

**Air Transport Symposium – Abuja, Nigeria**

28 to 30 April 2008

**A balanced approach  
to aircraft noise  
management**

**ICAO - International Civil Aviation  
Organization**

**Jane Hupe – Chief, Environmental Unit**

The background of the slide features a dark aircraft in flight, silhouetted against a blue sky with a grid pattern of latitude and longitude lines. The aircraft is positioned in the upper left quadrant, moving towards the right.

# ICAO ENVIRONMENTAL GOAL ON AIRCRAFT NOISE:

- Limit or reduce the number of people affected by significant aircraft noise;

# A36-22

- Appendix C: Policies and programmes based on a “balanced approach” to aircraft noise management
- Appendix D: Phase-out of subsonic jet aircraft which exceed noise levels in Volume I of Annex

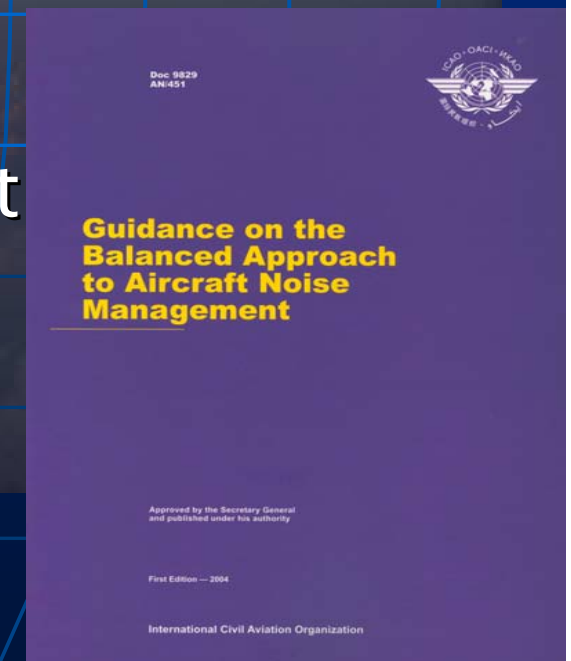
# A36-22

A dark, sleek aircraft silhouette is positioned horizontally across the upper middle of the slide. The background is a deep blue with a grid of lighter blue lines, suggesting a globe or a technical grid. The aircraft's nose is on the right, and its tail is on the left. The overall aesthetic is technical and professional.

- Appendix E: Local noise-related operating restrictions at airports
- Appendix F: Land-use planning and management
- Appendix G: Supersonic aircraft – the problem of sonic boom

# Noise Policy – The Balanced Approach to Noise Management

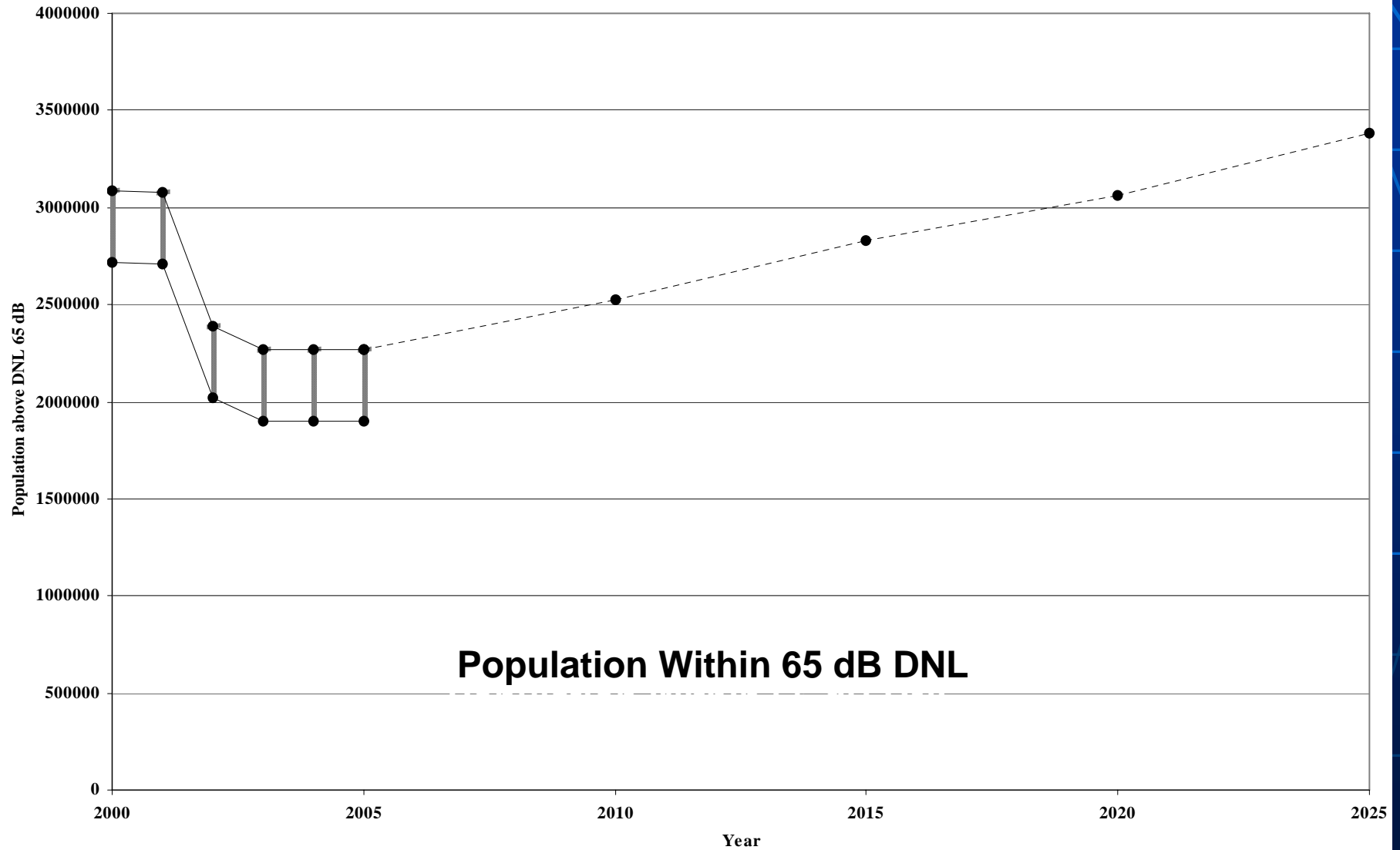
- Guidance on the Balanced Approach to Aircraft Noise Management (Doc 9829)
- Comprises four elements:
  - Noise at source
  - Land-use planning management
  - Operational measures
  - Operating restrictions



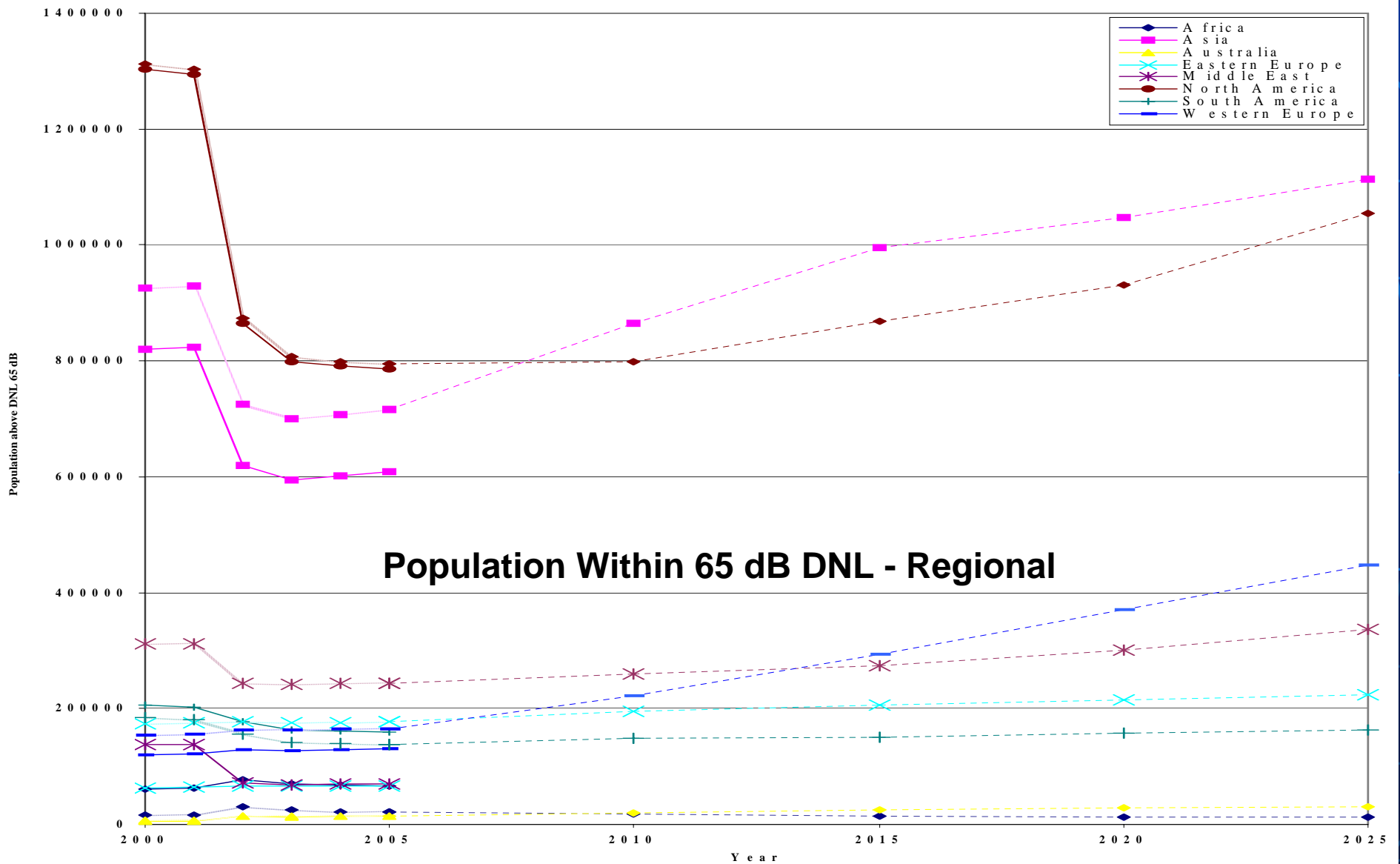
# Aviation noise data (inventories and models)

- MAGENTA - Model for Assessing the Global Exposure to the Noise of Transport Aircraft is the model used by ICAO for estimating the number of people exposed to aircraft noise  
Metric: Number of people exposed to significant noise
- ICAO Noise Certification Databases
- Noise db- Database Noise levels measured in accordance with the requirements of ICAO Annex 16, Volume I for the purposes of noise certification of the great majority of the world's current large jet aircraft have been collected into this database.

# Noise trends – CAEP/7



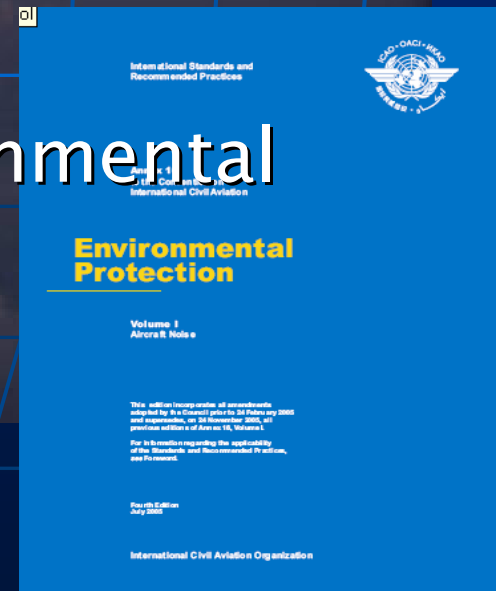
# Noise trends – results from CAEP/7





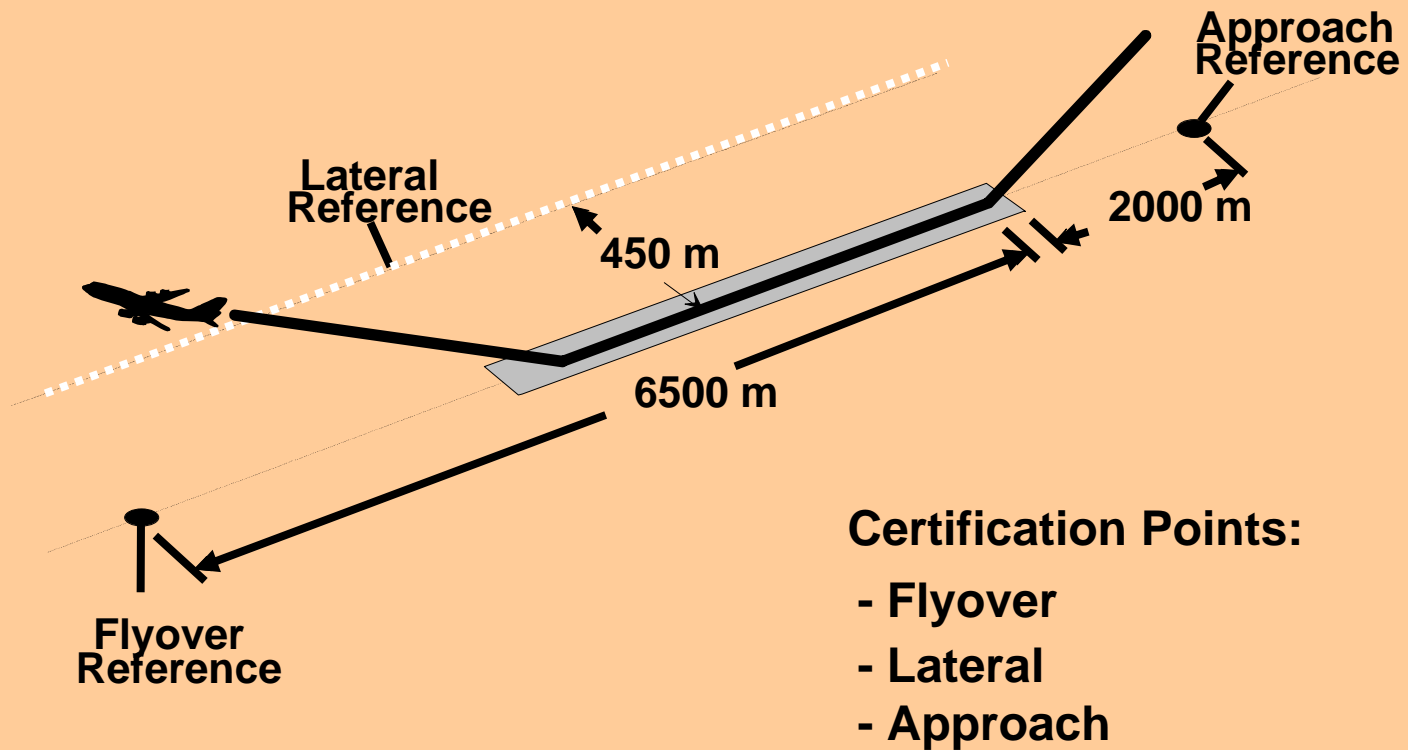
# Standards and the new technology available in aircraft noise – reducing Noise at Source

- Depends on pace of technological improvements – research programmes
- Involves high costs/time; aircraft performance trades
- Noise certification is based on aircraft performance (airframe + engine)
- Annex 16, Volume I and the Environmental Technical Manual contain the provisions and practices and the necessary guidance
- First SARPs in 1971



# Aircraft Noise Certification Measurement Points

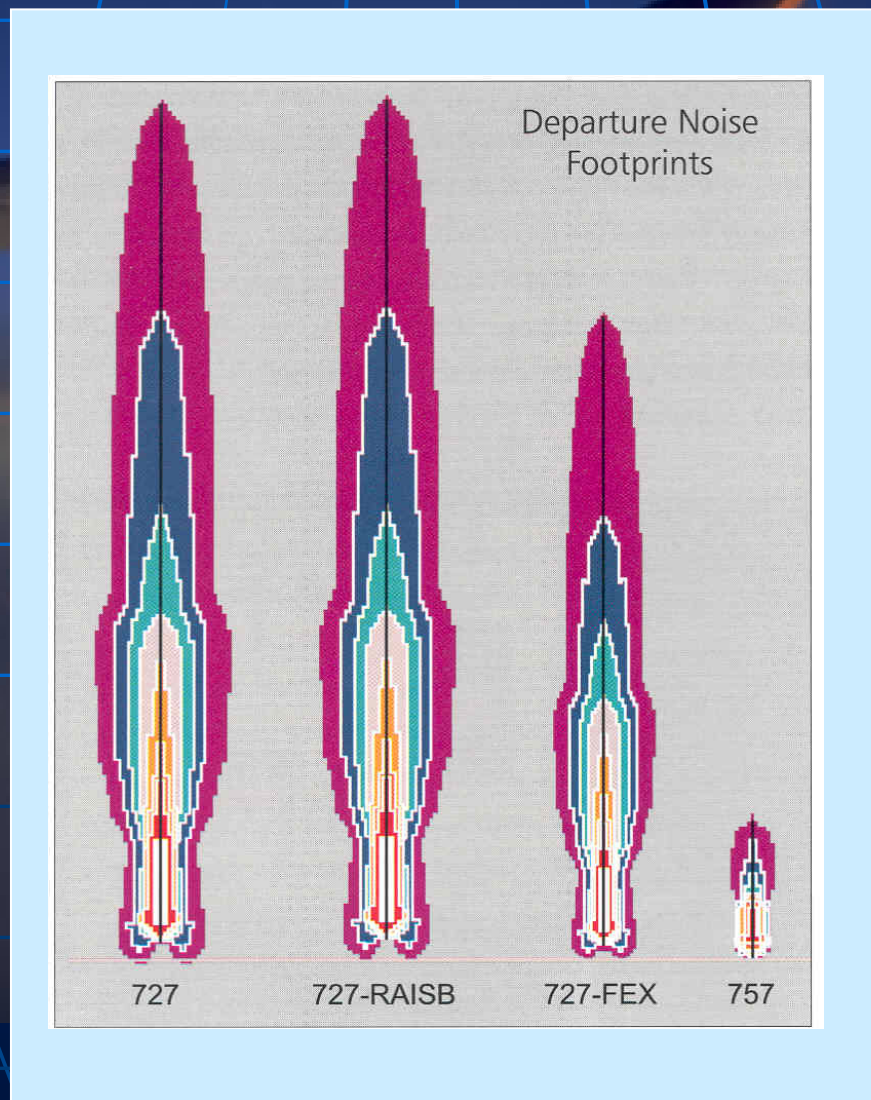
## *Trajectory and Certification Locations*



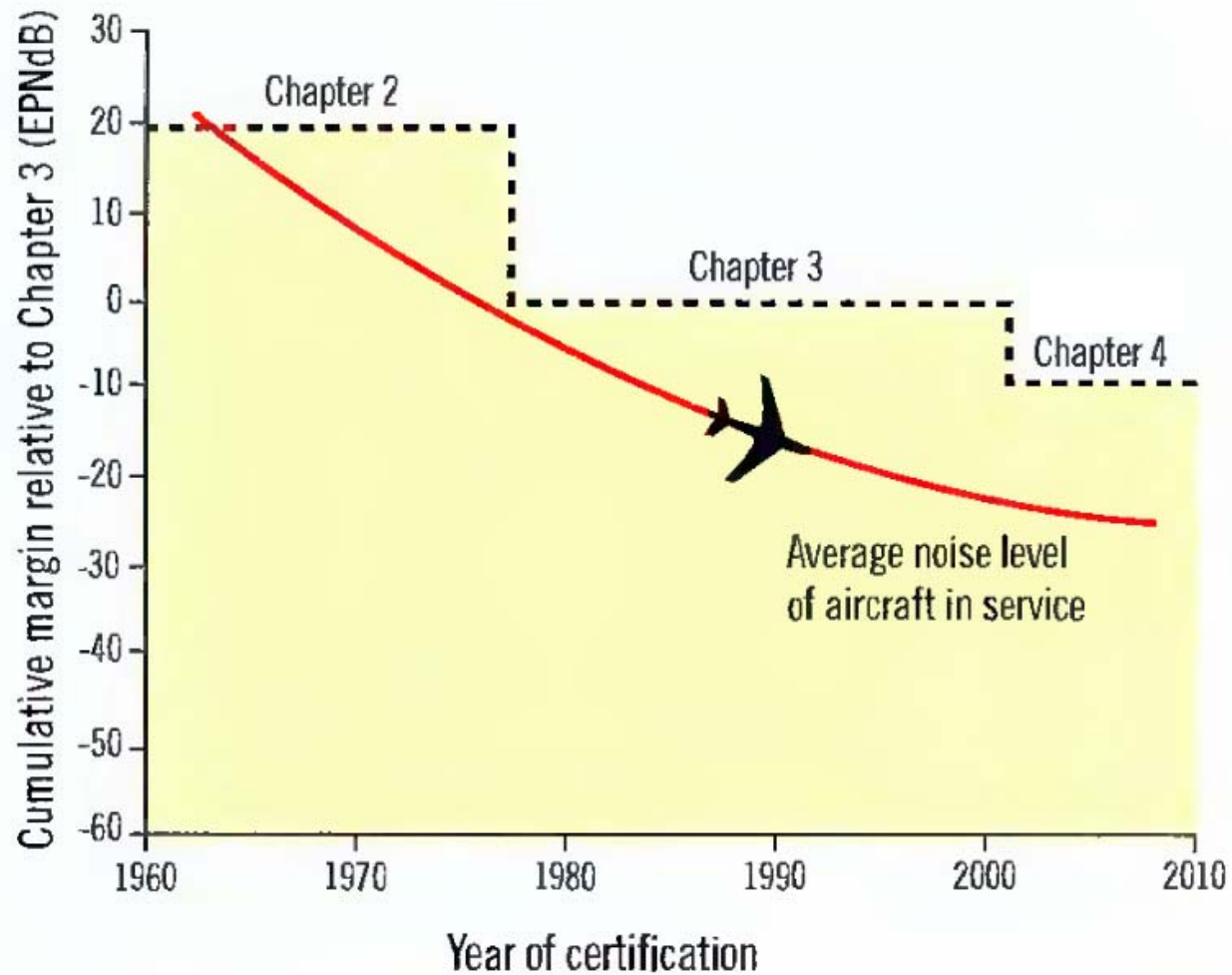
# ICAO Annex 16 - Volume I - Standards

- Chapter 2 - before Oct 1977, (eg B727, early B737 and DC9)
- Chapter 3 - Chapter 3 (after Oct 1977)
- Chapter 4 standards are the most stringent, and are applicable to aircraft types certificated after the 1 January 2006 = Chap. 3 less a 10 EPNdB cumulative margin

# Reduction at Source



# Annex 16 - Chapters





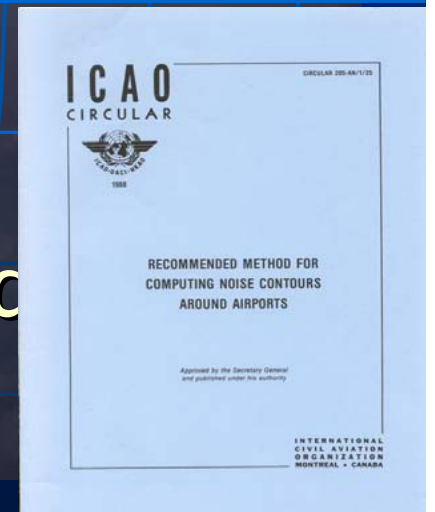
# ICAO NOISE CERTIFICATION WORKSHOPS

- ICAO held three Noise Certification Workshops (2004, 2005 and 2006) aiming at ICAO Contracting States and specific international organizations/associations, involved in, or having an interest in, aircraft noise certification activities with a view to:
  - enhance State's certification authorities' awareness of the current SARP's and guidance material for the noise certification and re-certification of transport aircraft; and
  - promote harmonization of procedures for the noise certification and re-certification of aircraft
- All workshops presentations can be viewed at the ICAO website, under the respective workshop information site (ICAO Meetings)

# Land-use Planning & Management

Airport development and operations should be coordinated with the planning, policies and programmes for the area in which the airport is located

**New** Recommended Method for Computing Noise Contours around Airports (replaces Circular 205)





# Land-use Planning & Management

An aerial photograph showing a large airport terminal building with a prominent orange roof, surrounded by a dense urban area with numerous buildings and roads. The image is overlaid with a blue grid pattern.

Airport planning is an integral part of an area-wide comprehensive planning programme



# Land-use Planning & Management

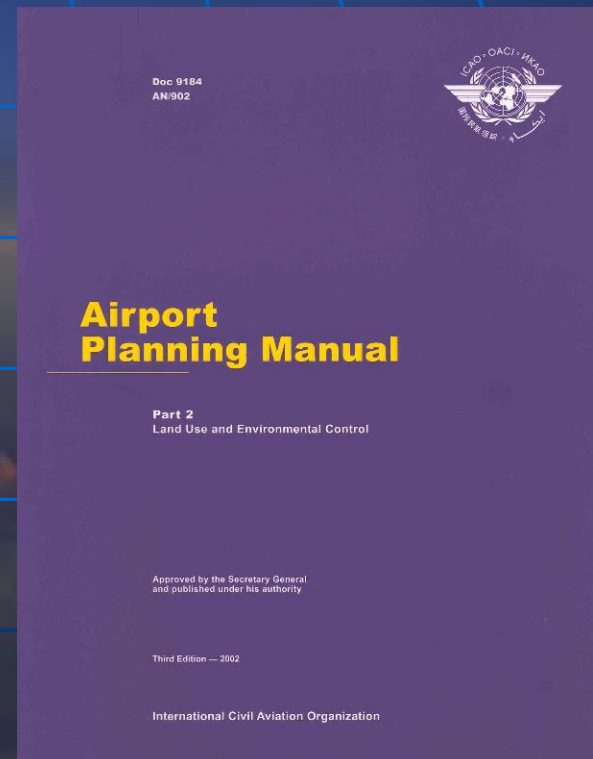
An aerial photograph of a city area with various colored overlays representing different land-use planning zones. The colors include yellow, green, blue, and red. The text is overlaid on this map.

**Airport development and operations should be co-ordinated with the planning, policies and programmes for the area in which the airport is located**

# Airport Planning Manual

Airport Planning Manual  
Doc 9184 Part II - Land-  
use and Environmental  
Control

Airport planning is an  
integral part of an area-  
wide comprehensive  
planning programme

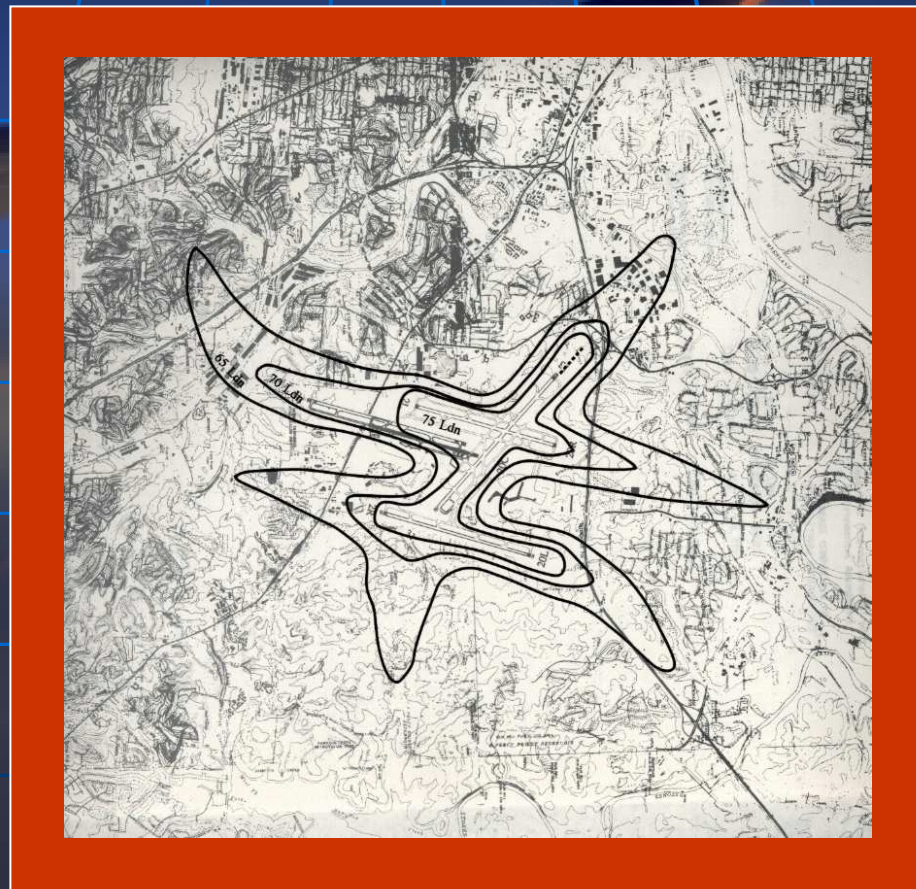


# Land-Use Control Measures

- Planning instruments
  - comprehensive planning, noise zoning, subdivision regulations, transfer of development rights and easings acquisition
- Mitigating instruments
  - building codes, noise insulation programmes, land acquisition and relocation, transaction assistance, real estate disclosure and noise barriers
- Financial instruments
  - capital improvements, tax incentives



# Noise Zones



# Noise Management Tools

- Noise monitoring
- Flight tracks



# Operational Measures

- Safety is paramount
- Noise preferential runways and routes
- Aeroplane operating procedures (safety/meteorology),
  - Noise abatement take-off
  - Approach
  - Landing
- Configurations and speed changes
- Displaced thresholds



# Operational Measures

- Publication of a new ICAO circular on noise and emission effects - To be published in 2008
- *Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS) noise abatement departure procedures*

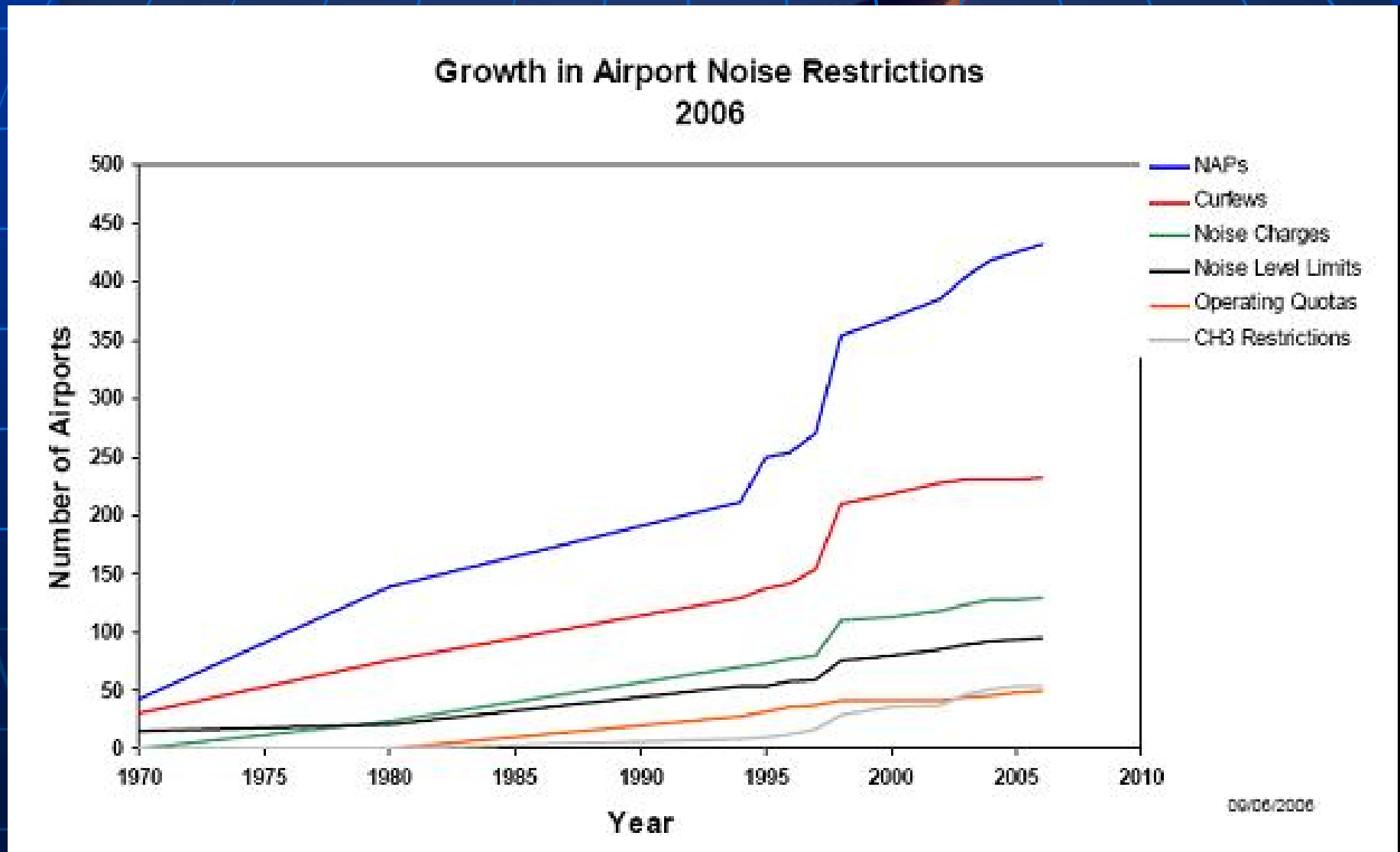
Chapter I – Section 7

# Operating restrictions

- Global – restrictions applied to all traffic at an airport based on total fleet noise performance.
- Aircraft-specific - restrictions applied to a specific aircraft or a group of aircraft based on individual noise performance.
- Partial – restrictions applied for an identified time period during the day, on specific days of the week, or only for certain runways at the airport.
- Progressive – restrictions which provide for a gradual decrease in the maximum level of traffic or noise energy used to define a limit over a period of time. This period is typically defined as a number of years before reaching a final level.



# Growth in Airport noise restrictions



- Source: Boeing, 09/06/2006 - NAPs – Noise Abatement Procedures; CH3 – Chapter

## **Chapter 2 Phase-Out (A36-22 App D)**

Policy developed by ICAO Assembly in 1990

Need for operating restrictions in some countries

Concerns over economic impact

Start restrictions in 1995, phased over 7+ years

## **Chapter 3 Operating Restriction (A36-22 App E)**

Policy developed by ICAO Assembly in 2001

Only as part of the balanced approach

Airport by airport

Only the noisiest Chapter 3 aircraft

# Curfews

- Curfews normally apply only at night, e.g. from 2300 hr to 0700 hr.
- A global curfew is one which bans all flights during a specific time period.
- A partial curfew prohibits the operation of specific aircraft types, or prevents the use of specific runways or only affects landings or take-offs.
- a curfew in a specific airport can have an effect in the noise situation in a different region or country

# CAEP/7 Study on curfews

- CAEP/7 prepared a study to address curfews focused on the scope and scale of the curfew problem.
- The study, which represented a snapshot in time of the curfew situation at the airports it covered, included an inventory of 227 with curfews, as extracted from the Boeing database at <http://www.boeing.com/commercial/noise/list.html>
- Approximately half of the airports with curfews were in Europe and a third were in North America.
- Of the 30 busiest airports (passenger numbers above 30 million), 18 were in North America and only 4 of these had curfews. The 6 in Europe all had curfews. Of the remaining 6 – all of which were in Asia – only 2 had curfews.

# ICAO Policy on Noise-related Charges

- Should be levied only at airports experiencing noise problems
- Should recover no more than the costs incurred.

*Doc 9082 - ICAO's Policies on Charges for Airports and Air Navigation Services*

# Work on quantifying noise impacts

- CAEP held a workshop in 2007 aiming at “Assessing current scientific knowledge, uncertainties and gaps quantifying climate change, noise and air quality aviation impacts”
  - to study the state of knowledge and gaps on noise impacts of aviation and for facilitating future development of cost-benefit approaches that would address alleviation of environmental health and welfare impacts
- Cooperation with WHO on Aircraft Noise and Health



# Future work

- Development of SARPs and guidance material reflecting technology developments
- Development of medium-term (10 years) and long-term (20 years) technology goals level of noise emission from individual aircraft
- assessment of the evolution of the impact of aircraft noise using models and indicators to estimate the number of people affected by noise
- The next step includes estimating the environmental impact of curfews on destination countries with a case-study for a major airport – Sponsored by South Africa & India.



**ICAO  
Environmental  
Report 2007**



Thank you

More info:

• [www.icao.int/env/noise.htm](http://www.icao.int/env/noise.htm)