



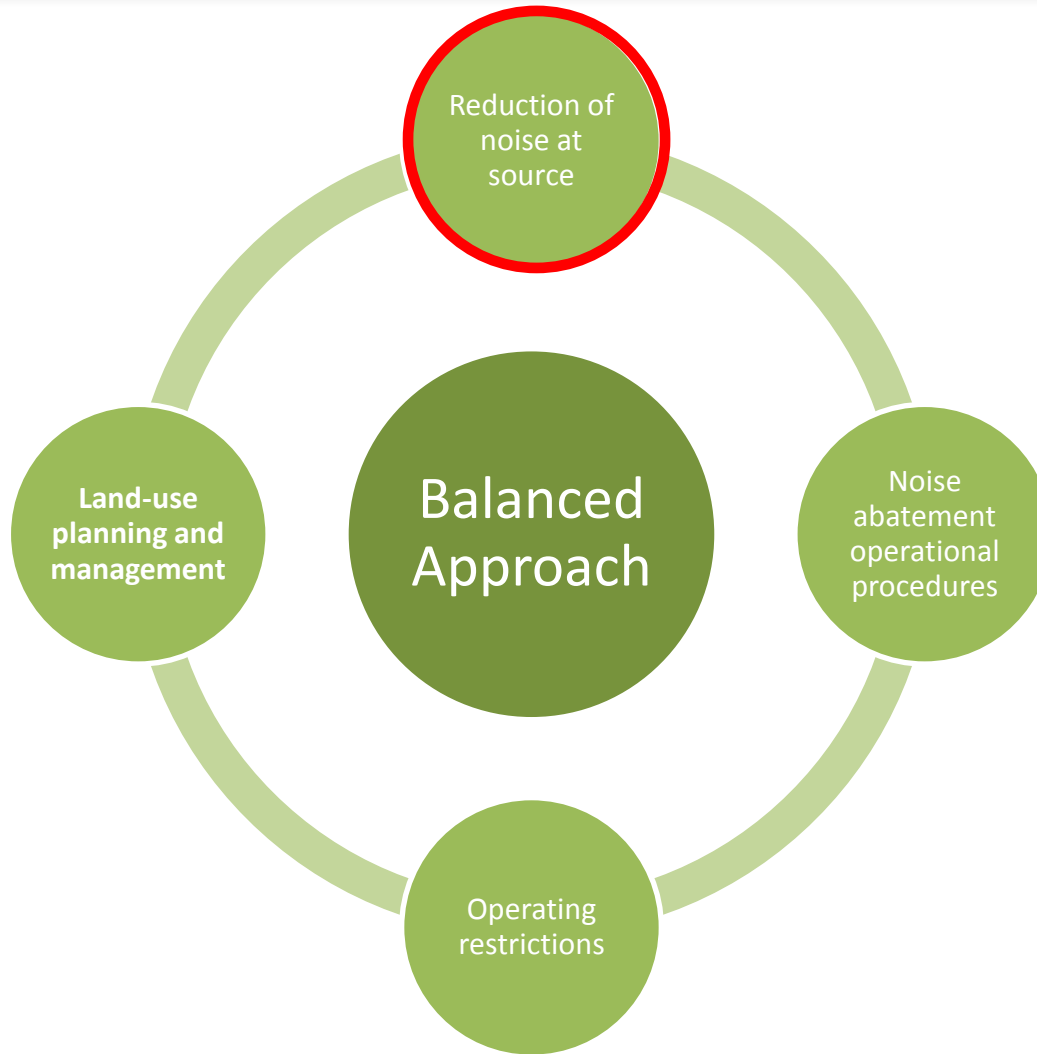
Aircraft Noise Technology and International Noise Standards

Dr. Neil Dickson, Environment Officer
Environment Branch,
ICAO Air Transport Bureau



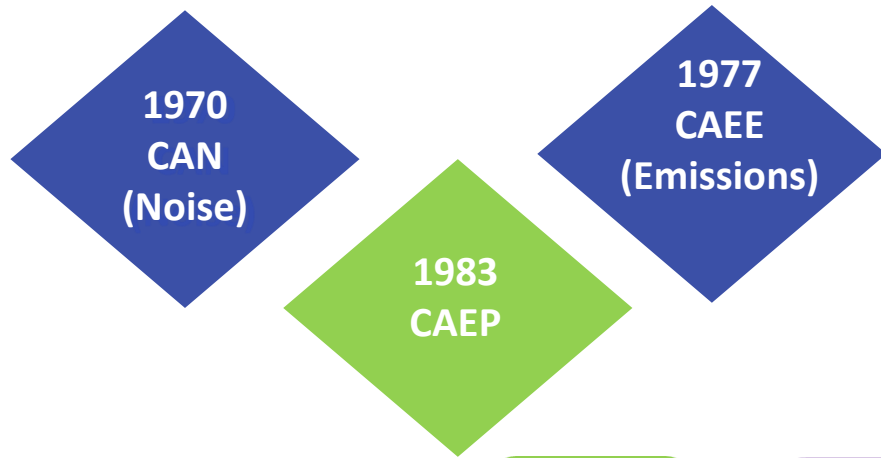
- The ICAO Noise Standards
- ICAO Noise Goals
- Overview and current work



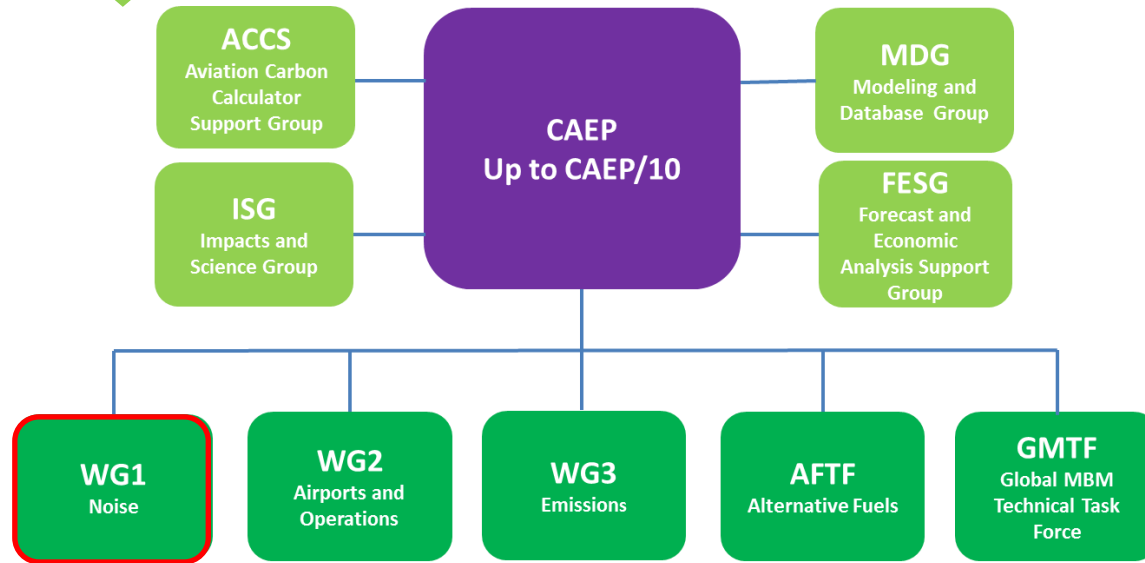




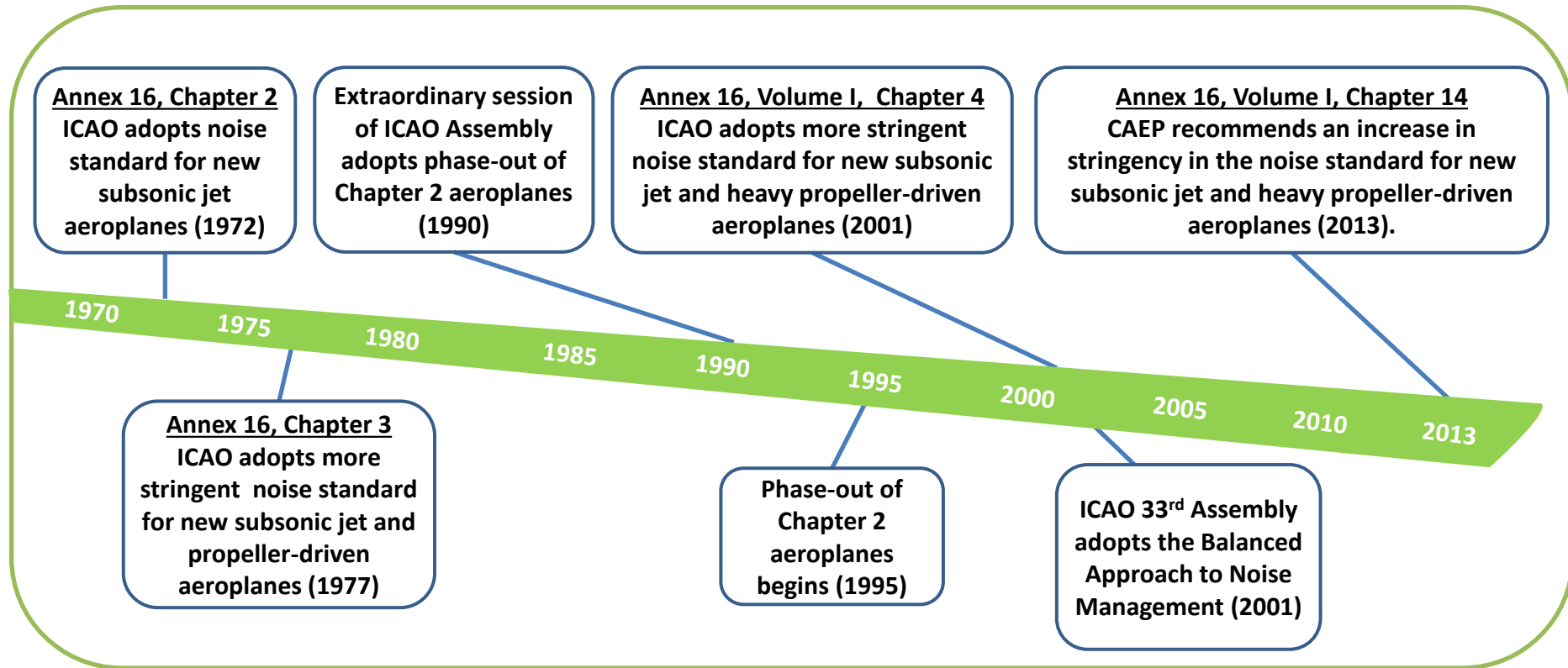
Committee on Aviation Environmental Protection (CAEP) – Working Group 1 – Noise



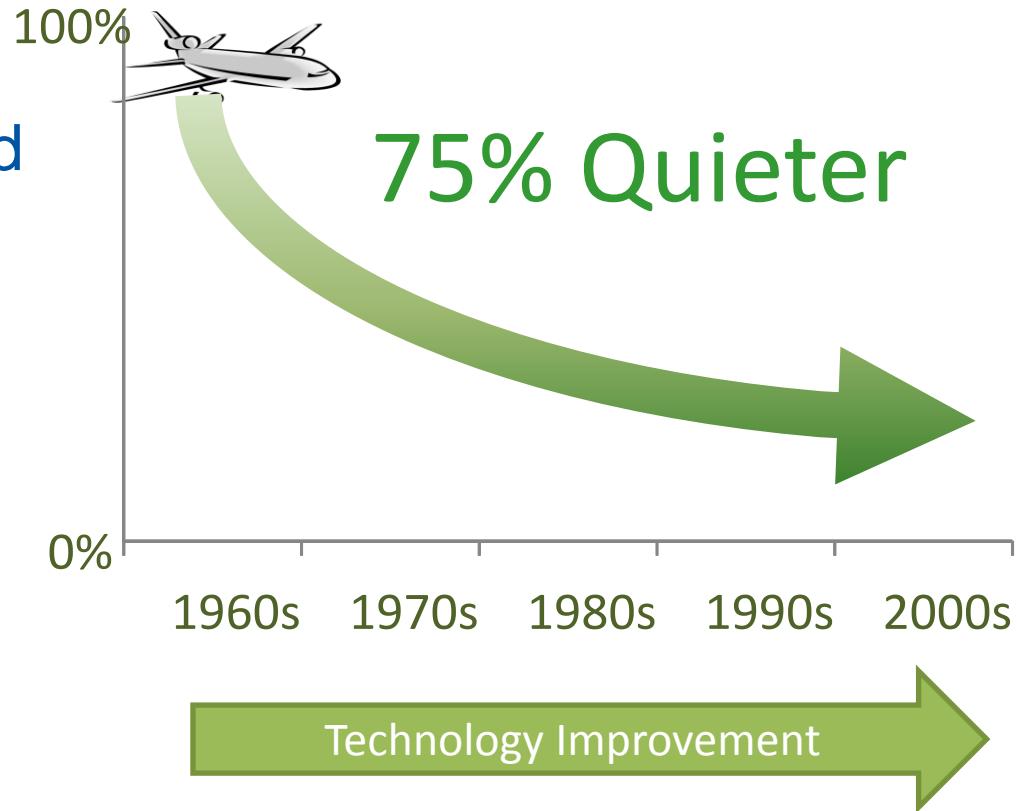
- Established by the ICAO Council in 1983, superseding the Committee on Aircraft Noise (CAN) and the Committee on Aircraft Engine Emissions (CAEE)



• ICAO adopted its first noise Standard in 1972



- Manufacturers' new technologies have produced significant noise reductions.
- Noise certification is based on aircraft performance (airframe + engine).
- ICAO Annex 16, Volume I contains the aircraft noise Standards.
- Environmental Technical Manual (Doc 9501) contains the procedures for noise certification of aircraft.





Establishing Technology Standards





ICAO

ENVIRONMENT

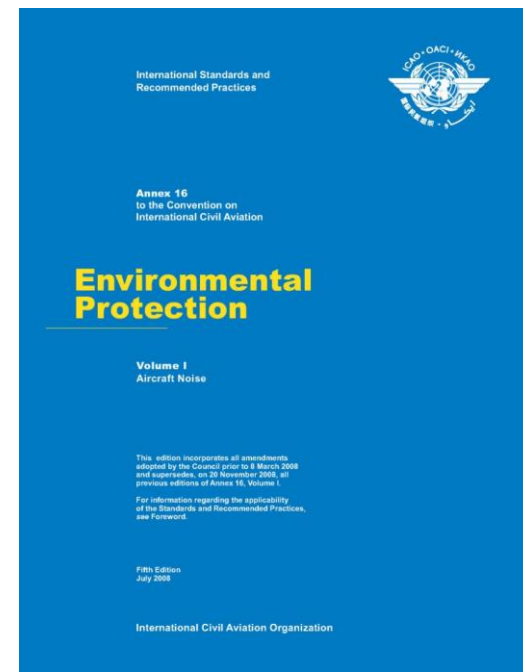
ICAO Noise Standards

Annex 16, Volume I



“The prime purpose of noise certification is to ensure that the latest available noise reduction technology is incorporated into aircraft design demonstrated by procedures which are relevant to day to day operations, to ensure that noise reduction offered by technology is reflected in reductions around airports.”

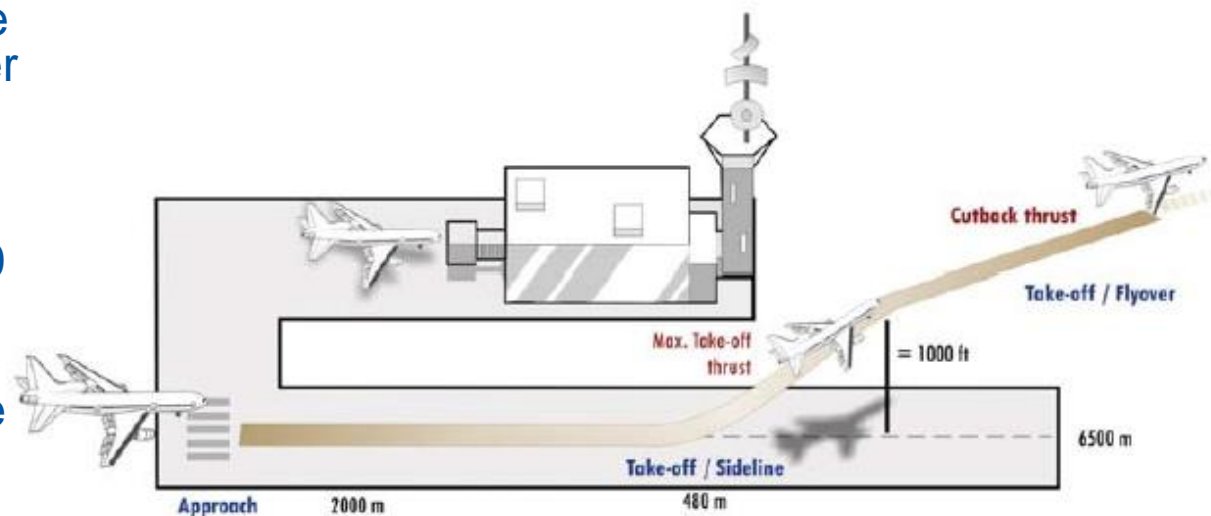
The seventh meeting of the Committee on Aviation Environment Protection (CAEP/7), 2007



Noise Certification Reference Points

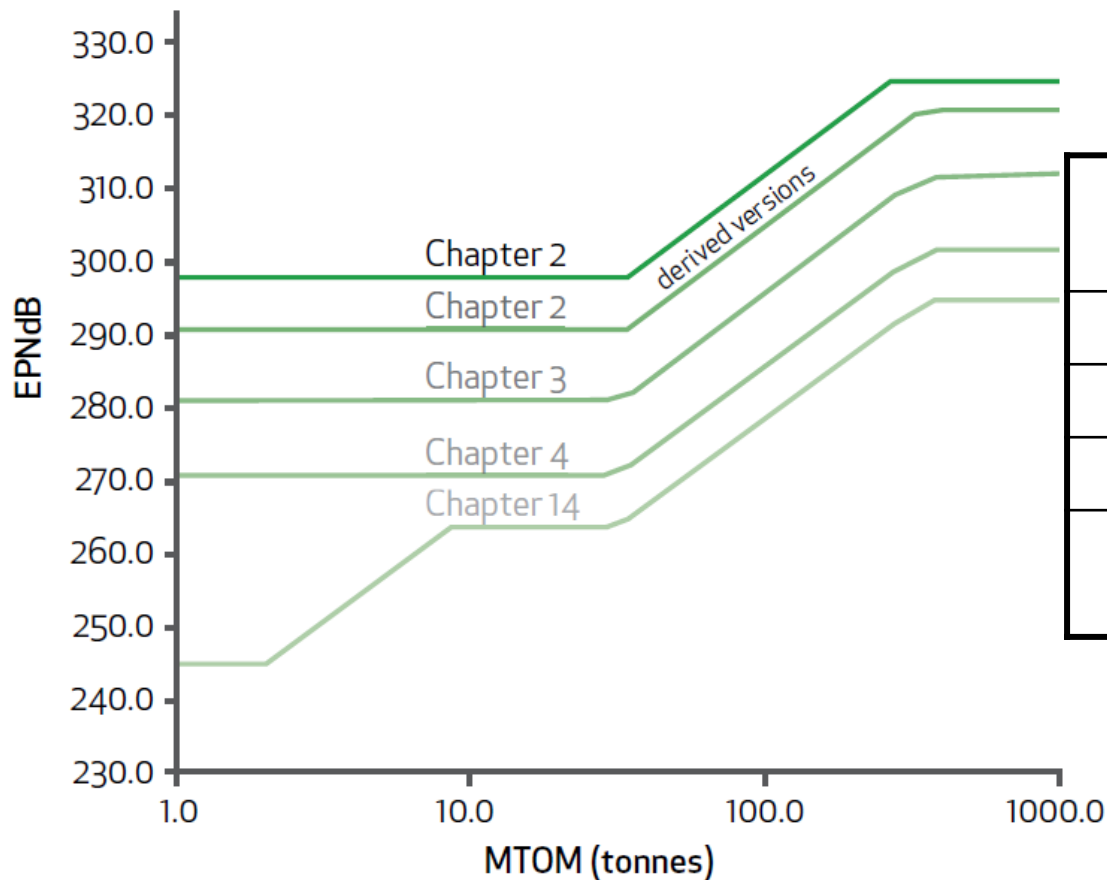
Aeroplane acoustic certification involves measuring the noise level of an aircraft in Effective Perceived Noise Level (EPN) dB at three reference points:

- **Fly-over:** 6.5 km from the brake release point, under the take-off flight path;
- **Sideline:** the highest noise measurement recorded at any point 450 m from the runway axis during take-off;
- **Approach:** 2 km from the runway threshold, under the approach flight path.



Cumulative levels are defined as the arithmetic sum of the certification levels at each of the three points.





Chapter	Applicable Year	Cum Margin (EPNdB)
2	1972	Ch. 3 --16
3	1978	0 (Ref)
4	2006	Ch. 3 +10
14	2017 & 2020	Ch. 3 +17 (Ch. 4 +7)



- Annex 16, Volume I also contains:
 - Standards for Propeller Driven Aeroplanes, Helicopters and Tilt-rotors;
 - Details on: noise monitoring, airport noise assessment and the Balanced Approach to Noise Management;
 - Appendices on the evaluation methods for noise certification;
 - Guidance material on the calculation of noise limits, APU noise, noise documentation administration and land use planning.





ICAO

ENVIRONMENT

ICAO Noise Goals

Independent Experts Review on Noise Technology



- Summarised the status of new technological advances (novel aircraft and engine concepts):
 - Looking at 2020 and 2030 time horizons (e.g. open rotor, geared turbofan, blended wing body, etc)



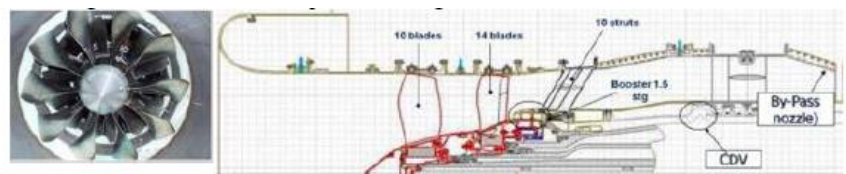
Silent Aircraft Initiative: SAX-40 concept



NACRE Proactive Green Concept



Aircraft configuration for the NASA UHB engine study



Front view and sketch of the reference Ducted Counter Rotating Fan (CRTF)





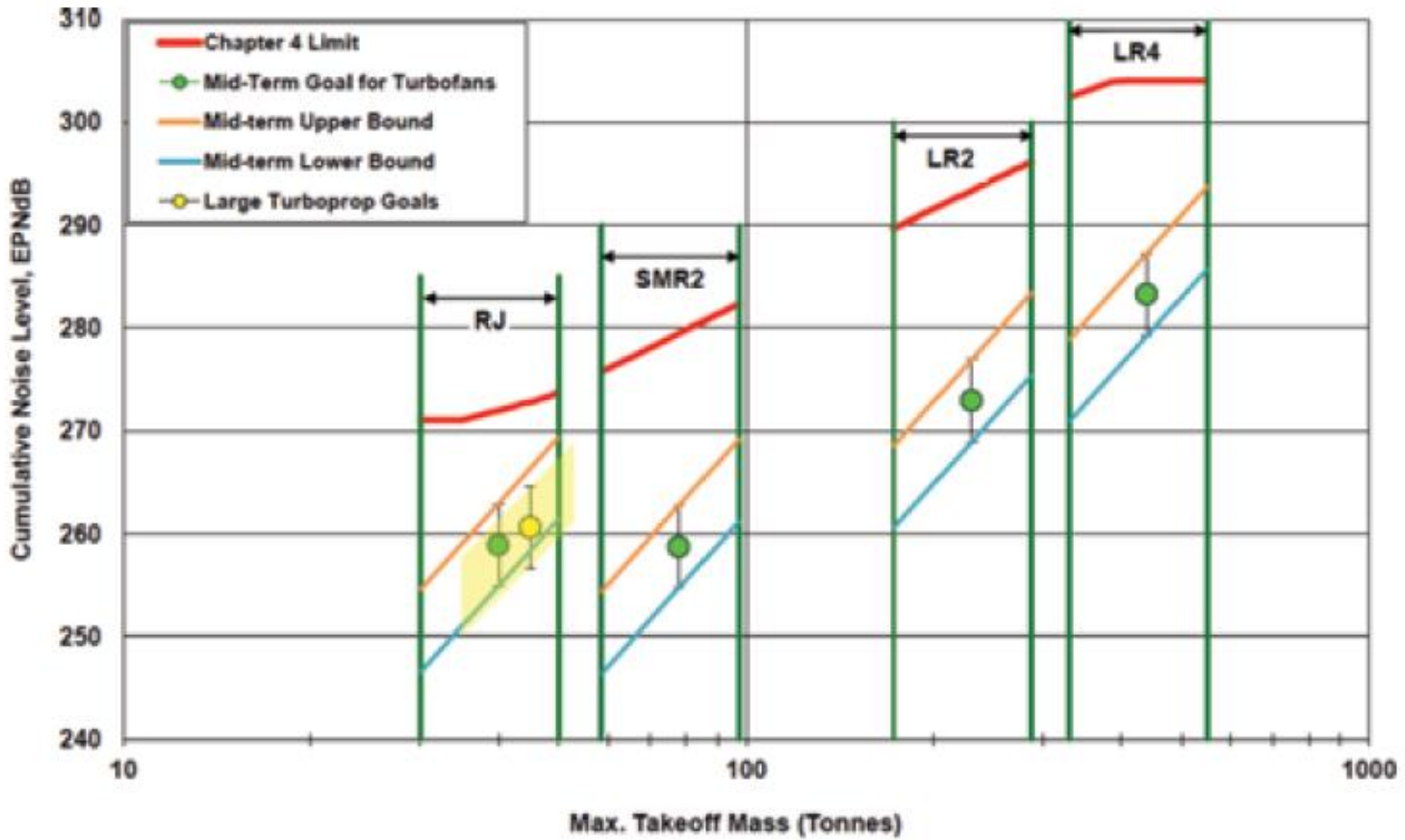
- Assessed the possibility of noise reduction from each technology;
- Commented on the environmental efficiency, and other economic tradeoffs resulting from adopting the candidate technologies;
- Recommended an update to mid-term and long-term technology goals for reducing aircraft noise.





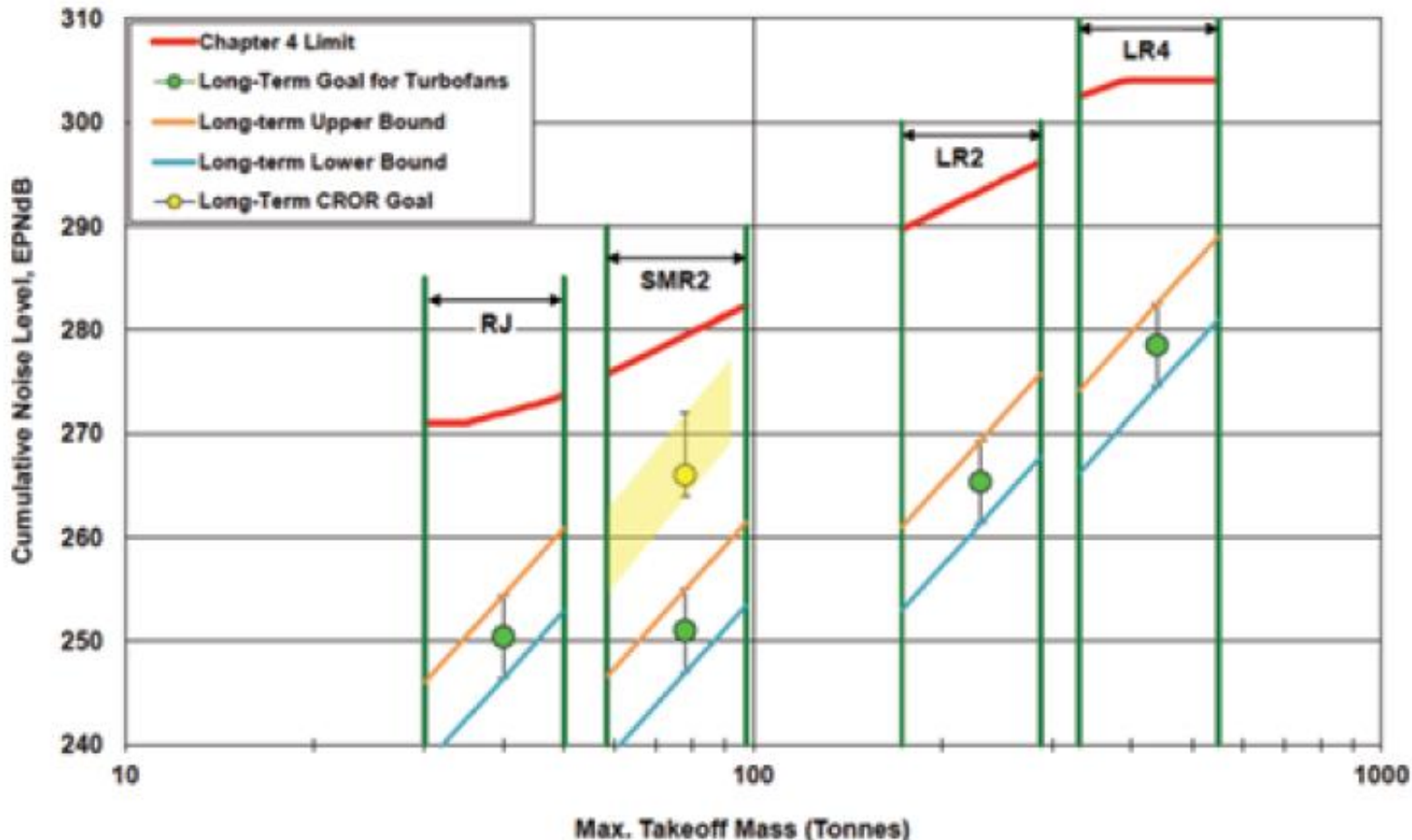
Setting ICAO Noise Goals - Independent Experts Review on Noise Technology

Mid-Term (2020) Cumulative Noise Goals at TRL8 (including Large Turboprops).



Setting ICAO Noise Goals - Independent Experts Review on Noise Technology

Long-Term (2030) Cumulative Noise Goals at TRL6 (including CROR for SMR2).



Second IE review on noise technology published as ICAO Doc 10017





ICAO

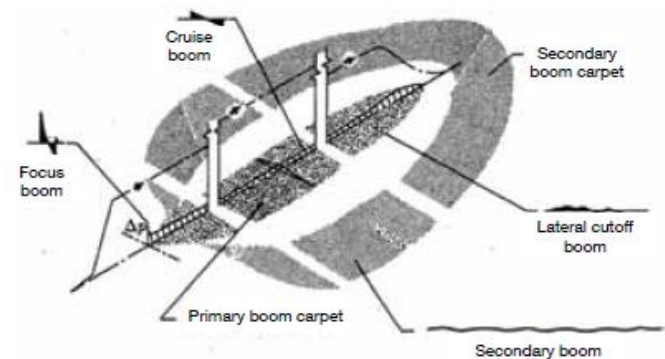
ENVIRONMENT

ICAO Current Noise Work

2013-2016



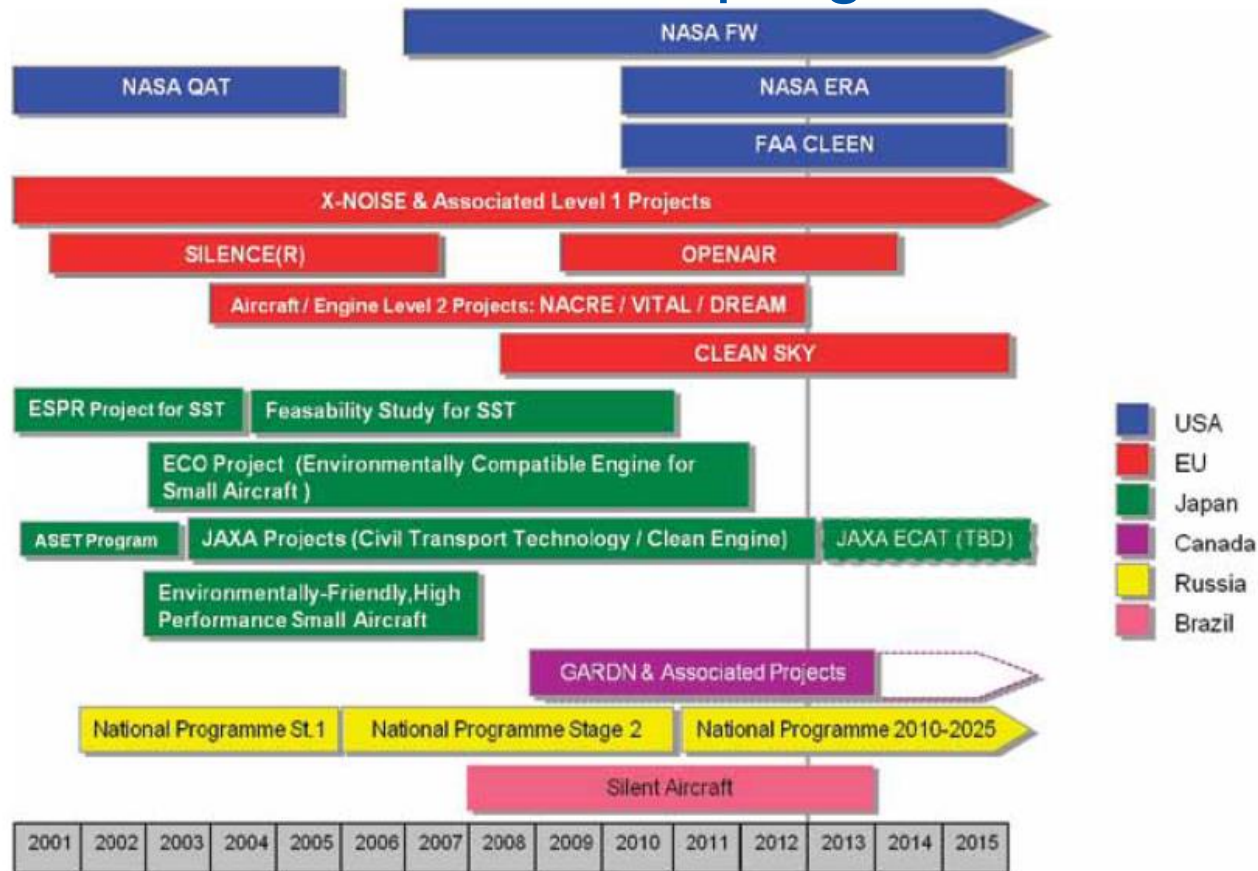
- CAEP (through WG1) continues to maintain and work towards updating Annex 16 during the CAEP/10 cycle.
- Work on interdependencies related to noise and emissions standards.
- Continue to work on noise certification standards for supersonic aircraft.
- Develop a new certification scheme for future supersonic aircraft.



*Main Components of the Sonic Boom Carpet
(from Maglieri and Plotkin, 1991).*



- Monitor research and report on various national and international research programmes.



Committed Major National and Regional Initiatives as of the end of 2012.



- Review data on emerging Subsonic technologies.
- Monitor and report on the status of Supersonic Transport projects.



Supersonic Civil Airplanes: Past (Concorde) and Future (Aerion and Gulfstream) Aircraft.





Establishing Technology Standards

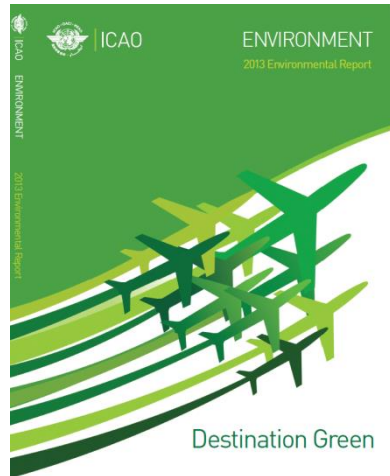


- **ICAO's role is to provide a global forum to develop a commonly-agreed solution among Member States:**
 - Consists of a variety of measures
 - Harmonized and balanced manner.
- **ICAO, through CAEP, will continue to update the Standards for noise in Annex 16, involving:**
 - Monitoring research and technology developments;
 - Review of the latest technology developments;
 - Consideration of the interdependencies.





For more information on ICAO activities on Aircraft Noise...



ICAO Web Page

www.icao.int/

THANK YOU

