and Opportunities of Liberalization, Montreal 24-29, 2003. Online: ICAO <http://www.icao.int/icao/en/atb/atconf5/docs/ATConf5_wp016_en.pdf> (date accessed: 15 September 2008).

[265] Regardless of the nature of the bilateral agreement or the types of provisions that are included in them, environment related compliances are absent. Even when subsequent amendments are made by States to include new provisions to these agreements, there is nothing in the texts that indicates any movement towards addressing issues of noise or emissions control. EU's bilateral agreements are drawing an exception to this. *Infra* note 271.

[266] The aviation agreement with Morocco is an unprecedented example of what can be achieved in air transport negotiations between the EU and a third country. The agreement sets a benchmark for future agreements in the neighboring region of the EU. The agreement provides for a very high degree of regulatory convergence. Morocco will implement most parts of EU aviation legislation. Online: Europa <'http://www.ecdel.org.au/newzealand/Whats_New/nz_aviation_horizontal_agreement.htm"> (date accessed: March 3, 2008).

[267] This is more so because as it is ICAO is so inhibited by the Convention and by itself in enforcing the rules that it comes up with i.e. Article 38 of the Convention. Convention *supra* note 4.

[268] For commentary on domestic enforcement of international rules see: Online ILR <http://ilreports.blogspot.com/2007/08/hathaway-hamdan-v-rumsfeld-domestic.html> (date accessed: 20 November 2007).

The EU engages with states through traditional horizontal agreements, designed to harmonize bilateral agreements between EU members and third parties with EU Law. Then there are more multilateral arrangements, which are also designed to bring consensus among a large group of States to apply standards applicable within the EU. The principles that govern these agreements are inherently based on the EU's policy to bring harmonization of rules and laws, within the larger framework of what exists within the EU.

The multilateral arrangements[269] include the agreement with most of the Balkan States; know as the European Common Aviation Area. This agreement was to bring the rules of countries to the South and East of the EU, closely aligned to the EU's aviation rules.[270] In the end all of the contracting states agreed to adopt, in entirety, the EU rules that are applicable to aviation activities. On complete application, the states would have access to the enlarged European aviation market.

The EU-Morocco bilateral is one agreement that has been an effective tool used by the EU to enforce its environmental standards on another independent state, attempting to require environmental compliance through an international agreement. There are various compliances that the EU-Morocco bilateral requires Morocco to implement domestically.[271]

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[269] EU and status of aviation relations with other States online: Europa < http://ec.europa.eu/transport/air/international_aviation/country_index/country_index_en.htm > (date accessed 27 May 2009).

[270] Multilateral Agreement on the establishment of a European Common Aviation Area, Journal of the EU, L 285/3 dated 16 October 2006. Contracting States include the members of the EU and Bosnia Herzegovina, Albania, Bulgaria, Croatia, FYR Macedonia, Iceland, Montenegro, Norway, Romania, Serbia and Kosovo.

[271] Council Directive 89/629/EEC of 4 December 1989 on the limitation of noise emission from civil subsonic jet aeroplanes. Council Directive 92/14/EEC of 2 March 1992 on the limitation of the operation of aeroplanes covered by Part II, Chapter 2, Volume 1 of Annex 16 of the Convention of International Civil Aviation, second edition (1988) as amended by: Council Directive 98/20/EC of 30 March 1998 amending Directive 92/14/EEC, Commission Directive 1999/28/EC of 21 April 1999 amending the Annex to Council Directive 92/14/EEC, Commission Regulation (EC) No 991/2001 of 21 May 2001 amending the Annex to Council Directive 92/14/EEC. Applicable provisions: Articles 1 to 11 and Annex No 2002/30. Directive 2002/30/EC of the European Parliament and of the Council of 26 March 2002 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports. Applicable provisions: Articles 1 to 15, Annexes I and II No 2002/49. Directive 2002/49/EC of the European Parliament

This bilateral is seen as a step forward from the usual 'open skies' arrangements as in addition to the usual commercial exchanges, this agreement looks at committing to safety and implementing uniform environmental standards also.[272] There are also examples found within the texts of agreements with states like the United States and Canada. The agreements identify environmental protection as an important part of aviation policymaking, and agree to enforce ICAO's Annex 16 provisions in their aviation related rules. [273]

Though, the only arrangement that the EU has been able to contract is the one with Morocco where the reciprocating state will apply EU rules. This is not applicable to other bilateral with the US and Canada etc.

The EU through its large rule making structures and institutions has a comparatively more effective method of dealing with problems related to aviation pollution. More so, its attempt to spread its standards to other states, whether through ETS or bilateral and multilateral arrangements, is quite commendable. It will be worthwhile to see how far these tools go to combating the problem of pollution in the future.

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and of the Council of 25 June 2002 relating to the assessment and management of environmental noise. Applicable provisions: Articles 1 to 16, Annexes I to IV L 386/86 EN Official Journal of the European Union 29.12.2006.

[272] Online: Europa <www.europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1770&format=PDF&aged=1&language=EN&guiLanguage=en> (date accessed: 21 December 2008).

[273] *See:* Article 15 of the US-EU bilateral, online: Europa <http://ec.europa.eu/transport/air/international_aviation/country_index/united_states_en.htm> (date accessed: 18 February 2008). And *See:* Article 18 of the EU-Canada bilateral, online: Europa <http://ec.europa.eu/transport/air/international_aviation/country_index/canada_en.htm. > (date accessed: 12 March 2008).

CHAPTER FOUR Lessons for the future and a way forward

In the preceding chapters, we have evaluated two possible alternatives in dealing with the problem of pollution caused by aviation.[274] On the one hand we have ICAO and its standards, which are supposed to be applied and followed by all nations uniformly. On the other we have the model of the EU, which makes rules for its member States and over the past few years has been trying to spread its standards and laws to other parts of the world, and also in some cases will deem them applicable to aircraft flying in and out of European airspace. What is key here is that when we look at the way forward, we must keep the weaknesses of both these approaches at the forefront. The ICAO approach has had considerable pitfalls and compliance with ICAO standards hasn't borne the results that were expected.[275] While the EU controlled approach is seen as very authoritarian, somewhat like an imposition by a grouping of States on the rest of the world.[276] Either way, what is important is to find which of the two options is most productive, to enable a progressive solution to the problem of aviation pollution that we face in the world today. Also the two

[274] Additionally we have small initiatives that come from other parts of the world like Asia, the Middle East and other regional organizations, with minor impact on the problem. Industry leaders contributing to better emissions control technologies, Online: ATC-NETWORK <http://www.atc-network.com/NewsItem-29353-Adacel-to-Demonstrate-Reduced-Aviation-Emission-Concepts-at-ATC-Global.aspx> (date accessed: March 2009).

[275] See *supra* notes 150 and 151.

[276] Most of the opposition to the ETS spearheaded by the EU has been there is an impression that the EU is trying to push for this unilateral approach. The major criticism against the EU is that it wants to impose its own emissions tariffs on non-EU countries, which is in violation of the Convention *supra* note 4 and against the spirit of international consensus. Online: Logistics <http://www.logisticsmagazine.com.au/Article/US-ATA-chief-says-ETS-is-bad-policy/429882.aspx> (date accessed: December 29, 2008).

approaches are not entirely independent of each other and can work in conjunction. Thus we shall see that a balance of merits of both the approaches may be the best way forward.

SARPs not accomplishing what they had set out to do

The biggest struggle that ICAO has had in the last few decades is to fulfill its mandate under the Convention. As we have already discussed in Chapter 2, it is difficult for ICAO to enforce its standards uniformly on all States. So what is the way out? Either amend the Convention to make the enforcement of SARPs a mandatory treaty obligation, which would mean that non-compliance would attract violation of treaty rules. Or find other alternatives to enforce rules to combat pollution caused by aviation.[277] Unless such amendments are carried out to the Convention, I don't see any other way of holding States responsible for their inaction or inability to both adopt and enforce SARPs in their jurisdictions.

It will not be fair to completely discount the importance of SARPs in the maintenance of standards in the aviation industry. Firstly, the standards that are put into place are models, which are applied by many States, if not by all. And then there is also the partial implementation phenomenon that exists. Larger economic groups and richer nations in the EU and North America, Australia etc., have had a good track record of applying and enforcing SARPs. Thus, in principle SARPs serve some purpose. But as their enforcement is faulty, we have to find better methods of cutting emissions and mitigate pollution.

[277] Milde Amendments, *supra* note 116.

Why ETS and the EU model

Europe seems to be one place where words are being supported by work on the 'action against climate change'. Europe decided to go ahead with its ETS plans, because it was finding it difficult to deal with the complete lack of support its efforts had received from the international community. After the 'falling out' that happened at the ICAO Council, there was little doubt that the ETS spearheaded by Europe would not go forward by consensus. However, in the end ETS seems to be a logical way to move forward in the absence of firm regulations that are enforced on states to limit greenhouse gas emissions. Voluntary emissions programs are already in place in many States.[278] Moving forward and bringing commercial implications to activities that cause pollution will be a positive step in the aviation community's fight against pollution.

Conclusion

Taking cue from what ICAO called its 'balanced approach', I think that is how we have to move forward with attempts or mechanisms that are put into motion to combat aviation pollution. There is already the juggernaut of ICAO, which is at our disposal. It can be used as a monitoring agency, an organization that continues to work on its role of setting standards that are to be parameters for the aviation industry. While the area that ICAO is lacking in, i.e. responsibility of implementation, has to be delegated and supplemented by more effective and immediate measures on a domestic, national level. Of all the initiatives

[278] ICAO has even come out with a template on voluntary measures by States for the reduction of CO2. Online: ICAO < http://www.icao.int/icao/en/env/Caep_Template.pdf> (date accessed: 14 September 2008).

the ETS, specifically for the mitigation of greenhouse emissions, seems like a good first step. While through its bilateral arrangements the EU is facilitating adoption of environmental standards by many other non-EU states. Through the ETS, economic responsibility will be placed on different sectors of the aviation industry. This will ensure that pollution combating technologies are improved and airlines and States will take note of the problem more seriously.

The primary onus to address this problem cannot be placed on any one entity. It has to be a collective effort, whether it's the players of the industry, individual states, international organizations or larger groups of nations. Everyone has to pool their resources to rise above mere economic or regional interests to tackle what is slowly becoming a menace for our future.

The environment cannot be toxic when our wings take flight and we continue humanity's dream voyage of the skies.

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