Maximizing Civil Aviation's Economic Contribution
Challenges and Potentials

Montreal, Canada, 6 – 8 June 2005

Information Paper

CO-OPERATION IN THE REGION UNITING THE CARIBBEAN BY AIR

(Prepared by Association of Caribbean States)

1. Since ages the communication within the Caribbean region has been difficult.

2. The economic growth of the developing countries in the region, many small others very small has been hindered by the lack of adequate communication by air and by sea. The routes are concentrated to and from the bigger states or centres outside the region. The possibilities for economic development are limited and dependency on international carriers is common with all the negative consequences thereof. Most of the states are heavily dependent on the tourism industry and are thus very vulnerable. The local markets are too small for a self-supporting airline. In summary there is a serious lack of communication in the region, the airlines of the region are constantly in financial crises and all this hampers the economic development of the states.

3. In 1999 the Second Summit of the ACS identified the tourist industry as the engine for the economic development of most of the member-states and associate members. An important tool for the promotion of this industry is transportation. The Programme Uniting the Caribbean by Air and Sea was adopted to promote viable and efficient means of transportation in the region. Several efforts have been made in the past however the many differences in culture, demographic, geographic and economic development rendered these efforts unsuccessful.

4. Aruba, one of the associate members that is having a positive experience with a liberal air transport policy and is a success story in the tourist industry in the region presented a draft multilateral air transport agreement to the members of the Transport Group of the ACS.
The negotiations were painstaking and progress was very slow. After more than 4 years the states agreed on finely woven instrument.

5. The preamble expresses the willingness of states to create a legal framework for the establishment of the sustainable tourism zone in the region. The articles on granting of rights were the stumbling blocks at every meeting. Especially fifth freedom right was a very controversial issue. A solution was found in the text where exchange of these rights could be on a multilateral or on bilateral/reciprocal basis. Even after granting the fifth freedom right the authorities can suspend the operations of an airline based on the consideration that these are detrimental to the national interests. What these are has not been defined though protection of the national airline surely is high on the list.

6. Non-scheduled passengers or cargo operations could only be considered positively when these do not affect or constitute unfair competition for scheduled operations.
For the promotion of multi-destination of tourism parties agreed on the exchange of stop over rights. In the same paragraph they agreed on sixth freedom rights.

7. As said before the fine line that holds the agreement together is in this article.
The consensus of the parties was to accept designation of only two airlines. But as most of the parties have one or two airlines, this should not be a problem. The solution when there are more national airlines is to share the markets between them. And a designated airline could be a truly regional airline as it has to be substantially owned and control by the parties (casu quo the states), its nationals or both. The headquarters have to be in the territory of the designating party. The islands members of the ACS which do not have an airline can make use of the Community of Interest-resolution of ICAO and designate an airline of the economic group of the region. For practical reasons the responsibility for compliance with Safety and Security aspects of the operations of the airline remains with the state issuing the air operator's certificate.
Revocation, suspension or limitation of the operating permit of an airline can be based on non-compliance with requirements of ownership and effective control, security, safety and national laws.

8. The usual soft rights are granted and transfer and remittance are to be in accordance with the legislation in force in each country. Other cooperative marketing arrangements like blocked space, code sharing or leasing between airlines of parties are permissible. Computer reservation systems will be governed by the ICAO Code of Conduct.
There will be fair and equal opportunity to compete and parties shall take all appropriate actions to avoid and eliminate all forms of unfair competitive practices. Airlines can determine the frequency and capacity of their operations; authorities can intervene only when safety or security reasons so require. Schedules shall be filed for approval.

9. The tariffs to be applied shall be approved according to the country of origin principle, this without prejudice to the provisions of the national laws.
Amending this agreement is very cumbersome as it has to be by consensus and shall enter into force when the amendment is ratified by one third of the parties to the agreement. The agreement itself shall come into force when one third of the member states and associate members of the ACS (this is nine states) has deposited their instruments of ratification with the Government of Colombia.

10. As said before there was fine architecture at work not to disturb the maze of existing published and unpublished, confidential operating permits, arrangements, memoranda of understanding, administrative agreements, protocols, bilateral and multilateral agreements in force or dormant or the renewal thereof among parties or among parties and non-parties.

11. As with the geographical size of the member-states there is an enormous variety of air transport policies and agreement in the ACS region. From restrictive to outright liberal from agreement between a group of states like Organisation of Eastern Caribbean States (OECS), CARICOM, Central American States and Comunidad Andina de Naciones, from states with a heavily government subsidized little airline to a regional operating airline, from economy that depends for more than 70% on the tourist industry to a tourist industry that depends for a greater part on foreign airlines.

12. Throughout the agreement one can note the reluctance of members to let loose of their national attachment and feel a citizen of the Greater Caribbean. It was difficult to have

consensus as the issues were viewed from a horizontal perspective. Some members had a real problem to stay focused on the goal of the agreement than rather on their national instruments. There are at least seven occasions in the agreement where parties can take measures to safeguard/to protect their own airlines/interests. Remarkably many of these states have liberal "open skies" bilateral air transport agreements in force with states out of the region and require not protection for their national airlines. The criteria what constitute national interests seems to vary depending on the neighbour states.

13. That every state party to the agreement has the tools to restrict the operations of the little regional airlines in the name of national interests, can hamper the development of a system that could meet the growing demand for efficient services at a reasonable price, and constitute a barrier to both economic and trade development and the growth of interregional travel. Up to now 15 states has signed the agreement and there is a growing optimism that more and more members are becoming aware that only with a position of give-and-take they could achieve the goal of uniting the Caribbean and promote sustainable tourism, trade and economic development.

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Maximizing Civil Aviation's Economic Contribution
Challenges and Potentials

Montreal, Canada, 6 – 8 June 2005

Information Paper

THE KENYAN EXPERIENCE

(Prepared by Kenyan Civil Aviation Authority)

1. Introduction

1.1 The aviation sub-sector plays a key role towards Kenya's economic growth. In recognition of this vital role played by aviation, the Government of Kenya has been formulating and implementing policies and strategies aimed at ensuring that the sector continues to be one of the key pillars of the Kenyan economy. As part of the efforts to enhance the economic contribution of civil aviation, the government developed a five-year economic recovery strategy in 2003, in which the civil aviation sub-sector has been earmarked to play an important role in the economic recovery program envisaged over the five-year period.

2. Economic Contribution of Civil Aviation

2.1 Although the contribution made by the civil aviation in the country's economy is rather an obvious and appreciated fact, no comprehensive analysis ha been done to determine the magnitude of GDP attributable to the sub-sector.

2.2 Civil aviation plays both direct and indirect role in Kenya's economy. Highlighted here below are the key areas where civil aviation makes a significant contribution.

a) Civil Aviation facilitates the activities of some very strategic economic sectors key among them being tourism and agriculture. Kenya is a leading tourist destination in the East and Central African region, receiving an average of 550,000 tourists annually for the last five years. After Agriculture, the tourism sub-sector accounts for the second highest proportion of GDP. The agricultural sector accounts for the largest share in Kenya's GDP, contributing approximately 17.0% of GDP. The sector particularly, the horticultural sub-sector heavily depends on civil aviation to conduct its activities. Presented in the table below is the output of tourism and agriculture. The two sections facilitated by aviation and their percentage share in GDP.

Sector	Sector output in US$	% Share in contribution to GDP
Agriculture	1,880million	17.0
Tourism	552.0million	12.6

b) Besides facilitating the activities of the other economic sectors civil aviation also creates employment opportunities. Although the number of people who are directly employed in civil aviation is relatively small, but when the people who are employed in other sectors which either provide inputs to civil aviation or are consumers of civil aviation services is taken into account, the number becomes significantly large.

3. **Civil Aviation's Economic Contribution: Challenges and potentials**:

3.1 *Challenges*

3.1.1 Inspite of the contribution which civil aviation has made, the sub-sector faces and continues to face a number of challenges some of which are highlighted below:-

3.2 *Inadequate funding for the sub-sector*

3.2.1 Although Kenya has a fairly well developed aviation infrastructure, the available funding is not adequate, for fully developing and maintaining the required infrastructure. As a result the sub-sector is not in a position to play effectively its envisaged role in the country's economy.

3.3 *Shortage of technical personnel*

3.3.1 The aviation sub-sector has shortage of personnel in critical areas like flight safety. The shortage of personnel has been occasioned by among other things the high cost of training. Relevant personnel and the inability to attract and retain qualified and experienced staff in the public sector due to relatively low remuneration levels.

3.4 *Inadequate Regulatory Framework*

3.4.1 The existing regulatory framework requires to be reviewed and updated for it to provide the oversight necessary for the sub-sector to realise its full potential. Currently, Kenya is in the process of reviewing regulations pertaining to implementation of ICAO Annexes 1, 6, 8, 14 and 17.

3.5 *Potential for civil aviation in Kenya*

3.5.1 Due to the constraints, which the aviation sector is currently grappling with, a number of potential areas are yet to be fully exploited. This include;-

a) The inability of civil aviation as a mode of transport to provide access to all parts of the country. Currently there are a number of high economic areas which are not effectively served with aviation as a mode of transport.

b) Kenya is a member of both the East African Community (EAC) and the Common Market for East and Southern African (COMESA). One of the key initiatives being implemented in the two regional groupings is the liberalisation of air transport in the region covered by the member states of both EAC and COMESA.

3.5.2 Full liberalisation of air transport in these two regions will create huge potential, for civil aviation to spur the economies of member states. In addition, Kenya is currently working with the other two member states of EAC namely Uganda and Tanzania to provide joint aviation services in the region.

4. Current Donor Support to Civil Aviation

4.1 Development partners have played a very vital role in the development of civil aviation in the country. Currently Kenya is implementing two key projects in the aviation sub-sector which are jointly funded by the Government of Kenya and Development partners. The first is the review of Civil Aviation Regulations, in which Kenya is working jointly with the Government of USA through Federal Aviation Administration (FAA) to update its civil aviation regulations based on ICAO Annexes 1, 6 and 8. The second project is the Northern Corridor Transport Improvement Project which is being funded by the World Bank. The aviation component in the project, which pertains to Kenya Civil Aviation Authority (KCAA) is aimed at strengthening the institutional capacity of KCAA to provide the requisite services more effectively.

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JOINT WORKSHOP

WB/ICAO/ATAG
1/06/2005

Maximizing Civil Aviation's Economic Contribution
Challenges and Potentials

Montreal, Canada, 6 – 8 June 2005

Information Paper

CIVIL AVIATION'S ECONOMIC CONTRIBUTION THROUGH TOURISM, EMPLOYMENT, EXPORT TRADE IN TANZANIA

(Prepared by
Tanzania Civil Aviation Authority)

SUMMARY

The United Republic of Tanzania is a developing nation in Eastern Africa with a total area of 945,234 sq. km., a population of 36.6 million, and a modest economic base with a GDP 11,876 billion. Tourism contributes directly and indirectly to the GDP by about 15%, in 2004 figures. More than 44% of international visitors arriving in Tanzania use air transport. Civil Aviation contributes directly to the national employment at its 14 manned airports, 20 other aerodromes, airlines and air operators, travel trade and tourist companies. Exports of perishables and high value goods are also carried by air.

1. Introduction:

1.1 The air service industry is particularly important in Tanzania because the country promotes international tourism and exports perishables and mined high value, low volume gemstones.

1.2 However due to the low per capita income and disposable income, travel by air within Tanzania is very limited. The total passengers who traveled by air for 2004 were only 1.9 million.

1.3 Infrastructure development is also limited and relatively low compared to other States of similar size and comparable tourist attractions. However, there is an encouraging steady growth in air passenger traffic.

2. **Air Transport links with Tourism and Economic Development**.

2.1 According to 2004 figures, 44% of the international arrivals in Tanzania are by air Transport. This is second to road transport that carries 51% of international arrivals. Considering that Tanzania has eight neighbouring countries with surface and maritime links, air transport plays an important role in the Tanzania tourism industry.

2.2 Tanzania has three international airports Dar es Salaam, Kilimanjaro and Zanzibar, which serves international scheduled services. There are 10 other airports, which cater for regional non-scheduled services, mainly from neighbouring States. These airports provide easy access to tourist destinations in terms of international transport and facilities, which is a prerequisite for the development of tourism. The extended domestic network of more than 14 airports, frequent flight schedules between these points, and the gateways contributes to the increased tourist movements in Tanzania as some of the aerodromes are near or inside some renowned tourist attractions.

2.3 The presence of airports and aerodromes in these areas stimulates expansion and improvements in essential infrastructure, such as access roads, electricity and water supply, and hotels and lodges. Such developments are indirect contribution of civil aviation to the economic development through tourism.

3. **Air Transport and Employment**:

3.1 In Tanzania, civil aviation provides employment directly and indirectly through the related industries.

3.2 Direct employment by the civil aviation institutions like the airports, airlines, aircraft maintenance organizations, the civil aviation authority, travel agencies and other air service providers, airfreight consolidators and forwarders is about 4000 people. The range of indirect employment is wide - from surface transport based at airports to hotels and restaurants receiving and serving air passengers at any point in Tanzania. It also includes the contract workers whose services are out-sourced by airports or airlines.

3.3 It is however not easy to quantify the contribution of civil aviation to the GDP of Tanzania, but it is significant.

4. **Air Transport and Export Trade**:

4.1 The exports trade in Tanzania is still in its infancy. Currently, only perishables and high value goods are air freighted.

4.2 From Mwanza Airport in the Lake Victoria zone, the airfreight of fish fillet and gold is generating good business. From Kilimanjaro Airport, the export of horticultural products like fresh flowers and vegetables is slowly picking up.

4.3 Other high value products are exported from Dar es Salaam Export Processing Zones.

4.4 Such developments have contributed to the economy of the country through the employment of those working in the related production sectors, and also by the contribution of such production sectors to the GDP. Also, as it is with the linkage with tourism, there is a

significant stimulation of the development of infrastructure, which results from having export trade zones or activities in any area.

5. **Challenges**:

5.1 The main challenge facing civil aviation as a sector is that, the role it plays in national development and its contribution to the national economy and particularly to the reduction of poverty, are yet to be recognized. Subsequently, investment in the associated infrastructure is minimum and expansion is not adequately planned for.

5.2 Lack of coordinated efforts and partnership by the stakeholders like tourism, finance, trade and civil aviation to plan and develop together has been another cause for minimal achievement. The lack of co-ordination or a grand master plan results in fragmented development which cannot make the desirable impact.

6. **Conclusion**:

6.1 Although no quantification has been successfully done yet, through observation, it has been proved that air transport has made a significant contribution to the economic development of Tanzania and has supported the tourism and export trade business, and has also generated employment, both directly and indirectly through its related industries.

6.2 What is required is the quantification and recognition of this contribution to the economic development of the country and its linkage to poverty alleviation strategies. This will boost attraction of more investments for the development of the infrastructure in the area. With adequate facilities and capacity, Tanzania can then participate better in international and domestic air transportation, and in turn, improve even more, the contribution of civil aviation to the economy as a whole.

- END -

Maximizing Civil Aviation's Economic Contribution
Challenges and Potentials

Montreal, Canada, 6 – 8 June 2005

Information Paper

THAI AIRWAYS INTERNATIONAL

(Prepared by Thai Airways International)

1. 2004 proved, once again, to be a very challenging year, not only for THAI, but for the aviation industry, worldwide. Against a background of increased competition; higher fuel costs; war in the Middle East; anxiety over a possible SARS epidemic; and the December 26 Tsunami tragedy, THAI was nevertheless able to achieve continued operational and financial success.

2. The financial year 2003-04 was THAI's 40th consecutive year of profit, an industry record. The company's operational revenues reached a record 152.6 billion Baht, with total corporate assets of 193.2 billion Baht, another record.

3. During the year, THAI carried a total of 19,540,000 passengers over its international and domestic route network and launched flights to five new destinations: Milan in Italy; Chennai (Madras) and Bangalore in India; Jinghong in China and Luang Prabang in Laos.

4. Other major highlights of the past year included the continued implementation of THAI's massive investment in Bangkok's new Suvarnabhumi Airport; the acquisition of two more Boeing 747-400 jets (THAI now has a total of 20 747s in its fleet); and the promotion of Chiang Mai as Thailand's northern aviation hub, with the launch of direct flights to seven regional destinations. THAI also became involved in the low-cost carrier sector through its 39% stake in Nok Air, an important development in this rapidly growing market. The success of THAI in various aspects of its operation was, once again, recognized by the receipt of many prestigious awards.

5. If the past year was one of achievement and growth, the developments which will be seen during 2005 are truly spectacular.

6. THAI is currently engaged in one of the most dynamic phases of expansion and rejuvenation ever seen in its 45-year history. The challenges are great for the future, but THAI has the capital and manpower resources to achieve it objective of becoming one of the world's leading airlines. THAI is indeed a worthy international ambassador and a source of great pride for the Thai nation.

- END -

JOINT WORKSHOP

WB/ICAO/ATAG
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Maximizing Civil Aviation's Economic Contribution
Challenges and Potentials

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Information Paper

ICAO'S POLICIES ON USER CHARGES

(Prepared by ICAO)

SUMMARY

This paper summarises some of the most important aspects of the current ICAO's policies on charges (Doc 9082/7), published in September 2004. It highlights only these aspects of relevance to the new commercial environment in which airports and providers of air navigation services operate today. Particular emphasis has been placed on new and revised policy guidance concerning cost recovery of security measures, segmentation of FIRs and charges collection. Doc 9082/7 is available under "*Free Publications*" on the ICAO web site together with its *Supplement* containing information on States' implementation of these policies.

REFERENCES

Doc 9082/7, *ICAO's Policies on Charges for Airports and Air Navigation Services*
Doc 9562, *Airport Economics Manual*
Doc 9161, *Manual on Air Navigation Services Economics*
Circ 284, *Privatization in the Provision of Airports and Air Navigation Services*

1. INTRODUCTION

1.1 During the last decade many changes, in particular the commercialisation and privatization process, occurred in the management of airports and air navigation services. In recognition of the need to update ICAO's policies on charges for airports and air navigation services in order to adapt them to this new environment, the Conference on the Economics of Airports and Air Navigation Services (ANSConf 2000) was convened in June 2000. The Conference made many recommendations that led to the publication of *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082/6) in 2001.

1.2 As a result of the economic downturn and falling revenues for airports and providers of air navigation services, following the events of September 2001 and the outbreak of severe acute respiratory syndrome (SARS), concerns were raised that ICAO's policies on charges lack the necessary flexibility to deal with situations of economic difficulties. With a strict application of cost recovery principles during such periods, some providers tend to increase charges to compensate for reduced revenues rather than to strive for improved efficiency and cost-effectiveness in their operations.

1.3 This article summarises some of the more important aspects of the current ICAO's policies which are delineated in the seventh edition of Doc 9082, published in September 2004. As can be seen, the current policies are relevant to the new commercial environment in which airports and providers of air navigation services operate today as they contain several business-oriented principles that go well beyond the scope of the traditional cost-recovery principles. Particular emphasis has also been placed on new and revised policy guidance developed since 2001 concerning cost recovery of security measures, segmentation of FIRs and charges collection.

1.4 Doc 9082, together with its Supplement containing information on States' implementation of the policies, is available under "Free publications" on the ICAO website (www.icao.int).

2. KEY ASPECTS OF COMMERCIALISATION

2.1 Establishment of Autonomous Entities

2.1.1 The trend towards commercialization and privatization in the ownership and management of airports and air navigation services is a part of the general process of globalization and liberalization of the economies of the world. Experience gained worldwide indicates that where airports and air navigation services have been operated by autonomous entities their overall financial situation and managerial efficiency have generally tended to improve. The ICAO Council therefore recommends in the Policies that where this is in the best interest of providers and users, States consider establishing autonomous entities to operate their airports or air navigation services, recognizing that in some circumstances a single entity may operate both airports and air navigation services, and that the entity may be in the form of an autonomous civil

aviation authority.

2.1.2 Commercialization is an approach to management of facilities and services in which business principles are applied or emphasis placed on development of commercial activities. The concept of privatization, however, refers to the transfer of full or majority ownership of facilities and services from the public sector to the private sector.

2.2 Economic oversight and regulation

2.2.1 With regard to private involvement it is also recommended in the Policies that States should, when considering the commercialization or privatization of airports and providers of air navigation services, bear in mind that they are ultimately responsible for safety, security, and, in view of the monopolistic nature of airports and air navigation services, economic oversight of their operations. Furthermore, where an autonomous body or entity is established, whether by a government or by private interests to operate an airport(s) and/or air navigation services, the State should stipulate as a condition for its approval of the new body or entity that it observe all relevant obligations of the State specified in the *Convention on International Civil Aviation* and its Annexes. The observance by autonomous bodies or entities of other ICAO policies and practices should be recommended or required, as necessary, by States.

2.2.2 With the rapidly growing autonomy in the provision and operation of airports and air navigation services, many States may wish to establish an independent mechanism for the economic regulation of airports and air navigation services. Such a mechanism would oversee economic, commercial and financial practices, *inter alia*, to ensure that there is no overcharging or other anti-competitive practices or abuse of dominant position and to encourage efficiency in the operation of providers.

2.3 Measuring performance and productivity

2.3.1 In order to improve performance, efficiency and cost effectiveness States should encourage their airports and providers of air navigation services to develop and collect data on performance in the provision of their services (for such aspects as safety, delay, predictability, flexibility, efficiency, availability, access, environment, and cost effectiveness of service provided).

2.4 Best commercial practices

2.4.1 It is recommended in the Policies that States apply best commercial practices in the provision of airports and air navigation services in order to promote transparency, efficiency and cost effectiveness in such areas as quality and timeliness of services, assessment of investment proposals, consultation process and relationship with users, accounting practices, transparency and development plans.

2.5 Balance of interests between providers and users

2.5.1 In view of the importance of the air transport system to States and its influence in fostering economic, cultural and social interchanges between States, there should be a balance between the respective interests of airports and providers of air navigation services on one hand and of air carriers on the other. This applies particularly during periods of economic difficulty. It

is therefore recommended that States encourage increased cooperation between airports and providers of air navigation services and air carriers to ensure that economic difficulties facing them all are shared in a reasonable manner.

3. PRINCIPLES OF COST DETERMINATION, COST ALLOCATION AND CHARGING

3.1 Users shall bear their full and fair share of the cost

3.1.1 As a general principle, where airports or air navigation services are provided for international use, the providers may require the users to pay their share of the related costs. At the same time, international civil aviation should not be asked to meet costs which are not properly allocable to it. Airports or providers of air navigation services should therefore maintain accounts for the services they provide in a manner which ensures that charges levied on international civil aviation are properly cost-based.

3.1.2 The cost to be shared is the full cost of providing the facilities and services, including appropriate amounts for cost of capital and depreciation of assets, as well as the costs of maintenance, operation, management and administration. The costs to be taken into account should be those assessed in relation to the facilities and services, provided for and implemented under the ICAO Regional Air Navigation Plan(s).

3.2 Costs for security measures

3.2.1 In accordance with the recommendations by the High-level Ministerial Conference on Aviation Security held in February 2002, new and revised policy guidance has been developed on cost recovery of security measures for airports and air navigation services.

Airports

3.2.2 States are responsible for ensuring the implementation of adequate security measures at airports pursuant to the provisions of ICAO Annex 17 (*Security*) to the *Convention on International Civil Aviation.* They may delegate the task of providing individual security functions to such agencies as airport entities, air carriers and local police. States may also determine in which circumstances and the extent to which the costs involved in providing security facilities and services should be borne by the State, the airport entities or other responsible agencies. The general principles applicable to security charges are that any charges or transfers of security costs should be directly related to the costs of providing the security services concerned and should be designed to recover no more than the relevant costs involved. Also, that civil aviation should not be charged for any costs that would be incurred for more general security functions performed by States such as general policing, intelligence gathering and national security.

3.2.3 The following security measures, equipment, facilities and services could be taken into account when determining airport security costs:

- ✈ Security control, including screening of passengers and their cabin baggage.
- ✈ Security control, including screening of hold baggage.
- ✈ Security control of cargo, mail and other goods.

- Security control of airport and airline personnel.
- Monitoring of aircraft and security restricted areas.
- Background checks on persons with access to security restricted areas.
- Identification systems for security purposes at airports.
- Training of security personnel.

Air Navigation Services

3.2.4 Costs for certain security measures of a preventive nature for the provision of air navigation services, which are specifically related to civil aviation and performed on a routine basis, may be included in the cost basis for air navigation services charges to the extent that they have not already been considered in the context of safety-related measures.

3.3 Return on assets

3.3.1 Airports and providers of air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets (before tax and cost of capital) to contribute towards necessary capital improvements. The option to remunerate adequately holders of airport equity has been added to the principle concerning airport charges.

3.4 Fair allocation of costs among users

3.4.1 Allocation of the costs of airports and air navigation services among aeronautical users should be carried out in a manner equitable to all users. The proportions of cost attributable to international civil aviation and other utilization of the facilities and services (including domestic civil aviation, State or other exempted aircraft, and non-aeronautical users) should be determined in such a way as to ensure that no users are burdened with costs not properly allocable to them according to sound accounting principles.

3.5 Economic pricing principles

3.5.1 The application of economic pricing principles may be considered in situations where demand exceeds the available capacity. Examples of economic pricing includes marginal cost, peak-period and congestion pricing. According to the Policies, such economic pricing principles may be applied provided that they are in conformity with Article 15 of the *Convention on International Civil Aviation* and other principles in the Policies.

3.6 Segmentation of FIRs for the purpose of generating revenue

3.6.1 It has been a long standing ICAO policy that Flight Information Regions (FIRs) be defined on the basis of technical and operational considerations to contribute to safety and operational efficiency of air traffic management (ATM). States should therefore refrain from segmenting FIRs solely for the purpose of generating revenue where this would not be related to the costs of service provision.

3.7 Pre-funding of projects through charges

3.7.1 When more traditional sources of funds are not available, it has been recognized that the

use of pre-funding of projects through charges can be an acceptable means of financing aeronautical infrastructure development. Pre-funding of projects may be accepted in specific circumstances where this is the most appropriate means of financing long-term, large-scale investment, provided that some strict safeguards, indicated in the policies, are in place.

3.8 Charges collection

3.8.1 For a successful collection of charges for airports and air navigation services entities, it is essential that a collection policy is established by an airport or air navigation services entity, or where applicable by a State, and that the following functions are up-to-date: national legislation; accurate invoicing; comprehensive and updated databases on airlines; a transparent cost recovery system with a fair and equal treatment of all users; precise and correct accounting; credit control; and enforced recovery procedures. Regarding air navigation services, it is recommended that States or their delegated service providers consider participating in joint charges collection agencies whenever this is advantageous.

3.9 Consultation with users

3.9.1 Consultation with users should take place before changes in charging systems or levels of charges are introduced. The purpose of consultation is to ensure that the provider gives sufficient information to users relating to the proposed change and gives proper consideration to the views of users and the effect the charges will have on them. The aim should be that, wherever possible, changes should be made in agreement between users and providers. Failing such agreement, airports or providers of air navigation services would continue to be free to impose the charges concerned subject to users having the right of appeal to a independent body, where available.

3.9.2 In the light of the high and ever-increasing cost of providing new or expanded airports or air navigation facilities and services, users or their representative organizations should be consulted before the finalization of plans for such projects. The purpose of such consultation is to ensure that, wherever possible, the developments concerned meet the needs of users and that users are aware of the financial implications in terms of the charges that would be paid by them.

4 CONCLUDING REMARK

4.1 ICAO’s Policies on Charges in Doc 9082/7 address a number of principles related to the commercialization and privatization of airports and air navigation services. Within this framework, it is possible to combine a cost-based charging system with a performance-based airport and air navigation system. This can be achieved, for example, through economic regulation and the application of price caps (limitations on price increases) or through establishment of performance objectives and targets.

- END -

Maximizing Civil Aviation's Economic Contribution
Challenges and Potentials

Montreal, Canada, 6 – 8 June 2005

Information Paper

AN OVERVIEW OF REGULATORY AND INDUSTRY TRENDS IN INTERNATIONAL AIR TRANSPORT

(Prepared by ICAO)

1. INTRODUCTION

1.1 For the past decade, there have been significant developments in the air transport regulatory scene and in the airline industry. Much progress has been made in the liberalization of international air transport regulation with an increasing number of States being parties to arrangements towards full market access. At the same time, the airline industry has witnessed major structural transformation, inter alia, through alliances, mergers and acquisitions in order to cope with an increasingly competitive environment. This paper provides a brief global overview of regulatory and industry trends and developments that have taken place in recent years, primarily in the context of market access.

2. REGULATORY DEVELOPMENTS

2.1 **International Air Services Transit Agreement**. Although most international air services operate under bilateral or regional regimes, the International Air Services Transit Agreement (IASTA), which provides for the multilateral exchange of rights of overflight and non-traffic stop for scheduled air services among its Contracting States, has made an important contribution to the development of international air transport. The Agreement is a cornerstone of multilateralism in air transport. The number of Contracting States which are parties to the IASTA increased from 99 in 1994 to 122 as of May 2005, but more than one-third of ICAO Contracting States, including several with large land masses, remain outside the Agreement. Assembly Resolution A35-18 Appendix A "Urges Contracting States that have not yet become parties to the International Air Services Transit Agreement (IASTA) to give urgent consideration to so doing". The fifth Worldwide Air Transport Conference (ATConf/5) recognized IASTA's contribution to the sound and economic development of air transport to the States which are parties to it and reaffirmed its importance for liberalization and for multilaterally developing the air transport system.

2.2 **Bilateral liberalization**. Bilateral air services agreements are still the prevailing approach used by States in expanding international air transport services. During the period from 1995 to 2004, about 800 bilateral air service agreements (including amendments or memoranda of understanding) were reportedly concluded. Over 70 per cent of these agreements and amendments contained some form of liberalized arrangements such as unrestricted traffic rights (covering Third, Fourth and in some cases Fifth Freedom rights), multiple designation with or without route limitations, free determination of capacity, a double disapproval or country-of-origin tariff regime, and broadened criteria of air carrier ownership and control. As the airline business evolves, some of the more recent bilateral air service agreements have included provisions dealing with new types of commercial activities, some of which have market access implications, such as computer reservation systems (CRSs), airline codesharing, leasing of aircraft and intermodal transport.

2.3 One notable development is the considerable increase in the number of "open skies" agreements, which provide for full market access without restrictions on designations, route rights, capacity, frequencies, codesharing and tariffs. The first such agreement was concluded in 1992 between the Netherlands and the United States. Since then, 102 "open skies" agreements were concluded, involving 79 States, with the United States being one of the partners in 65 cases. These agreements involve not only developed countries but also an increasing number of developing countries (about 65 per cent). In addition to the basic market access elements, 63 agreements also grant "Seventh Freedom" rights for all-cargo services (five agreements also granting this right for passenger services). Twenty-five of the "open skies" agreements concluded by the United States have a transition annex that places limits on or provides for the phase-in of, inter alia, frequencies, Fifth Freedom rights, Seventh Freedom rights for all-cargo, third-country codesharing, charter services, and ground handling, some of which are applied only to United States carriers.

2.4 **Regional and plurilateral liberalization**. Some agreements negotiated in recent years have sought to liberalize air transport services on a regional or sub-regional basis or amongst a group of like-minded States. The regional and/or plurilateral liberalization arrangements have the basic objective of providing greater market access and improving services amongst the member States concerned. Small groups of States of comparable size and development would find it easier to agree on market access than larger, diverse groups of States. The small groups would also provide a more manageable environment to test liberalized air transport policies.

2.5 Before the fourth Worldwide Air Transport Conference (ATConf/4) in 1994, there were just two such regional arrangements, namely the European Union (EU) — single market completed by 1997 with 15 member States and three States belonging to the European Economic Area (EEA), joined by Switzerland through bilateral agreements in 2002, and expanded to include another ten member States in Central, Eastern and Southern Europe in 2004 — and the Andean Pact involving five States in South America. Since 1995, eight more regional arrangements have emerged with a worldwide dispersion. They include:

a) the Caribbean Community (CARICOM) Air Service Agreement amongst 15 States in the Caribbean (1996, entry into force in 1998 for nine States);

b) the Fortaleza Agreement amongst six States in South America (1997);

c) the Banjul Accord amongst six States in Western Africa (1997, a separate more liberal multilateral agreement was signed among seven States in 2004);

d) the CLMV Agreement by Cambodia, Lao People's Democratic Republic, Myanmar and Viet Nam (1998, a formal multilateral agreement was signed in 2003);

e) the Intra-Arab Freedoms of the Air Programme amongst 16 States of the Arab Civil Aviation Commission (ACAC) in the Middle East and Northern Africa (1999);

f) an agreement amongst the six States of the Economic and Monetary Community of Central Africa (CEMAC) (1999);

g) an agreement amongst the 20 States of the Common Market for Eastern and Southern Africa (COMESA) (1999); and

h) the Yamoussoukro II Ministerial Decision amongst 53 African Union States (1999, entry into force in 2000).

2.6 Of these ten agreements, seven provide for instant or phased-in liberalization leading to full market access. In addition, there are two area-specific agreements covering IMT-Growth Triangle region by Indonesia, Malaysia and Thailand (1999), and BIMP-East ASEAN Growth Area region by Brunei, Indonesia, Malaysia and Philippines (1999).

2.7 At the plurilateral level, the Multilateral Agreement on the Liberalization of International Air Transportation (MALIAT) known as the "Kona" open skies agreement was signed in 2001 by five like-minded members of the Asia-Pacific Economic Cooperation (APEC) (i.e. Brunei, Chile, New Zealand, Singapore and the United States). It is open for adherence by other members of APEC as well as non-member States. Peru, Samoa and Tonga subsequently joined the agreement (Peru withdrew in 2005). In 2004, Brunei, Singapore and Thailand signed two Multilateral Agreement — one on the Full Liberalization of All-Cargo Services and the other on the Liberalization of Passenger Air Services — both of which are open to other member States of the Association of South East Asian Nations (ASEAN).

2.8 Several potential arrangements are also in the pipeline, for example, a common air transport programme amongst eight States of the Economic and Monetary Union of West Africa (WAEMU); a Pacific Islands Air Services Agreement (PIASA) amongst 16 States of the Pacific Islands Forum; an ASEAN Economic Community amongst ten member States of the ASEAN; an Open Aviation Area (OAA) between the EU and the United States as well as a Common Aviation Area between the EU and its neighbouring countries[1]; and an air transport agreement for a

[1]There was a development affecting a common EU policy with third countries. In November 2002, the European Court of Justice (ECJ) ruled on a case brought, in 1998, by the European Commission against eight member States which have concluded or amended bilateral air services agreements (seven of them "open skies" agreements) with the United States. The judgement affirmed the ability of the member States to enter into bilateral agreements with third countries to the extent that these do not affect Community rules on air transport, but found that some of the provisions in these bilateral agreements infringed the Community's exclusive external competence, as regards air fares and CRSs. The Court also found that the clause regarding ownership and control of airlines infringed Community law on freedom of establishment. Following the Court's judgement, in June 2003, the Council of the EU conferred on the Commission a mandate to negotiate air services agreements on behalf of all member States with the United States for creation of an OAA between the two territories, as well as a so-called "horizontal" mandate to negotiate with third countries on the replacement of certain specific provisions in the existing agreements. In April 2004, the Council of the EU and the European Parliament also adopted a regulation on the negotiations and implementation of air services agreements

Common Aviation Area, which is open to 24 member States and three associate members of the Association of Caribbean States (ACS).

2.9 **Trade in services**. At the multilateral level, the World Trade Organization (WTO-OMC) came into being on 1 January 1995, and along with it, the entering into force of the General Agreement on Trade in Services (GATS). The GATS Annex on Air Transport Services applies trade rules and principles such as most-favoured nation (MFN) treatment and national treatment to three specific so-called "soft" rights, namely, aircraft repair and maintenance, selling and marketing of air transport, and CRS services. It excludes from the application of the GATS "services directly related to the exercise of traffic rights". Pursuant to an earlier ministerial decision, the WTO-OMC launched in 2000 the first review of the operation of this Annex with a view to considering a possible extension of its coverage in this sector. During the review, there was some support to extend the Annex to include some additional "soft" rights (for example, ground handling) as well as some aspects of "hard rights" (for example, air cargo, non-scheduled and multi-modal transport), but there was no global consensus on whether or how this would be pursued. In 2003, the WTO-OMC decided to end a first review process of the Annex as well as any further discussions on its expansion. The result of this review was that the Annex remains unchanged and continues to cover the existing three "soft" rights. The second review of the Annex will formally be launched in December 2005.

3. INDUSTRY DEVELOPMENTS

3.1 **Airline alliances and codesharing**. A relatively recent and rapidly evolving global phenomenon is the formation by airlines of alliances, i.e. voluntary unions of airlines held together by various commercial cooperative arrangements. There are now over 600 such alliance agreements in the world which contain a variety of elements, such as codesharing, blocked space, cooperation in marketing, pricing, inventory control and frequent flyer programmes, coordination in scheduling, sharing of offices and airport facilities, joint ventures and franchising. Intermodal alliances with railways have also grown in Europe and North America. The steady expansion of transnational alliances for strategic purposes and to achieve market access and synergies are a consequence of air carriers' response to, *inter alia*, perceived regulatory constraints (for example, bilateral restrictions on market access, ownership and control), a need to reduce their costs through economies of scope and scale; and a more globalized and increasingly competitive environment.

3.2 While numerous agreements concern cooperation on a limited scale (for example, codesharing on certain routes), the number of wide-ranging strategic alliances has been on the rise. Most notable was the emergence of several competing "global alliance" groupings. Each group is composed of some major airline members having different geographical coverage with fairly extensive networks. Through the alliances, these carriers have combined their route networks which extend to most parts of the world, and carried together over 50 per cent of the worldwide scheduled passenger traffic. Three existing global alliance groupings are:

a) "Star Alliance" founded in 1997 (Air Canada, Air New Zealand, All Nippon Airways, Asiana Airlines, Austrian Airlines, bmi British Midland, LOT

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between member States and third countries. While the OAA negotiations with the United States have been ongoing, the Commission has so far initialled "horizontal" agreements with Chile, Georgia, Lebanon, Azerbaijan, Croatia, and Bulgaria. In addition, the Commission has been proposing the creation of a Common Aviation Area with neighbouring countries, as well as a framework for negotiations with other regions in a targeted fashion.

Polish Airlines, Lufthansa, SAS, Singapore Airlines, Spanair, TAP Air Portugal, Thai Airways International, United Airlines, US Airways and Varig; to be joined by South African Airways);

b) "oneworld" founded in 1998 (Aer Lingus, American Airlines, British Airways, Cathay Pacific, Finnair, Iberia, Lan Airlines, and Qantas);

c) "SkyTeam" founded in 2000 (AeroMexico, Air France, Alitalia, Continental Airlines, CSA Czech, Airlines, Delta Air Lines, KLM Royal Dutch Airlines, Korean Air, and Northwest Airlines; to be joined by Aeroflot and China Southern Airlines).

The fourth global alliance group dubbed "Wings" was absorbed into the SkyTeam group in 2004 when Continental Airlines, KLM, and Northwest Airlines joined in the latter group. The Swissair-led European alliance group "Qualiflyer" was dismantled in 2001 following the demise of Swissair and Sabena.

3.3 The partnership of each global alliance group, however, remains unstable. For instance, a trans-Tasman alliance was proposed in 2002, which involved Qantas (oneworld member)'s equity investment in Air New Zealand (Star Alliance). In 2004, Mexicana withdrew from Star Alliance and switched its codeshare partner from United Airlines (Star Alliance) to American Airlines (oneworld). In 2004, Cathay Pacific (oneworld) acquired a 10 per cent stake in Air China, which has a close relationship with Star Alliance members.

3.4 The shifting development and marketing power of global alliances, together with their competitive consequences, including their dominance at some hubs, have caused concerns to small and medium-sized airlines regarding their survival and have prompted efforts by these airlines to either develop a particular segment of a market or to compete as low-cost, point-to-point airlines. Some small airlines also moved to become affiliate or regional members of global alliances (for example, Adria Airways, Blue 1 and Croatia Airlines joined in Star Alliance as regional members in 2004), and to enter into franchise agreements with major airlines (for example, Comair of South Africa has been operating as British Airways' franchise carrier since 1996). Overall, airline alliances are widespread but still evolving, with partnership relations becoming more intertwined and complex.

3.5 Airline alliances and codesharing have regulatory implications because of their potential effect on market access, competition and consumer interest. In 1997, ICAO released a major study of the *Implications of Airline Codesharing* (Circ 269) and has since produced recommendatory guidance on the consumer protection aspects of codesharing (see Doc 9587). In practice, there has been no systematic regulatory treatment of these arrangements but rather on an *ad hoc* basis, often dictated by general aero-political considerations of the States concerned. Nevertheless, it has now become a general practice that international codesharing is treated within the context of bilateral air services agreements and that underlying traffic rights are required for codesharing services. Some major alliances have also been examined closely by relevant national and regional regulatory bodies (notably, the United States Department of Transportation, the European Commission and the Australian Competition and Consumer Commission); and, in some cases, certain regulatory measures were introduced to ameliorate the anti-competitive aspects of the arrangements.

3.6 **Mergers and acquisitions**. Airlines in many parts of the world continued the pursuit of the perceived advantages of enhanced market strength through mergers, acquisitions or

operational integration under a single holding company. The common thread of this trend is the continuing development of growth strategies designed to hold and expand the existing market shares, gain access to new markets, achieve unit cost reduction, shield themselves against fierce competition, and increase the scale of operations in order to attain a critical market position. Most mergers or acquisitions have been achieved within the same country, as were the cases of Air Canada's acquisition of Canadian Airlines in 2000; American Airlines's bankruptcy buyout of Trans World Airlines in 2001; Alianza Summa jointly established by Avianca, Aces (liquidated in 2003) and SAM Columbia in 2002; Japan Airlines System (now Japan Airlines Corporation) jointly established by Japan Airlines and Japan Air System in 2002; and the creation of three Chinese airline groups headed by Air China, China Eastern Airlines and China Southern Airlines through mergers with other smaller State-owned airlines in 2003-04. Against the industry consolidation, however, quite a few States expressed their concerns, and scrutinized proposed mergers with great caution. For example, the United Airlines – US Airways merger plan was blocked by the United States Department of Justice in 2001.

3.7 The opportunity for cross-border mergers and acquisitions has increased as many States adopted a new policy or amended existing rules on foreign investment or control in national carriers (for example, Australia, Brazil, China, India, and Malaysia), and relaxed the air carrier ownership and control conditions in the air services agreements. For example, in 2004, Air France and KLM Royal Dutch Airlines created a cross-border European airline group under a single holding company through a share exchange offer by Air France for KLM's shares. In 2005, Lufthansa commenced a takeover and integration of Swiss International Air Lines, which will be completed with a phase-in period. Most attempts to initiate cross-border mergers or acquisitions, however, have been abandoned owing to the aero-political, economical and regulatory complexity (for example, Alitalia - KLM and British Airways - KLM merger plans in 2000). Even in the successful cases, the control and management of foreign carriers was not financially risk-free (for example, Iberia and its parent company SEPI's majority control of Aerolineas Argentinas, and Air New Zealand's acquisition of Ansett, both of which fell through in 2001). Because of the difficulties in implementing cross-border mergers and acquisitions with success, most foreign investments in the airline industry have been made in a limited scale, instead of taking a majority stake or pursuing a full-scale merger, and often as part of a strategy to forge or strengthen alliances. Nevertheless, foreign investments have sometimes been short-lived (for example, Singapore Airlines' minority shareholdings in Air New Zealand from 2000 to 2004). As of February 2005, about 65 carriers had shareholdings in foreign airlines while about 230 airlines had equity owned by foreign investors in various degrees.

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SECRETARIAT STUDY ON THE SAFETY AND SECURITY ASPECTS OF ECONOMIC LIBERALIZATION

(as presented to the Council on 31 May 2005)

1. INTRODUCTION

1.1 This study emanates from the work of the fifth Worldwide Air Transport Conference (ATConf/5). While the issues addressed by the Conference mainly dealt with the economic aspect of air transport liberalization, safety and security aspects were a theme throughout its deliberations and results. The Conference noted that globalization, liberalization and privatization in the last two decades have brought about fundamental changes in the air transport industry, some of which also have implications for safety and security regulation.

1.2 In view of these, the Conference stressed: the paramount importance of safety and security in any regulatory change; the need for clear lines of responsibility; the leading role of ICAO in developing global strategies for safety and security under liberalization; and the means to address the limited resources available in many developing States to ensure safety and security. Recognizing that the increasingly multinational operating environment has raised issues with the essentially national-based safety and security regulatory system, the Conference called for an ICAO study to clarify the definition of the State or States responsible for safety and security oversight, and possibly to recommend amendments to the existing ICAO regulatory provisions in this area (paragraph 1.2.3.1 f) of Doc 9819).

1.3 As the United Nations specialized agency responsible for setting international standards for civil aviation, ICAO has been called upon to play a leadership role in developing global strategies for the regulation and oversight of aviation safety and security, both definitively and in the context of facilitating economic regulatory reform (paragraph 1.2.3.1 d) of Doc 9819). This study is part of the response by the Organization to ensure that the global safety and security regulatory system will continue to be capable of adapting to changes and addressing concerns.

1.4 As one of the ATConf/5 follow-up actions endorsed by the Council (C-DEC 169/11), the Secretariat launched the study in March 2004. The task was carried out through a coordinated inter-Bureaux (ATB, ANB and LEB) review of various liberalization arrangements and relevant ICAO Standards and Recommended Practices (SARPs) and guidance material with a view to: a) identifying areas which could have safety and/or security implications, and b) determining if any gaps exist in the existing ICAO provisions.

1.5 The review involved a four-step exercise, namely, taking stock of specific situations (actual or potential) which raised safety and/or security questions; analysing how such situations could affect safety and/or security regulation; finding out if such situations can be addressed by existing ICAO SARPs and guidance material; and determining what, if any, action is required by ICAO and/or States. During the course of the review, members of the Air Transport Regulation Panel (ATRP) and the Aviation Security Panel (AVSECP), as well as ICAO regional offices, were consulted through correspondence where their input was useful. This paper presents the findings of the study.

2. FINDINGS OF THE STUDY

2.1 The interrelationship between economic liberalization and safety and security regulation

2.1.1 The issue of the potential impact of liberalization on safety and security and their interrelationship is not new. The issue was a subject of discussion at the two most recent air transport conferences held in 1994 and 2003. The results of the conferences reflected a consensus that liberalization is a general goal that should be pursued by each State at its own choice and own pace. At the same time, the conferences made clear that safety and security must remain of paramount importance, irrespective of any change in regulatory arrangements. As liberalization spreads, there continues to be a need to address existing as well as potential concerns over its implications on safety and security. The challenge for States is how to capture the benefits of economic liberalization without compromising safety and security. Therefore, while liberalization per se is not at issue, it is essential to ensure the maintenance of safety and security as liberalization spreads.

2.1.2 It is generally recognized that liberalized policies (e.g. on market access, airline designation, capacity, pricing, and commercial opportunities) could bring about many economic benefits for States, the industry and consumers, such as growth in traffic (both in terms of passenger/cargo traffic and aircraft movements), multiple air carriers (including low-cost carriers) entering the market, increased service options and pricing competition, development of travel and tourism, and job creation. Moreover, in addition to the economic benefits derived, safety standards in many liberalized markets have been maintained. Nevertheless, it is also clear that the resulting growth in air transport activity and complex commercial arrangements from the evolution of business and operating practices could put additional pressure on the State in terms of its capacity in safety/security regulation. A State is required to provide safety/security oversight not only to its own aircraft operators but also those foreign operators that operate in its airspace. It would not be able to cope with the consequences of market growth and liberalization if it does not have the necessary legal, regulatory and organizational infrastructure and human and financial resources to perform the required safety/security regulatory functions.

2.1.3 In this regard, many ICAO member States are already facing problems with respect to safety oversight. For example, the findings of the initial safety oversight audit conducted by ICAO relating to Annex 1 *Personnel Licensing*, Annex 6 *Operation of Aircraft* and Annex 8 *Airworthiness of Aircraft*, indicated that of the 181 Contracting States that were audited between March 1999 and July 2004, considerable numbers of States had deficiencies in respect of a number of requirements under these Annexes. Furthermore, audit follow-up missions have revealed that in many cases, significant deficiencies identified during the initial audits remain (A35-WP/67). Therefore, where States are facing market growth resulting from liberalization and globalization, due regard should be given not only to economic benefits but also its potential impact on safety and security regulation, and to their continued capacity to meet those requirements, and thereby ensure the continued safe, secure and orderly development of civil aviation.

2.2 Some situations that could have implications for safety and/or security regulation

2.2.1 In order to determine if the existing ICAO provisions can meet the safety and security challenges in the constantly changing environment, it is necessary to first find out which arrangements or practices arising from a liberalizing, globalizing commercial and operating environment could have implications for safety and security. For this purpose, a review was undertaken of various situations in the following areas that had been considered as having certain implications on safety and security. They are: ground handling, aircraft leasing, airline codesharing, franchising, air carrier ownership and control, market access, outsourcing and the commercialization of airports and air navigation services providers.

2.2.2 The review has found that concerns over safety and security arise mainly from those commercial arrangements or practices which impinge on the operation of aircraft or the operating personnel. The various situations reviewed can fall into two basic categories. The first are those that could have an impact on safety/security regulation (such as increasing the pressure on licensing and oversight) but do not pose a problem in terms of identifying the State s responsibility. Such situations concern mostly activity taking place within a single State, for example, operations involving non-traditional, new entrant operators or services providers; airlines facing financial exigencies; and transfer of government operations as a result of commercialization or privatization of airports or air navigation services providers.

2.2.3 The second are those situations involving multiple States which could raise questions regarding the delineation of accountability or responsibility for safety/security oversight under the existing regulatory system based on ICAO provisions. It is mainly this type of situation that led to the call for the present study. Following are some examples illustrating the issues such situations could raise.

2.2.3.1 **Operations involving foreign registered aircraft**. The past two decades have seen air operators increasingly employ foreign registered aircraft for various reasons. More and more, aircraft might be leased or otherwise interchanged and operated outside the State of Registry, sometimes for long periods of time. In some cases, a foreign registered aircraft might be leased or sub-leased or chartered from one country to another. While such arrangements are legitimate from an economic regulatory perspective, they can present problems from a safety viewpoint because of the bifurcation of the State of Registry and State of the Operator. For example, this could result in a situation where operators can be subject to the SARPs as implemented by different States. A major safety concern is the problem of **flags of convenience** [1] associated with foreign registered aircraft. When an aircraft rarely, if ever, returns to the State of Registry, its airworthiness oversight becomes an issue in the absence of safety oversight arrangements between the State of Registry and the State of the Operator. There are broadly two groups of foreign registered aircraft that can be deemed to operate under a flag of convenience: those done for fiscal purposes and those done to take advantage of a system with no or minimal economic or technical oversight. The first group may not pose a serious problem if arrangements are made between concerned States to ensure proper oversight, for example through bilateral agreements under Article 83 *bis*, which permits States to transfer all or a part of certain safety oversight responsibilities under the Convention. Even for this group, the reality remains far from satisfactory in that relatively few bilateral agreements implementing Article 83 *bis* have been notified to ICAO (by March 2005, 114 agreements are in force involving only 34 States), and numerous aircraft of all types all over the world are still subject to split oversight responsibility. It is the second group that creates a major safety problem which needs to be addressed[2].

2.2.3.2 **Operations involving foreign flight crew**. Split oversight problems could also occur in respect of foreign-licensed flight crew. Article 32 (a) of the Convention requires that The pilot of every aircraft and the other members of the operating crew of every aircraft engaged in international navigation shall be provided with certificates of competency and licenses issued or rendered valid by the State in which the aircraft is registered . As a result, where an aircraft is operated by a State different than the State of Registry, such as in the case of dry leases (i.e. the lease of an aircraft without crew), the problem of validation of foreign crew licenses by the State of Registry could arise. The issue becomes complicated when the rules and requirements for crew licenses in the State of Registry are at variance with the corresponding rules in the State that initially issued the licenses. Differences between the laws and regulations of the State of Registry and those of the State of the Operator may also exist in the case of wet leases (i.e. a lease of aircraft with

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[1] Flags of convenience is *a term derived from the maritime industry which denotes a situation in which commercial vessels owned by nationals of a State, but registered in another State, are allowed to operate freely between and among other States.*

[2] This problem is currently being addressed separately by the Air Navigation Commission and the Council in association with the Unified Strategy to resolve safety-related deficiencies within the scope of Article 54 j) of the Convention. See AN-WP/8015.

crew). While the lessor usually remains the official operator in such cases, the lessee may already operate aircraft of a similar type under its Air Operator Certificate (AOC). It may happen then that the wet-leased aircraft are operated under the lessee s AOC and, consequently, the State of the lessee becomes the State of the Operator. In such circumstances, proper surveillance of the operating crew may become difficult. The situation could become more complicated if the operation involves a mixed crew (e.g. the cabin crew from the lessee carrier and the cockpit crew from a foreign lessor carrier).

2.2.3.3 **"Off-shore" operations (**i.e. flight operations away from the designating State, State of Registry or State of the Operator). In a situation where the designated airlines of a bilateral agreement are granted the so-called 7th freedom rights (i.e. *to carry traffic from the second State to/from third State(s) without the need for the service to connect the home State*), such airlines may set up an operational base in a second country for services to/from third countries. Where cabotage or right of establishment is permitted, air carriers may operate in the territory of the granting State. Such a situation could raise the question as to how the required safety oversight should be handled between the State of the Operator and the State in which the operation is based.

2.2.3.4 **Operations involving multiple parties and the use of other's brand**, such as codesharing and franchising. Codesharing has been the most prevalent element in transnational airline alliance arrangements and can take a variety of forms. Although it is usually treated as a commercial arrangement, because of the complexity of some codesharing arrangements (e.g. a flight using the codes of several carriers from different countries), the safety/security authorities may find it difficult to determine their level of involvement *vis-à-vis* other authorities. In these circumstances, the questions of responsibility and accountability for safety/security can lead to uncertainty (see Circ 269, *Implications of Airline Codesharing*). Also, since such arrangements allow an operator to use the name or assume the public face of another carrier (e.g. in the case of franchising), the need to safeguard reputation in terms of service/safety quality have led to some regulatory action on safety/security. For example, some States require foreign airlines with which their national airlines have codesharing arrangements to meet a similar level of safety. This could also raise a question of whether all States whose airlines are involved in a codesharing operation should be involved in such safety oversight, and to what extent each should be involved. Another concern arising from codesharing relates to the security implications caused by the potential transfer of a security threat, which may exist against one airline and be spread to its partner or partners in a codesharing arrangement, and any subsequent additional security measures imposed by the appropriate authorities. Since technical and operational regulations may vary considerably from one partner airline/State to the other, this raises the question as to how the accountability and responsibility for safety/security should be handled amongst the partner airlines and States.

2.2.3.5 **Cross-border airline merger/acquisition**. Where this is allowed, it could lead to such companies having operations or places of business in different States, or operating mainly outside the State in which their registered offices and/or owners are located. This situation could raise questions regarding the attribution of regulatory oversight responsibility amongst the States concerned (e.g. in the case of the merged airline having two principal places of business), or on the application of whose standards, where they differ between the countries concerned.

2.2.3.6 **Outsourcing of activity affecting aircraft operation**. Examples include: airlines outsourcing their ground handling; sending their aircraft to be repaired and/maintained in foreign countries; and contracting out certain flight operations and/or crew administration to another airline or company. In each of these cases, multinational industries have emerged to provide such services. Some States also encountered such a situation where an AOC applicant had only a corporate skeleton with most of the proposed operational activities to be performed/provided by foreign companies (including the aircraft and flight crews). This situation could present challenges for the licensing and safety oversight authorities from both the State issuing

the AOC and the State of the outsourced activity on how to ensure that such practice or entity properly meet the safety and security requirements.

2.2.3.7 While some of the above situations already make it difficult individually for identifying or attributing the responsibility for safety/security compliance and oversight, it could become even more problematic when dealing with a complex situation that combines many or all of the above features. As reflected in the above, there is an increasing number of situations in which one is dealing with a cascade of States, each having a share of responsibility in an air transport operation. The challenge for States is how to ensure that, regardless of the form of regulatory or commercial arrangement, there should always be a clear point of contact for the safety and security oversight responsibility in a clearly identified State or its delegated authority for any given aircraft operation (paragraph 1.2.3.1 c) of Doc 9819).

2.2.4 Along with the trend of liberalization and globalization as well as broader regional economic integration, many States have taken a **regional approach** as an effective means in pursuing regulatory change in international air transport. Substantial steps have also been taken on a regional basis to strengthen safety regulation. For example, the programme of the European Civil Aviation Conference (ECAC) includes safety assessments not only of aircraft of its member States but also of other air carriers operating into Europe. The European Union has established a European Aviation Safety Agency (EASA), whose functions already include certification of aeronautical products and may extend to approval of air operations and personnel licensing. Similar approaches to safety coordination are also being pursued in other regions (e.g. Autorité Africaine et Malgache de l Aviation Civile (AAMAC); the Regional System for Cooperation on Operational Safety Oversight (SRVSOP) of the Latin American Civil Aviation Commission (LACAC); the Regional Aviation Safety Oversight System for the Caribbean (RASOS); the Central American Agency for Aviation Safety (ACSA); and the Pacific Aviation Safety Organization (PASO)). While these regional arrangements have many advantages and can bring benefits, chiefly including economies of scale and the promotion of uniformity within the region, they vary a great deal in the extent to which they have been delegated the execution of national responsibilities. This situation could raise the issue of harmonization on a broader scale (e.g. the assessment of compliance by one body may differ from that of another). In addition, there is clearly a need for transparency of such regional arrangements so that all parties affected, especially third parties, know exactly what functions have been delegated to the regional body and what remains with the State.

2.3 Could existing ICAO provisions address the issues?

2.3.1 The Chicago Convention and its Annexes provide the legal and operational framework for Contracting States to build and maintain a civil aviation safety/security system based on mutual trust and recognition. From a strict legal viewpoint, the system is designed to ensure that international civil aviation operates in a safe and secure manner independently of the air transport policy and economic regulations that Contracting States may follow. Therefore, regardless of any change in economic arrangements, the responsibility for safety/security compliance and oversight remains vested in the Contracting States. States implement their safety and security oversight obligations imposed by the Convention and its Annexes through relevant national laws and regulations, as well as provisions in bilateral air services agreements.

2.3.2 Against the backdrop of globalization and liberalization, it is important for ICAO to make sure that the SARPs and guidance material it has developed for safety and security remain effective and capable of handling the changes. For the purpose of the study, a review was carried out of the existing provisions contained in the Convention and relevant Annexes against the situations identified. It was found that, as far as establishing the respective responsibilities of involved States are concerned, existing SARPs and guidance material are deemed to be generally adequate. However, more work could be done to improve the existing SARPs and/or guidance material to address the new challenges brought about by the evolution of business practices in international air transport.

2.3.3 More specifically, for **situations involving service providers with a permanent base** (such as ground handling companies, airport operators and air navigation service providers), it is clear that the State in which such companies are based shall be responsible for safety and security oversight in accordance with the requirements set out in the applicable Annexes (e.g. regarding certification and surveillance of aerodrome operators and ground handling companies).

2.3.4 For those **situations involving the operation of aircraft,** the safety aspects are addressed by Annexes 6 and 8. There are three levels of responsibility referred to in Annex 6 regarding the operation of aircraft which are assigned respectively to the State of Registry, the State of the Operator, and the Operator of the aircraft. The logical trail of responsibility is easy to follow in a situation where all three are part of the same State. In this case the operator is responsible to the State of the Operator, which is also the State of Registry. There are, however, situations that are more complex, which are described below.

2.3.4.1 ***Identification of the operator (in the context of Annex 6) in the case of lease, codesharing or franchising***. Under Annex 6 provisions, an air operator is responsible for conducting the commercial operations in accordance with the AOC issued by the State of the Operator. Therefore, codesharing or franchising flights are conducted under the responsibility of the operator that is actually operating the flight no matter what the aircraft livery or flight number might be. The oversight of such operation is normally conducted by the State of the Operator. However, if the operator uses aircraft registered in a State other than that of the operator, oversight may be required by the State of Registry if an agreement such as Article 83 *bis* or a bilateral agreement is not in place between the States concerned. It should be noted that any operator, codesharing partner or not, is expected to meet the applicable requirements of the ICAO SARPs when engaged in international operations. In leasing situations, the aircraft can only be operated under an AOC issued by the State of the Operator. In the case of a dry lease (i.e. *a lease without crew*), the lessee State will always be the State of the Operator, and will always be responsible for issuing the AOC. In the case of a wet lease (i.e. *a lease with crew*), the aircraft will generally be operated under the lessor s AOC and the State of the Operator responsible for the AOC is the lessor State. However, depending on the provisions and circumstances of the lease, the lessee State may become the State of the Operator, and therefore will be responsible for the AOC. In addition, the lessee State must ensure that the flight crew, licensed in the lessor State, are trained and demonstrate competency in accordance with applicable regulatory requirements and conditions of the AOC issued by the lessee State. Note that certain regulatory authorities will not enter into this type of agreement, as the training of flight crews to satisfy the requirements incumbent on the lessee can present difficulties. Guidance material concerning lease, charter and interchange agreements is contained in the *Manual of Procedures for Operations Inspection, Certification and Continued Surveillance* (Doc 8335), the *Airworthiness Manual* (Doc 9760) and in the *Guidance on the Implementation of Article 83 bis of the Convention on International Civil Aviation* (Circ 295).

2.3.4.2 ***The State of the Operator is different from the State of Registry***. Annexes 6 and 8 establish the respective responsibilities for the safety of operations and airworthiness of the aircraft. In terms of Annex 6 requirements, the operator has the responsibility of maintaining adequate organization, control and supervision of flight operation. It has also the responsibility to establish and maintain appropriate maintenance arrangements to ensure that the aircraft, under its control, meets all the applicable airworthiness requirements that are under the responsibility of the State of Registry. The State of the Operator has therefore the ultimate oversight responsibility for the safety of flight operations conducted by the operator, and the State of Registry has the responsibility for the airworthiness of each individual aircraft on its registry. While the respective responsibilities of the State of the Operator and the State of Registry are clearly spelled out in the Annexes, the actual situation may be complex and lead to some fragmentation of responsibilities. For example, several States of Registry may be involved if an operator s fleet includes aircraft registered in different States. An additional potential level of complexity is that the State of Registry may validate a certificate issued by another State rather than issuing its own Certificate of Airworthiness. In most instances, the sharing of responsibility between the State of the Operator and the State(s) of Registry can be handled through well-

established rules and procedures, even in complex cases. However, it does complicate the accountability for safety oversight and, in the absence of proper implementation of the rules, may be a potential area of weakness of the existing system.

2.3.4.3 The allocation of responsibility between the State of the Operator and the State of Registry derives to a large extent from the Convention that assigns the responsibility for aircraft airworthiness and flight crew licences to the State of Registry and only recognizes the role of the State of Operator in Article 83 *bis*. As a result, there are only limited ways in which the potential fragmentation of responsibility described in the previous paragraph can be avoided. In this context, the transfer of certain functions from the State of Registry to the State of the Operator by way of implementing Article 83 *bis*, in respect of lease, charter and interchange of aircraft, provides an effective solution but one that is nevertheless limited by the voluntary nature of such agreement. Another course of action that can be considered is an amendment to Annex 6 that would require that a certified true copy of the AOC under which the aircraft is operated be carried on board on international flights. This would help in identifying the States responsible for safety oversight on the occasion of any verification process such as ramp inspections. This provision could also be complemented by a Standard specifying that a given aircraft can only be operated under one AOC at any given time. Additional clarification in the form of guidance material on the relationship between the State of Registry, the State of the Operator, and the Operator could be developed. This guidance should address the responsibilities of each party involved in relation to the Convention and its Annexes, and in relation to each other.

2.3.4.4 ***Surveillance and inspection by States other than the State of Registry or the State of the Operator***. Article 16 of the Convention gives the right to States to search, without unreasonable delay, aircraft of the other Contracting States on landing or departure, and to inspect the certificates and other documents prescribed by this Convention which include the licence of the flight crew and the certificate of airworthiness. There are, however, some practical limits to what can be achieved through the application of Article 16, which are mainly due to the fact that a valid certificate of airworthiness does not necessarily mean that the aircraft is airworthy and to the absence of a requirement in the Convention or in the Annexes on the carriage of a copy of the AOC. With regard to the latter, a suggestion to make the carriage mandatory is included in paragraph 2.3.4.3 above. With regard to the former, the reason is that a temporary loss of airworthiness, caused by a malfunction or other event, is normally dealt with by the operating regulations requiring an aircraft to be airworthy before it is operated (e.g. Annex 8, Part I, Paragraph 3.5 or Annex 6, Part I, Paragraph 8.1.1 a)) rather than by a suspension or revocation of a certificate of airworthiness. However, Annex 8, Part I, Paragraph 3.6.2, enables the authorities of a Contracting State to detain a damaged airplane registered in another Contracting State, provided that the State of Registry is advised immediately and given all of the necessary information to enable the State of Registry to determine the airworthiness of the aircraft. Amendment 100 to Annex 8, which will become applicable on 13 December 2007, clarifies the responsibilities of the respective States in this situation by introducing a requirement for the State of Registry to consider limitations proposed by the Contracting State that detained the aircraft, when authorizing a ferry flight to an aerodrome where the necessary maintenance can be carried out.

2.3.5 **With respect to personnel**, the provisions in Article 32 and Annex 1 and Annex 6, Part I, are generally adequate for addressing the various situations involving flight crew members. The responsibility for validation or conversion of the licences and for maintaining the licence validity lies with the State of Registry while the responsibility for maintaining the competence of the crew lies with the State of the Operator. Although the maintenance of validity of the licence under Annex 1 and the maintenance of competency under Annex 6 are technically independent, the proficiency check of Annex 6 is accepted in practice for maintaining a valid pilot licence and there is a note to that effect in Annex 1. One particular safety aspect of the economic liberalization is the increasing use of validation for flight crew licences. The safety oversight audits have indicated a certain number of problems with validations that relate to the traceability of the original licence (in particular to the limitation or restriction that may have been attached to it) and to

extension of privilege of the original licence (type ratings in particular). These issues were reviewed by the Flight Crew Licensing and Training Panel as part of its global revision of flight crew licensing SARPs. The Panel has proposed some changes to Annex 1 and to the guidance material that will be presented to the Air Navigation Commission during the second quarter of 2005.

2.3.6 **On the security side**, Annex 17 *Aviation security* and related guidance material are deemed to be generally adequate in addressing most existing situations (e.g. concerns regarding ground handling personnel, transfer of security threats via codesharing, outsourcing of airport security screening). Each State is responsible for ensuring the security of air transport activities in its territory, including the establishment and enforcement of national civil aviation security programmes. The SARPs in Annex 17 cover many specific aspects of aviation security requirements, such as security measures for domestic operations, threat assessment, airport security programmes, operator security programmes, personnel background checks and selection, training and standard of performance, certification of screeners, quality control programmes as well as cooperation between States. Guidance material developed to assist States in implementing Annex 17 includes: the *Security Manual for the Safeguarding of Civil Aviation Against Acts of Unlawful Interference* (Doc 8973 Restricted) and the Aviation Security Training Packages (ASTPs) which are updated on a regular basis. In addition, the ICAO worldwide network of Aviation Security Training Centres (ASTCs) offers States and Industry stakeholders a large variety of training courses and workshops in the aviation security field.

2.3.7 **Regarding regional or supra-national bodies**, while Contracting States are not prevented from making arrangements for entrusting certain safety/security regulation to other entities, including national autonomous or private entities, or international or supra-national organizations, or the performance of such function, they should be fully aware that the responsibilities imposed by the Convention and its Annexes remain vested in the States concerned. When considering making such types of arrangements, they should take precautions to ensure the necessary accountability of the entities performing those functions. Transparency may also be required regarding what exactly has been delegated by States to such regional or supra-national entities.

3. CONCLUSIONS

3.1 From the above findings, the following conclusions may be drawn:

a) Economic liberalization as well as the evolution of business and operating practices have implications for safety and security regulation, which need to be addressed properly. In this constantly evolving environment, due regard should be paid to its impact on safety and security so that a more coherent policy may be developed. Potential problems for identifying the line of responsibility tend to arise in situations where the operation or arrangement involves multiple parties from different States, or where the aircraft is based and operated in places other than the State of Registry and/or State of the Operator. Such situations deserve closer attention by States.

b) Existing ICAO provisions and guidance material regarding States responsibility for aviation safety and security are generally adequate in addressing various situations resulting from liberalization (such as those reviewed by the study). However, more work could be undertaken to improve the existing SARPs and/or guidance material to adapt to the evolution of business practices (such as those identified in paragraph 2.3). In particular, States should be strongly encouraged to use Article 83 *bis* which provides a useful means of avoiding complex situations involving aircraft transferred abroad. More attention should also be given to improving the

enforcement and implementation of relevant SARPs and guidance material. In this connection, the problems identified by the study may need to be taken into account in addressing the identified safety and security oversight shortfalls on a worldwide basis.

c) Safety and security must remain of paramount importance in the operation and development of international air transport and should at no time be compromised by economic considerations. ICAO should continue to monitor closely industry and regulatory developments and take appropriate action to ensure that the global regulatory system for aviation safety and security continue to work effectively in dealing with the evolution of the air transport industry and the increasingly complex, often multinational business practices.

d) There is a need for all parties, governments and service providers, to realize the importance of having a clear understanding of their respective responsibilities for safety and security compliance and oversight. States must accept their primary responsibility for ensuring regulatory oversight of safety and security, irrespective of any change in economic regulatory arrangements. In this regard, the findings of the study could be useful to help enhance the awareness of States so that appropriate preventative or corrective measures may be developed and implemented. The findings (such as those situations deserving close attention) could be prepared in an appropriate manner and disseminated to States by means of correspondence and/or the ICAO website, and meetings such as workshops.

END

International Civil Aviation and the End of Cheap Oil

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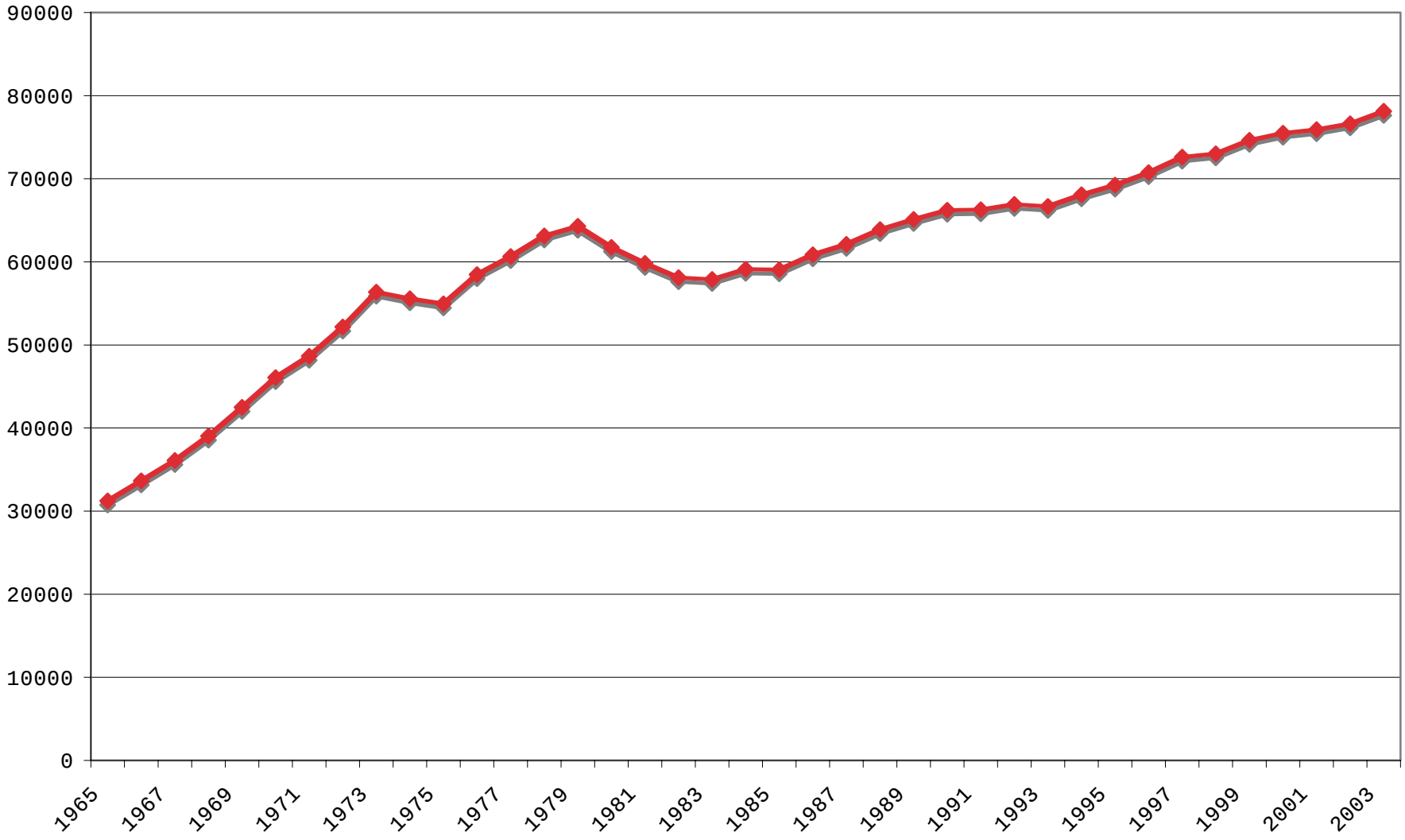
Information paper for participants at the Joint World Bank-ICAO-ATAG Workshop: Maximizing Civil Aviation's Economic Contribution: Challenges and Potentials, Montreal, 6 to 8 June 2005.

Introduction

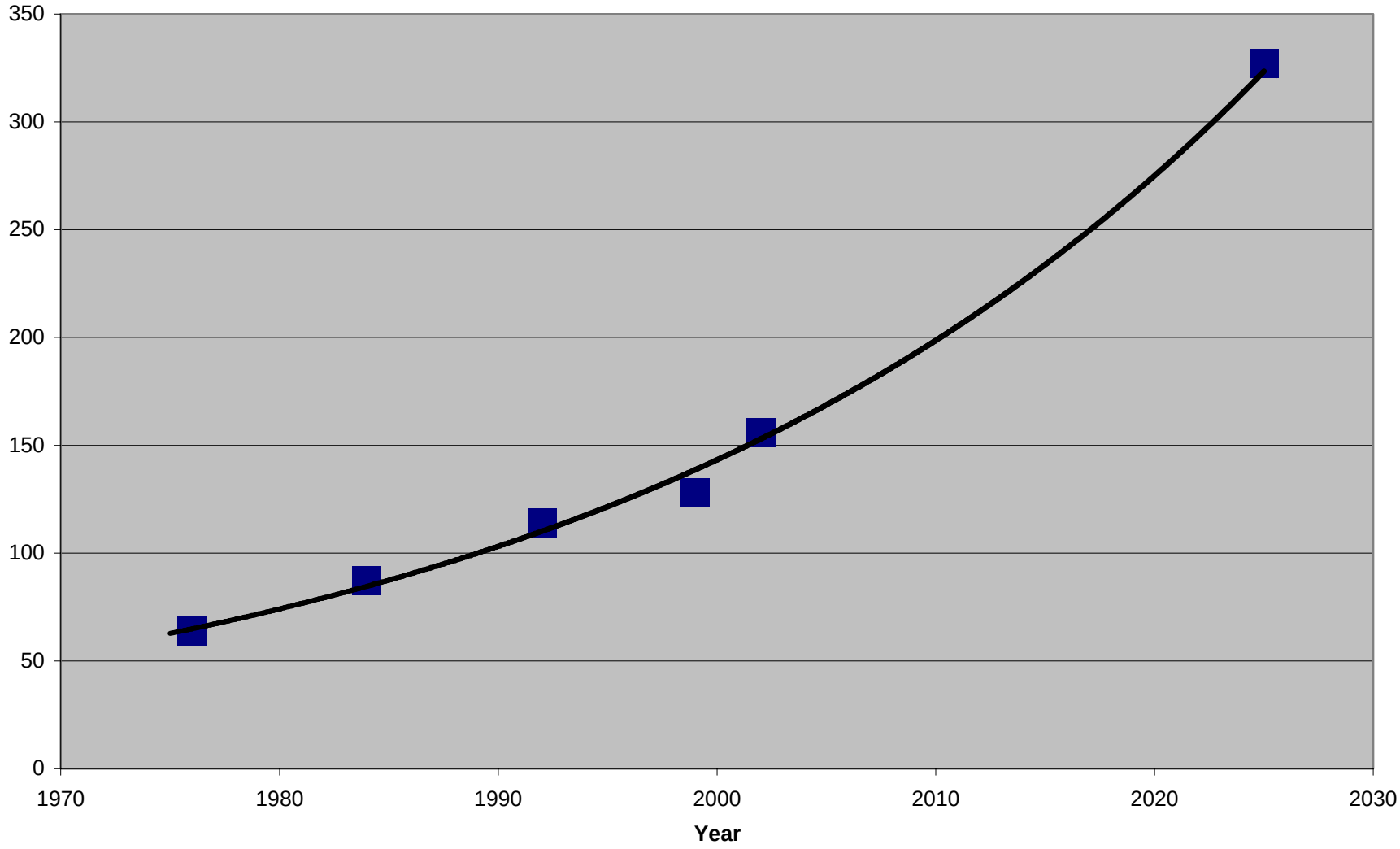
- Aviation is completely dependent upon petroleum for fuel, unlike other transportation modes
- In predictions of growth in the aviation industry, it is often assumed that there will be
  - No price constraints
  - No fuel constraints
- Global oil consumption has increased by a factor of 2.5 since 1965, in a linear fashion
- Fuel use by the aviation industry has increased in an exponential fashion, and is predicted to continue to do so (in an unconstrained model)
- Please see the diagrams in the next two slides for illustration of oil consumption

Global Oil Consumption in 1000's of barrels per day



Data from BP Statistical Review of World Energy, 2004

Historical and Projected Aviation Fuel Consumption



Data from Chapter 9, IPCC, 1999, and Eyers et al, 2004

Introduction (continued)

- Now, there are indications of constraints on petroleum production; increasing attention is being given to M. King Hubbert's oil depletion analyses, "The End of Cheap Oil" (Campbell and Laherrère, 1998).
- Fuel is usually the second largest cost for airlines, after labour
- High oil prices in the last year have significantly added to the strain on the economic well-being of many airlines
- One example of the seriousness of this situation has been the publication by IATA of the first edition of "Guidance Material and Best Practices for Fuel and Environmental Management" in December, 2004.

Purpose of this paper:

To examine:

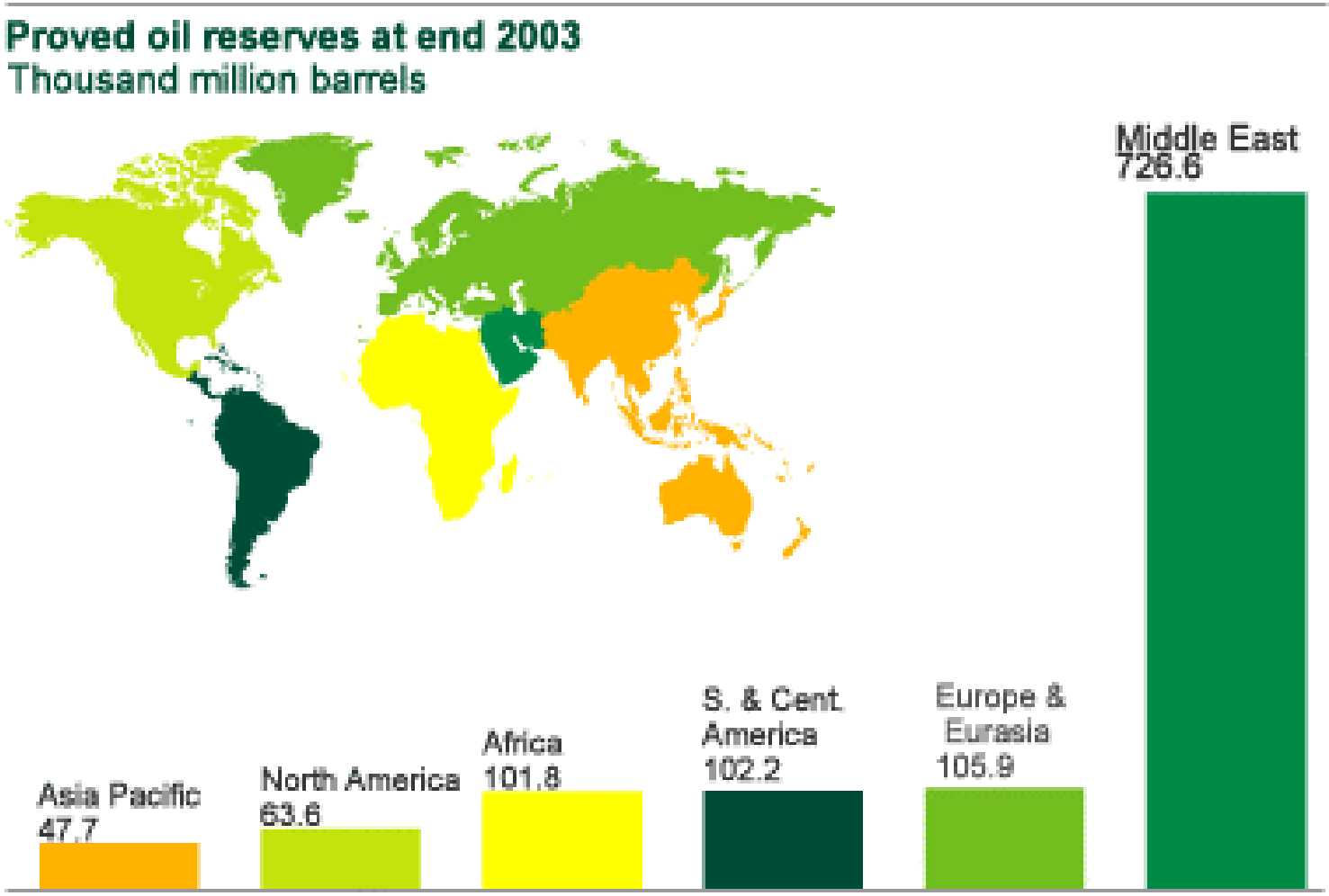
- The status of petroleum reserves
- Trends in oil consumption
- Trends in oil prices
- To look at the implications for the civil aviation industry

Global Petroleum Reserves

- In discussing oil reserves, some definitions are required:
- Oil is categorised as conventional or non-conventional
- The amount of oil that can ultimately be extracted from all the world's deposits is called the Ultimate Recoverable Reserve (URR)
- The reserve to production ratio (R:P) yields an estimate of how long present proven reserves will last at current annual rates of production

Conventional Petroleum

- Conventional oil is that where oil flows from a drilled well, and requires no upgrading before refining
- Conventional oil is the least expensive petroleum to extract
- The distribution of global petroleum reserves is shown in the next slide, in terms of location and size
- Currently, the world is consuming 80 million barrels of oil per day
- The estimated size of the URR for conventional oil is 2.2 to 3.0 trillion barrels
- The current R:P ratio for global conventional oil is 41 years; that is, at current rates of production from present known reserves, there is enough oil left to last the world 41 years (BP Statistical Review of World Energy, 2004)



From BP Statistical Review of World Energy, 2004

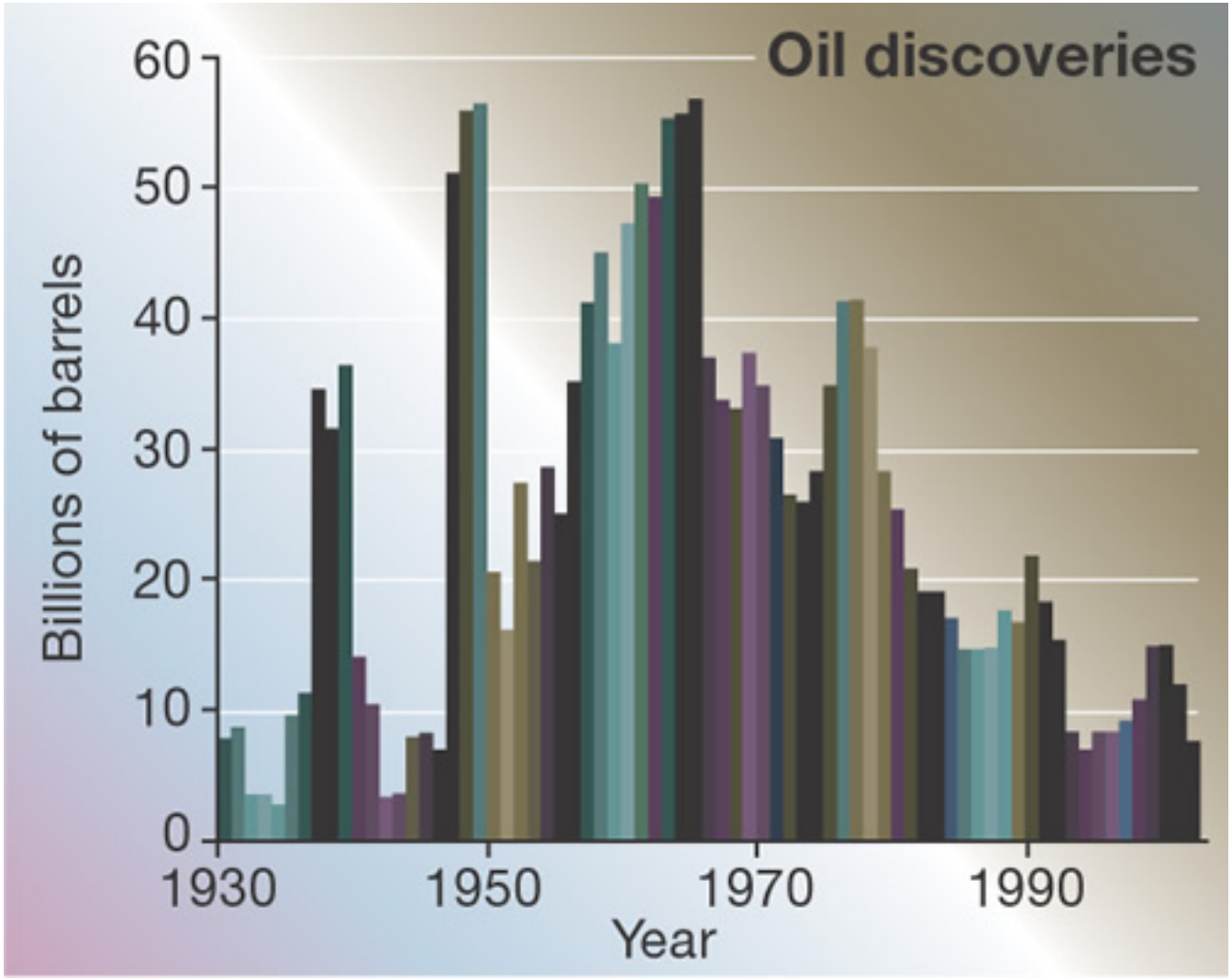
Non-Conventional Petroleum

- examples of non-conventional deposits of petroleum are the tar sands of Alberta or the oil shales of the U.S.
- extraction of non-conventional petroleum is energy intensive and expensive
- the petroleum must first be physically separated from the sand or rock using heat and hot steam
- then, because it is not mature, it must be upgraded with the addition of hydrogen before it can be sent to the refinery
- there are vast reserves of non-conventional oil
- Alberta tar sands - 3 trillion barrels
- Green River oil shales (U.S.) - 700 billion barrels
- however, both the extraction and upgrading are expensive, and are not required of conventional oil

Trends in Oil Discoveries and Consumption

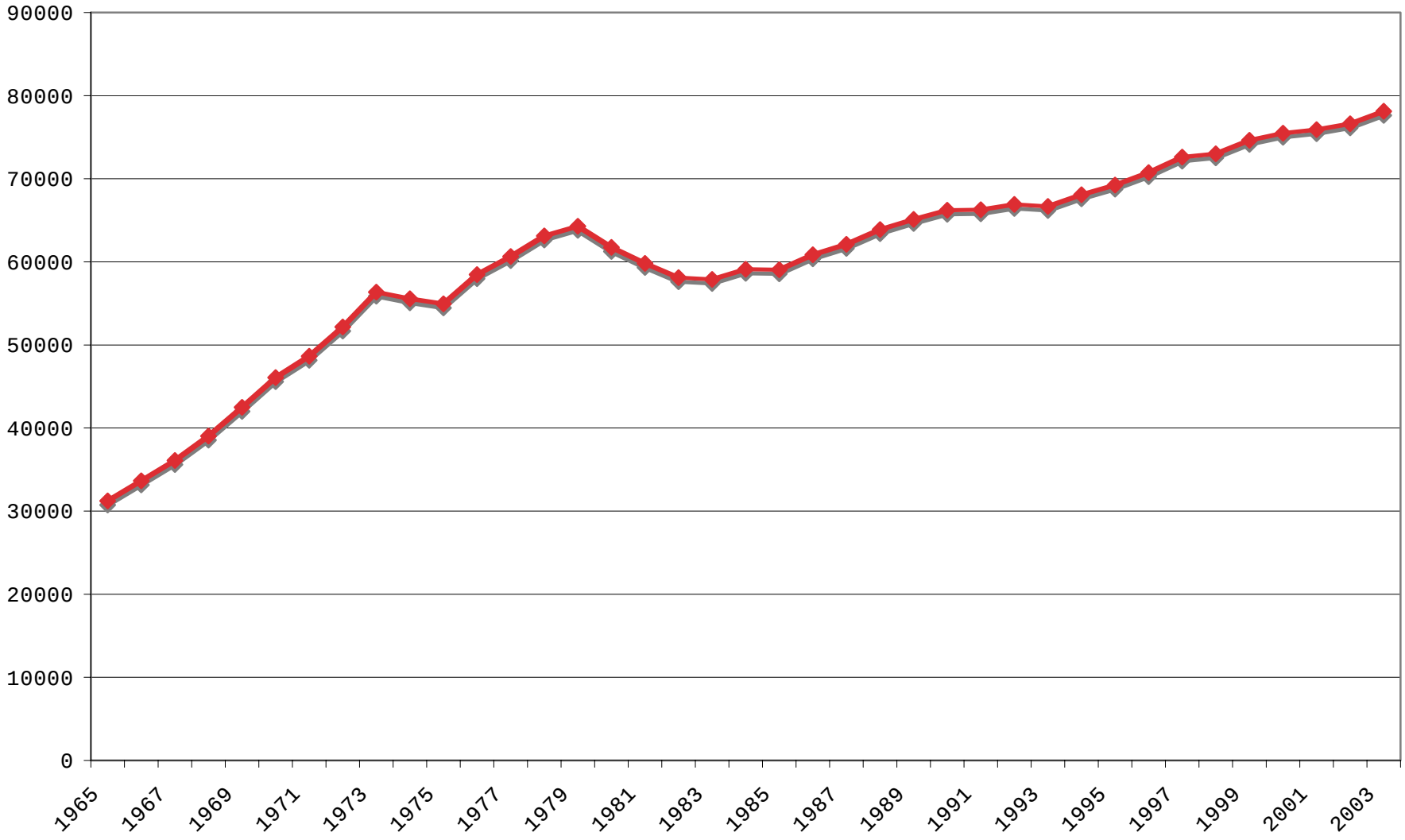
- The largest oil fields were discovered in the post WWII era (1950's and 1960's)
- The size and rate at which conventional oil fields have been discovered has been declining since 1965
- Over the same period, the global consumption of oil has doubled
- The next three slides show
  - The pattern and size of discovery of conventional oil deposits
  - The daily global consumption of oil
  - A chart that combines the discovery and consumption

Discovery of New Conventional Reserves

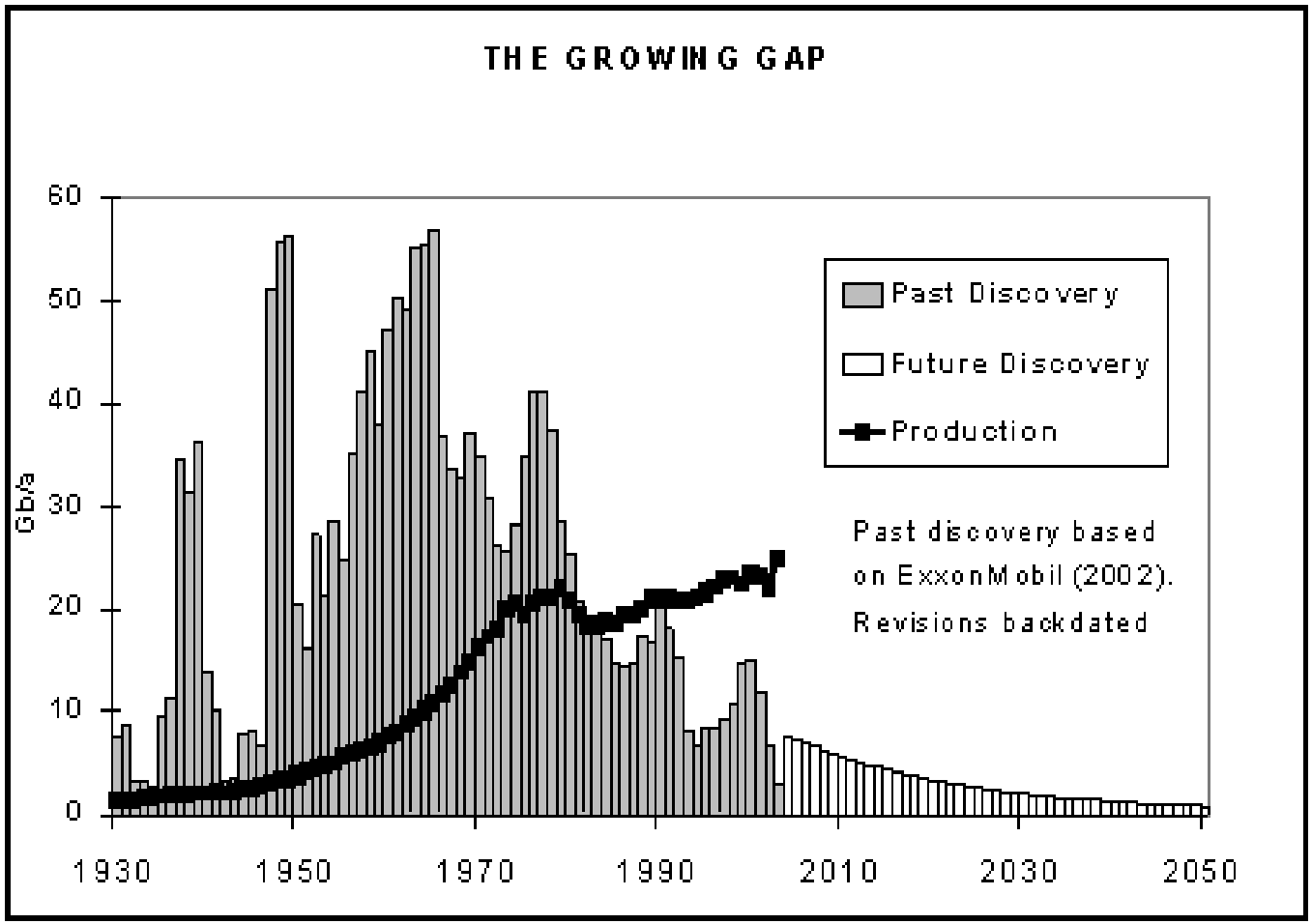


From Giles (2004)

Global Oil Consumption in 1000's of barrels per day

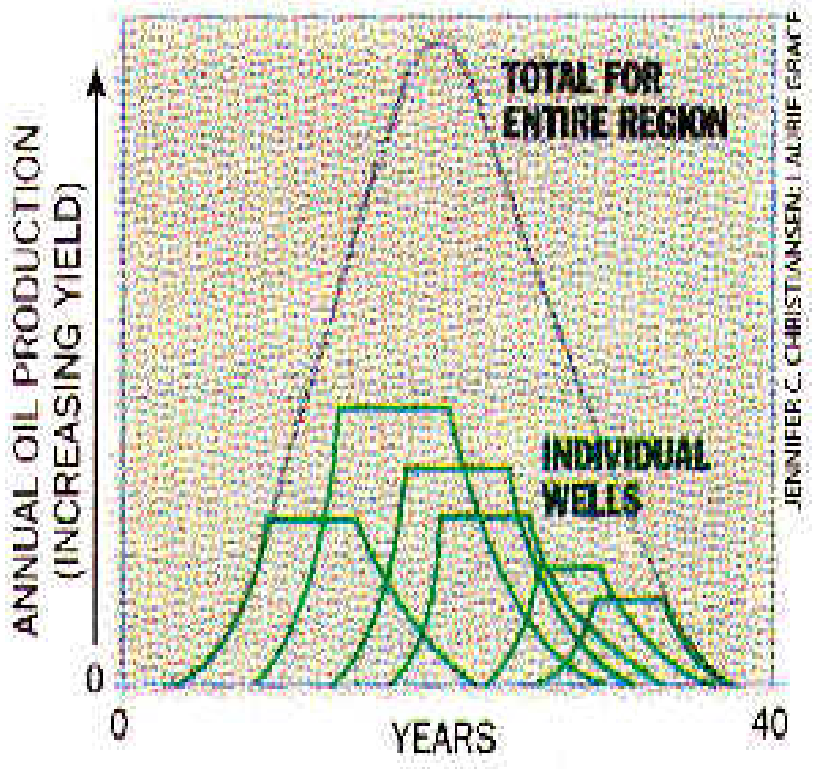


Data from BP Statistical Review of World Energy, 2004


THE GROWING GAP
60
50
40
30
20
10
0
Gb/a
1930
1950
1970
1990
2010
2030
2050
Past Discovery
Future Discovery
Production
Past discovery based
on ExxonMobil (2002).
Revisions backdated

Conventional Oil Production

It is a fundamental geological principle that once half the oil in a reservoir is extracted, the rate at which the remaining oil is produced begins to decline.



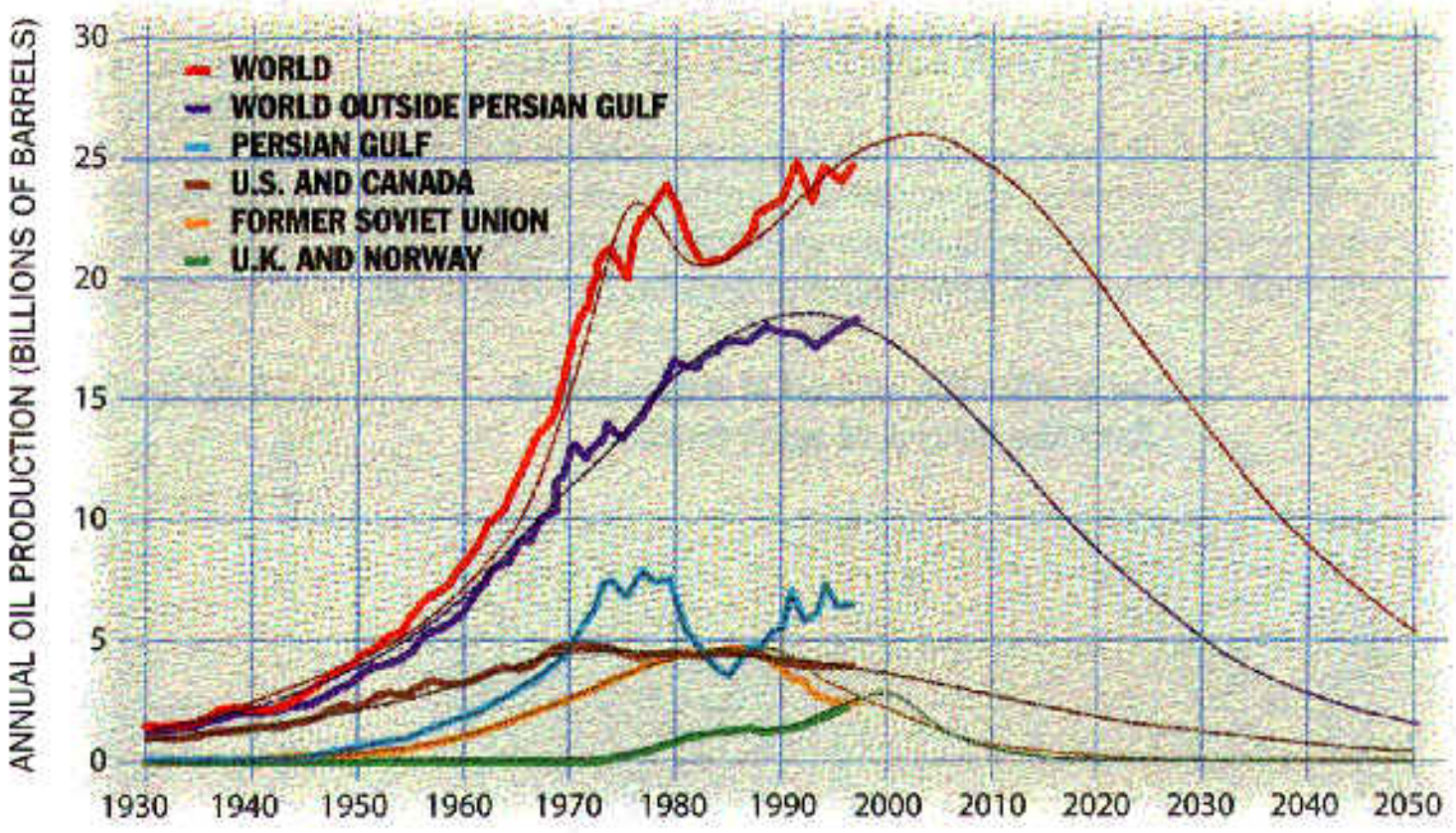
From Campbell and Laherrere, 1998.

Conventional Oil Production
(continued)

- In the late 1950's, geologist M.King Hubbert successfully predicted that the lower United States oil production would peak in 1970.
- Hubbert then applied these principles to global reserves, and predicted that global production of conventional oil would peak in the year 2000
- Nearly 30 years later, Campbell and Laherrère (1998) redid the Hubbert curves, and predicted the peak of production of global oil for the first decade of this century. They coined the term "The End of Cheap Oil"
- Their diagram is on the following slide

“The End of Cheap Oil”

Campbell and Laherrere, 1998

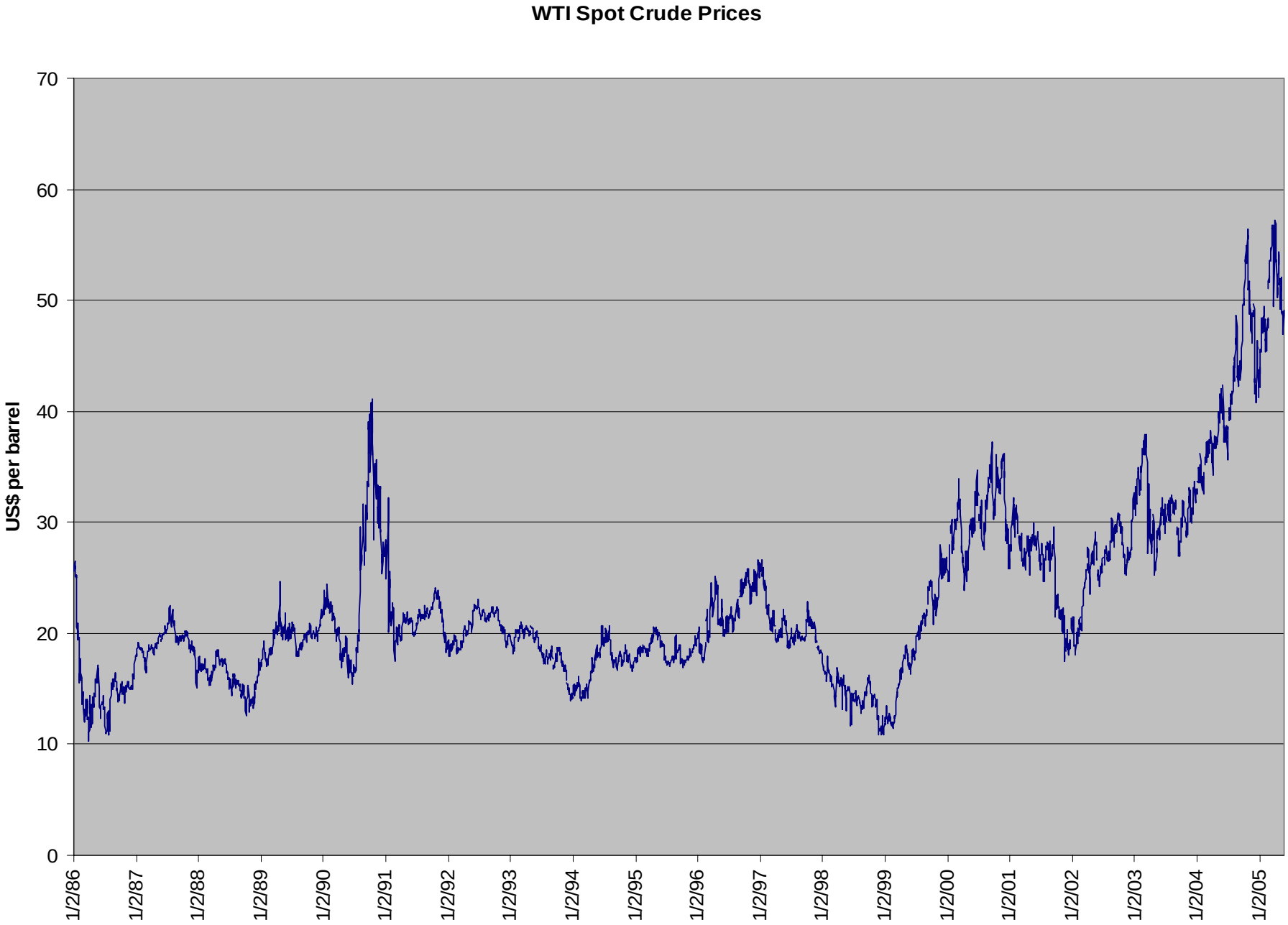


From Campbell and Laherrère, 1998.

The Price of Oil

- Oil prices are determined by multiple interactive factors, including
  - Supply
  - Demand
  - Geopolitical factors
  - Costs of exploration and extraction

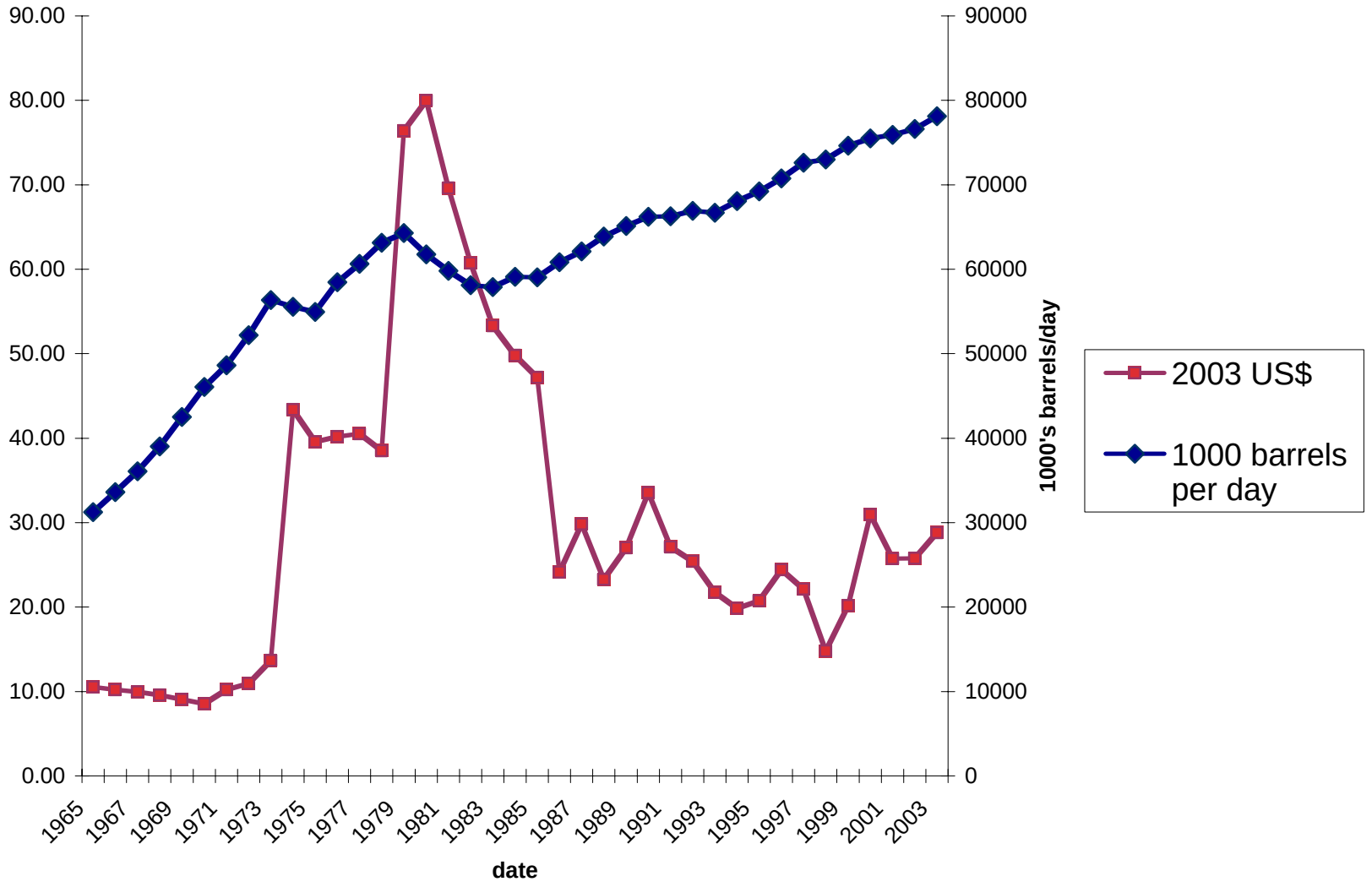
- The following slides show:
  - historical oil prices, both raw and adjusted to US$2003 (from BP Statistical Review, 2004)
  - West Texas Intermediate crude prices (unadjusted for inflation) from January 3, 1986, to May 24, 2005. (from U.S. Energy Information Administration, 2005)


WTI Spot Crude Prices
US$ per barrel
70
60
50
40
30
20
10
0
1/2/86
1/2/87
1/2/88
1/2/89
1/2/90
1/2/91
1/2/92
1/2/93
1/2/94
1/2/95
1/2/96
1/2/97
1/2/98
1/2/99
1/2/00
1/2/01
1/2/02
1/2/03
1/2/04
1/2/05

Supply, Demand, and Oil Prices

- The next diagram shows a plot of oil consumption data and oil prices adjusted for inflation (in 2003 US$)
- In the early 1970's, oil prices had started a slow rise; then, with the oil embargo, there was a drop in consumption due to a supply shortage. This was followed by a sharp spike in prices.
- In late 1979, with political instability in Iran, there was a sharp spike in prices, followed by a decline in consumption.
- Therefore, in the past 30 years, we have seen situations where a supply shortfall has spiked prices, and where a price spike has cause a decrease in consumption (demand destruction)

Oil Consumption vs. the Price for a barrel of oil (in 2003 US$)



Data from BP Statistical Review of World Energy, 2004

Are we at or near the End of Cheap Oil?

- A question that is being asked now in petroleum circles is if we are coming to the midpoint of production of conventional oil, as predicted
- the trend in the size and number of discoveries has been declining since 1965
- OPEC has the taps wide open, and is just meeting demand
- Royal Dutch Shell had to revise downward its estimate of proven reserves by 20%
- demand continues to grow - CHINA!
- the current increase in oil prices started in 1998 (with a dip at 9/11)
- if indeed we are at the peak of production of conventional oil, then the remaining conventional reserves will be more costly to extract
- non-conventional reserves are costly to extract

Implications for Aviation

- Engine technology- from 1950-1997 there has been a 70% improvement in aircraft fuel efficiency
- Technological innovations take 5-10 years; therefore, it will not be a technological fix that helps civil aviation cope with the existing high fuel prices
- Airline companies are now cutting to the bone; how much more room is there to cut?
- It may be the time to develop a new paradigm for civil aviation
- These potential options are discussed more fully in the publication by Anthony Perl and Judith Patterson, 2005. Will Oil Depletion Determine Aviation's Response to Environmental Challenges? Annals of Air and Space Law, vol. XXIX, p. 259-273.

Summary

- The data indicate that the peak of production of conventional oil will be soon, if not already upon us
- Prices will remain high due to demand and constraints on conventional supply due to peaking, and non-conventional oil due to inherent costs
- We believe it unlikely that present growth trends in aviation can be sustained, due to oil prices
- Airports, and the aviation industry in general, may need to develop a new paradigm

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