



Destination Green

ICAO Symposium on Aviation and Climate Change, "Destination Green", 14 – 16 May 2013

Making Aircraft Quieter

Alan H. Epstein

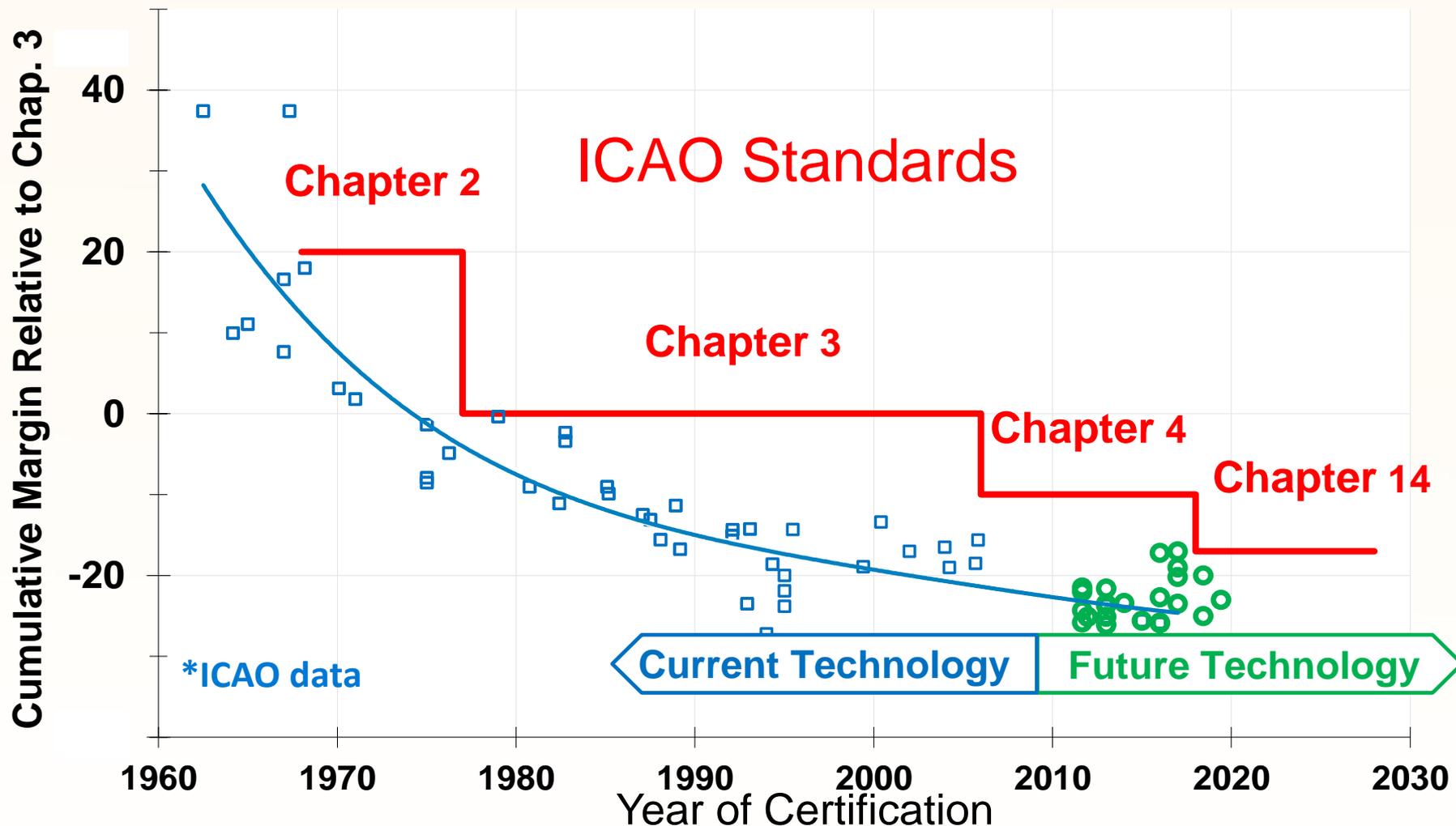
ICCAIA



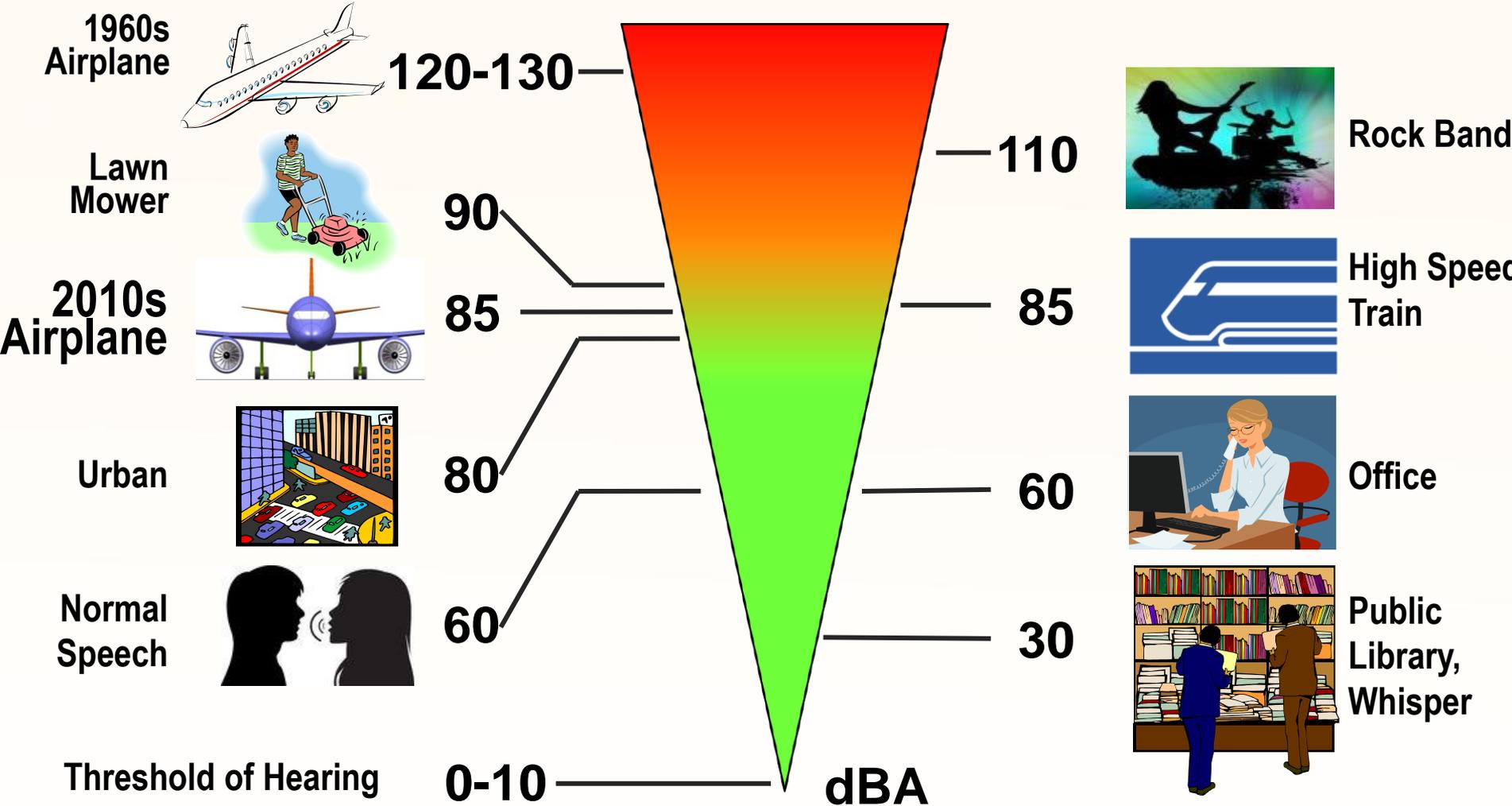
INTERNATIONAL COORDINATING COUNCIL OF
AEROSPACE INDUSTRIES ASSOCIATIONS



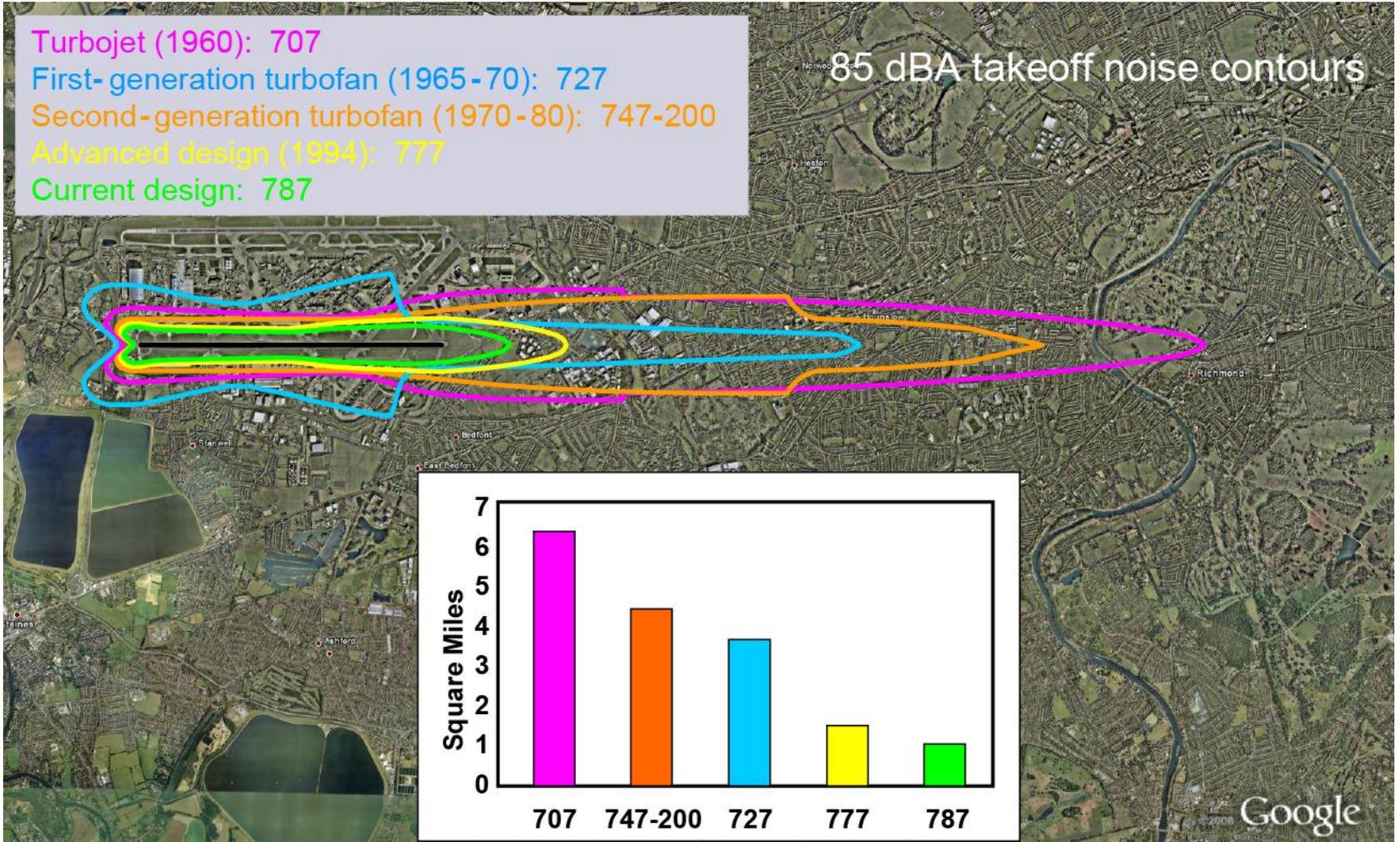
Steady Progress In Noise Reduction



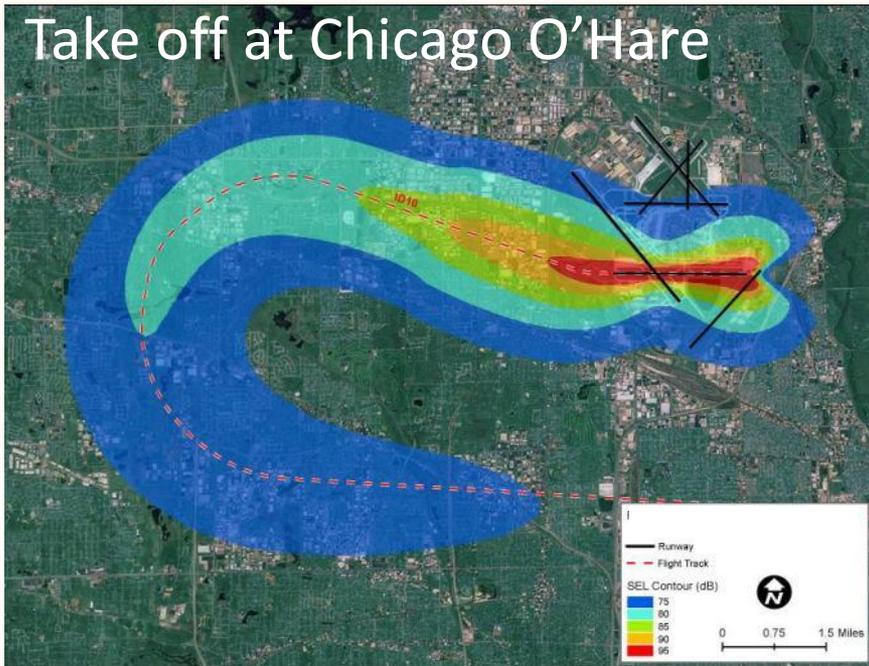
Noise in Perspective



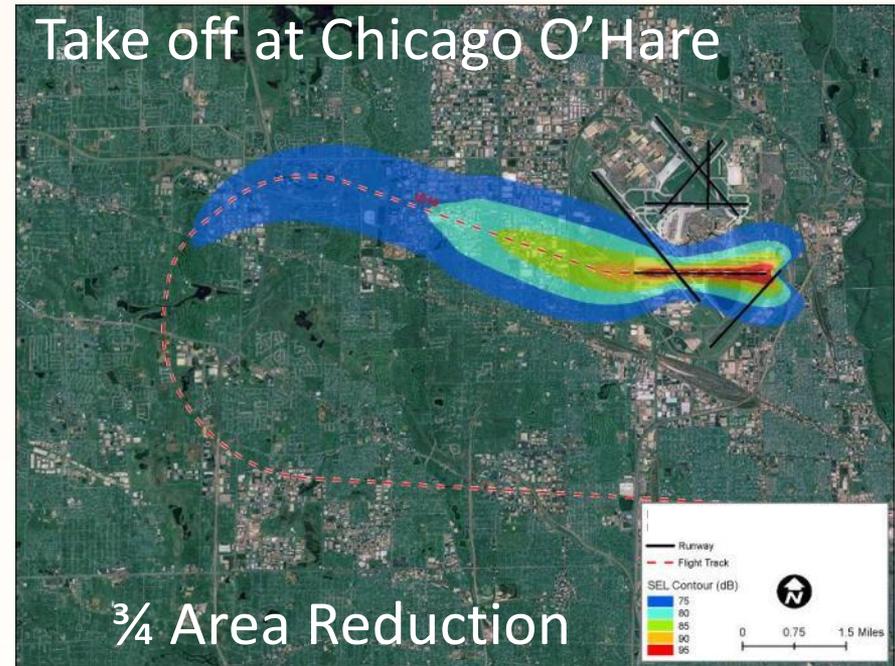
Community Noise Reduction: Much Achieved



Community Noise Reduction: More to Come



1990's Narrow Body

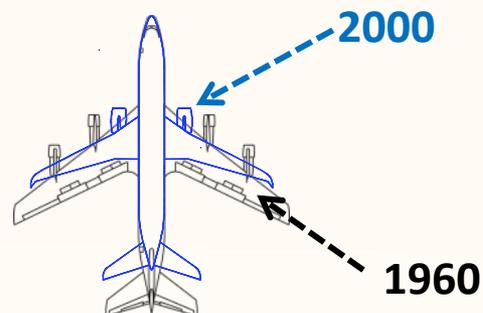


2014-16 Narrow Body

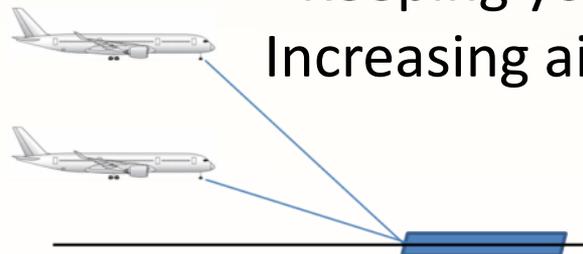
Aircraft Noise Making It & Hearing It

Making Less Noise

- Lighter airplanes at same capability
- Higher bypass ratio engines
- Noise reduction technologies

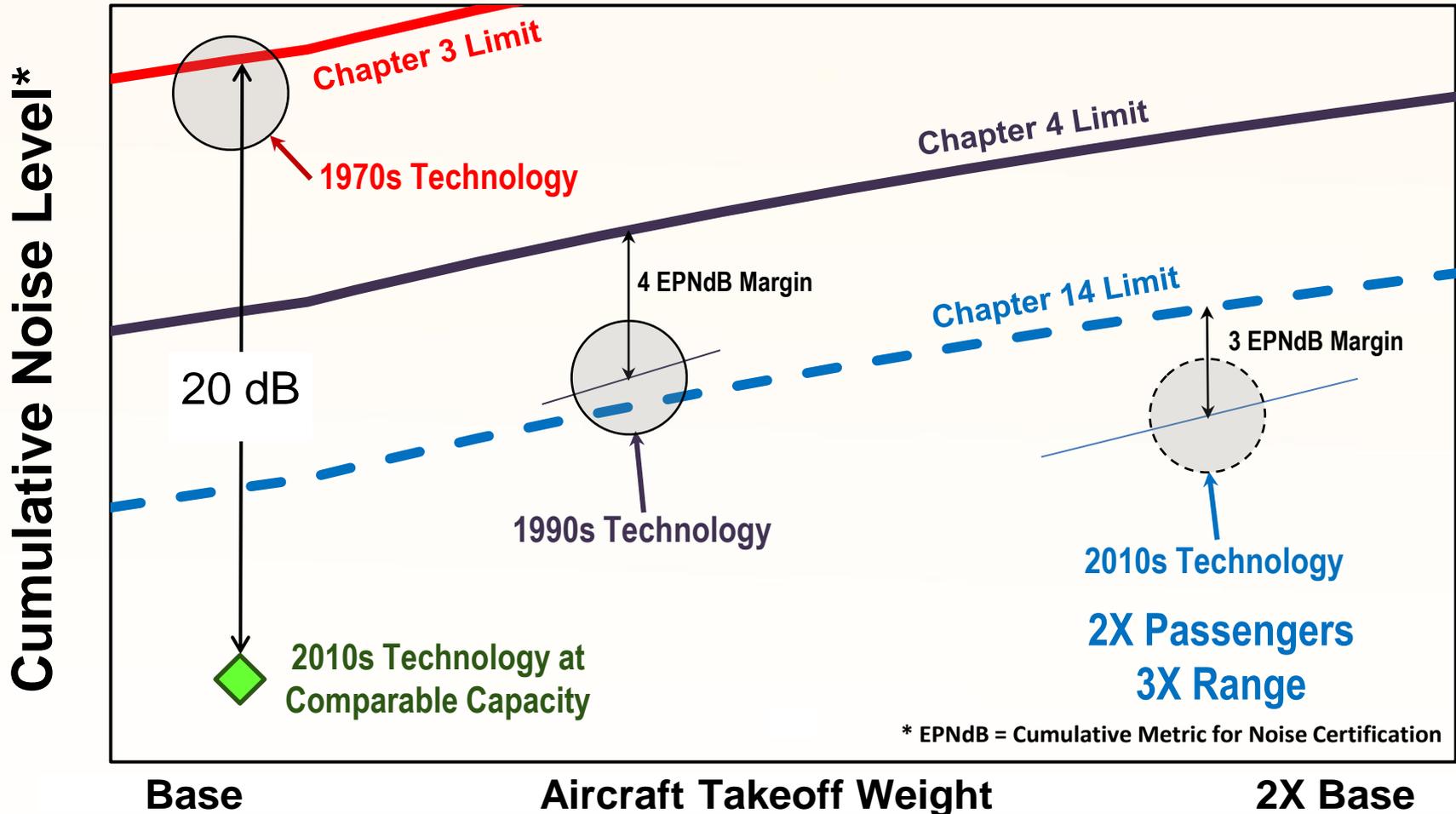


Hearing Less Noise
Keeping your distance
Increasing aircraft height



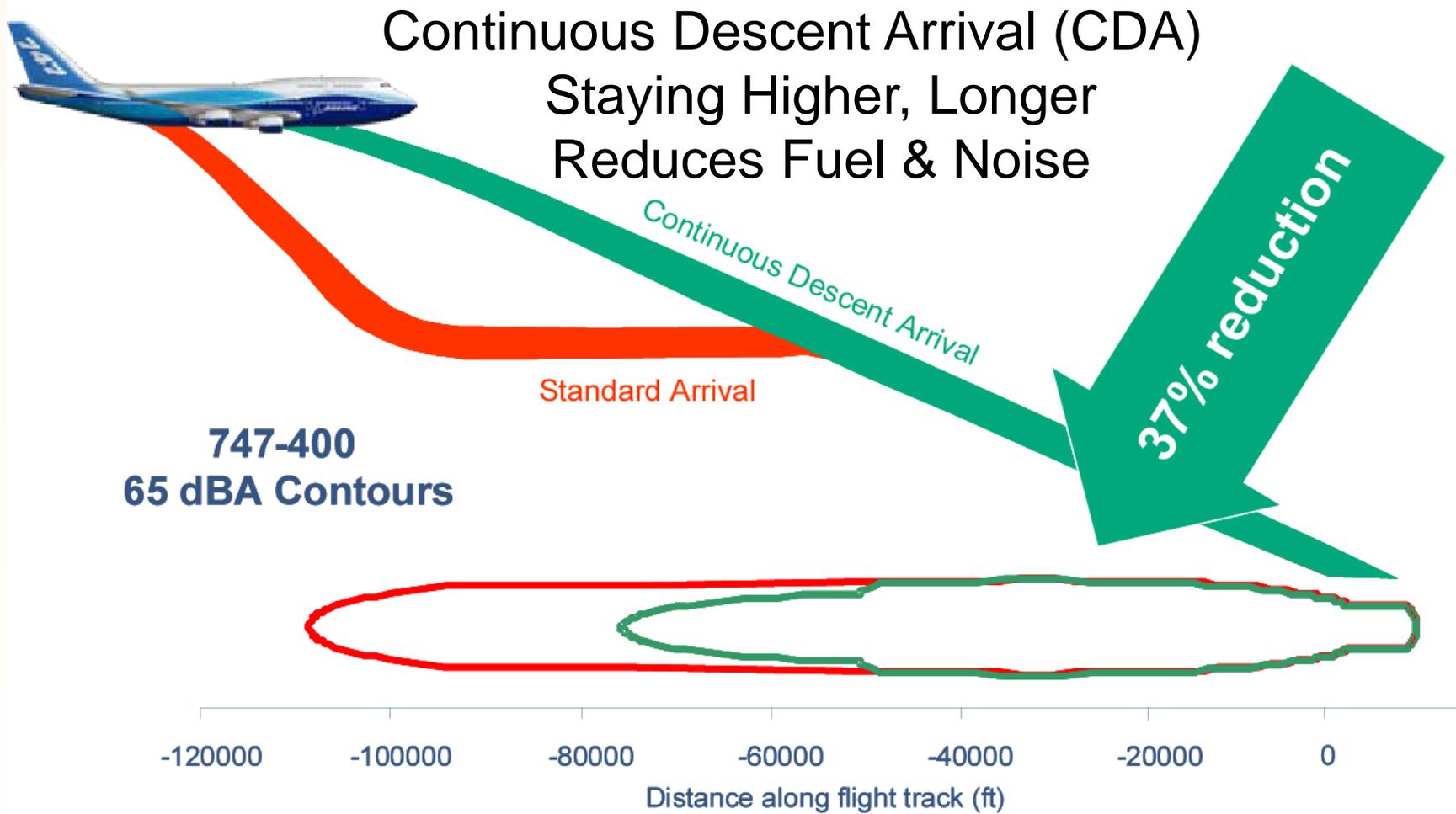
More Efficient Aircraft Deliver Significant Noise Reduction

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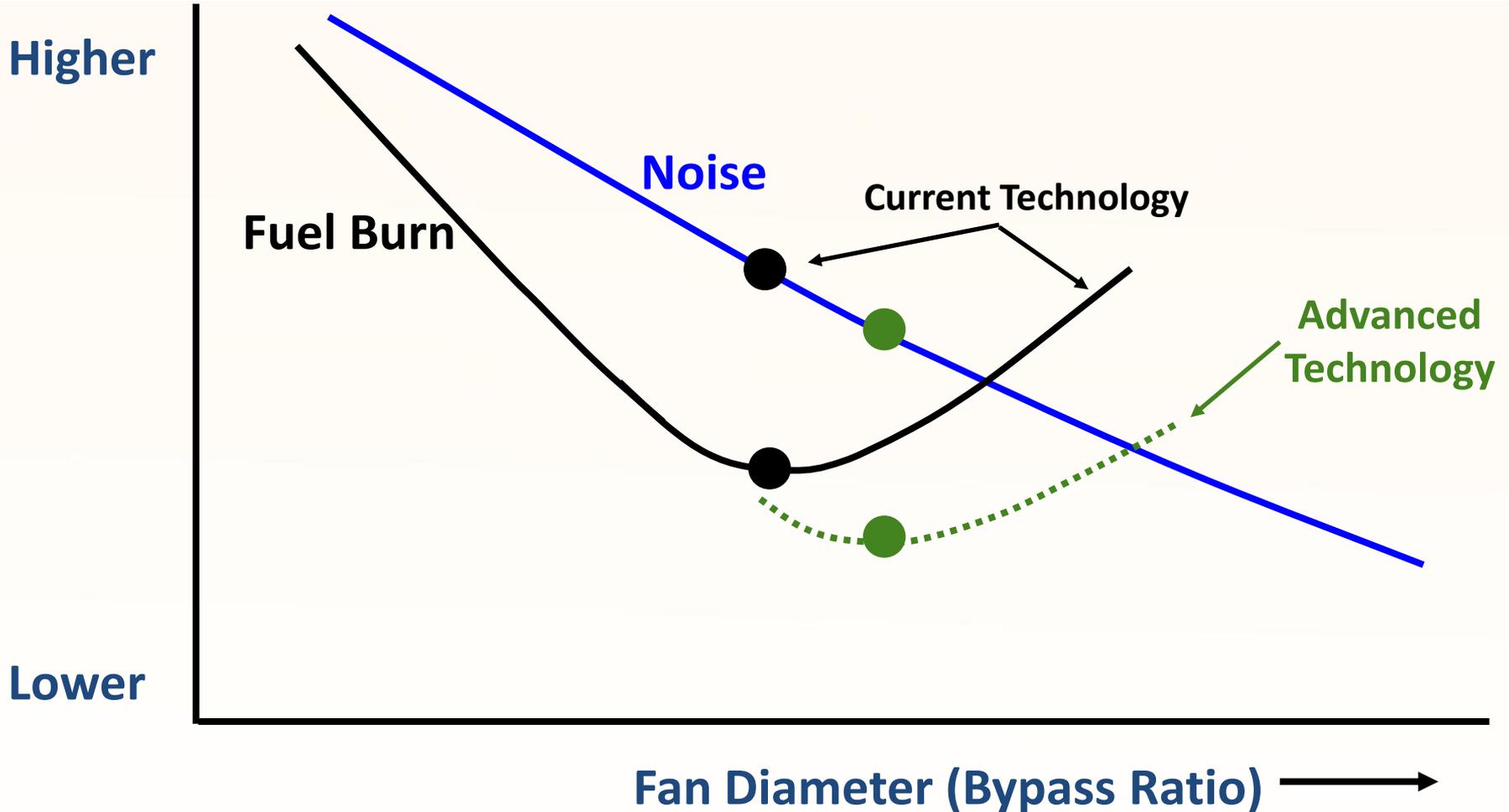


Operations to Reduce Noise

Source: The Boeing Company, 201



Propulsion System Optimization





Larger, Slower Fans Reduce Noise



1985-1995

2014-2020

Noise Reduction Technology Examples



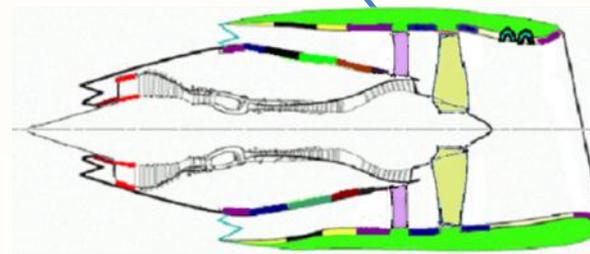
Landing Gear



Wing Leading Edge

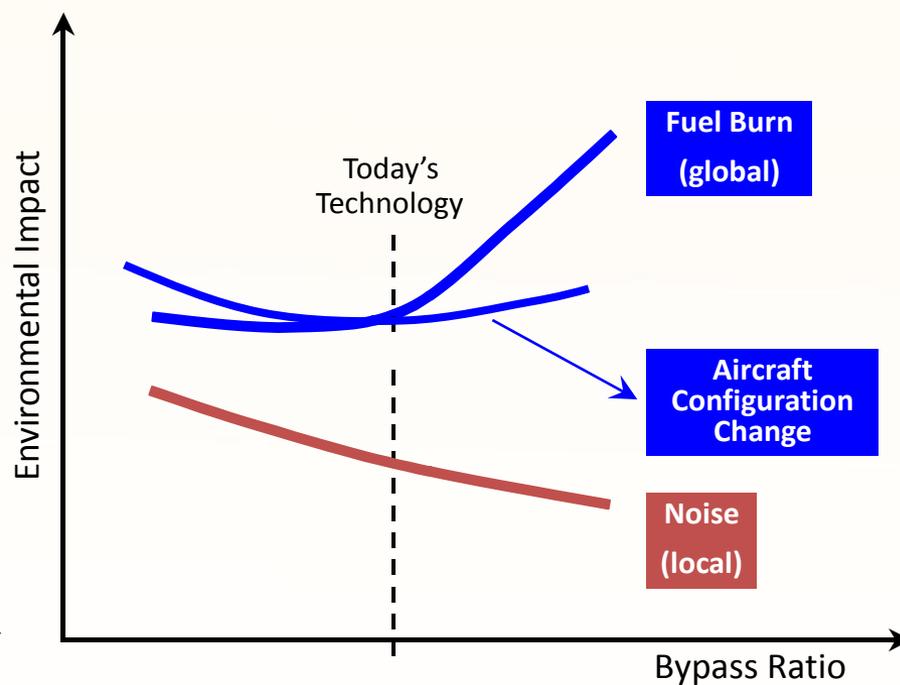
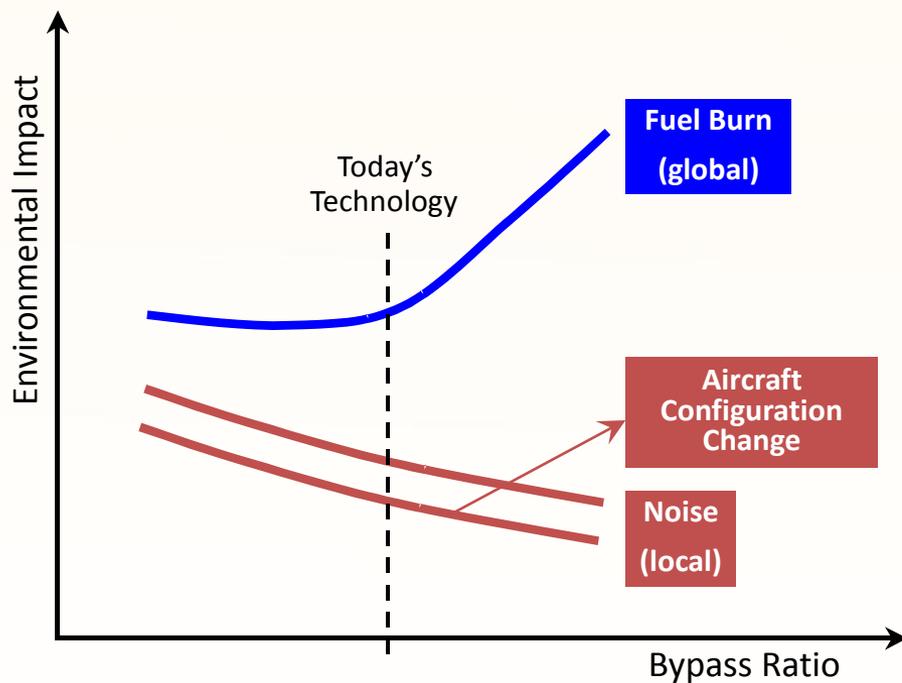


Chevron Nozzles



Engine
Internal Features

Advanced Aircraft Configurations



Summary

- New aircraft are very quiet



- Even quieter aircraft coming



- All aspects of a balanced approach are important

