

CAEP/9 Working Group 1 Work Programme Following Steering Group 2011-2					
Members: ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, ICCAIA, Italy, Spain, Japan, Nigeria, Russian Federation, UK, USA, Secretariat					
Project Number	Short Title	Description	Target Date	Deliverable	Support
N.01.01	COORDINATION: Technology, operations and goals coordination	Coordinate with other working group Rapporteurs on interdependencies related to technology, operational issues, and goals as well as harmonizing the goal setting process	Ongoing	Coordination	Rapporteurs
N.01.02	COORDINATION: Databases coordination	Coordinate with other working group Rapporteurs on interdependencies related to management and update of noise and emissions databases	Ongoing	Coordination	Rapporteurs
N.01.03	COORDINATION: Environ-mental impacts coordination	Coordinate with other working group Rapporteurs on interdependencies related to environmental impacts, including stringency	Ongoing	Coordination	Rapporteurs
N.01.04	COORDINATION: SST coordination	Coordinate with other working group Rapporteurs on programmes for development of both noise and emissions SARPs for future supersonic aeroplanes	Ongoing	Coordination	Rapporteurs
N.02	Technical issues	Maintain and update Annex 16 Volume I and ETM Volume I	CAEP/9	Proposed changes to Annex 16 Volume I and ETM Volume I	All WG1
N.03	NoisedB	Ensure process integrity and data currency of the ICAO noise certification database	Each WG1 meeting	Up-to-date ICAO NoisedB	All WG1
N.04.01	TECHNOLOGY: Monitor research	Monitor and report on the various national and international research programme goals and milestones	SG3	Report	All WG1
N.04.02	TECHNOLOGY: Technology goals bench-marking	Review progress towards achievement of Technology Goals recommended by IEs for 2018 and 2028.	SG3	Report	All WG1
N.04.03	TECHNOLOGY: new technology	Using the IE process conduct review of new technological advances (e.g., open rotor, geared turbofan, blended wing body, etc.)	Spring 2012 WG1 meeting	Report	All WG1
N.04.04	TECHNOLOGY: Liaise with other IERs	Build upon work done for other IE reviews	Spring 2012 WG1 meeting	Report	All WG1
N.04.05	TECHNOLOGY: IER alignment	Develop common approach on “Realization Factor” and uncertainty estimation for goal setting as well as align goal dates (2020 and 2030)	Spring 2012 WG1 meeting	Report	All WG1

Project Number	Short Title	Description	Target Date	Deliverable	Support
N.05.01	SUPERSONIC: SST standards	Investigate adoption of current subsonic noise rules for supersonic Standards and make recommendations as appropriate	SG3	Report and, if appropriate, proposed changes to the Annex	All WG1
N.05.02	SUPERSONIC: SST monitoring	Monitor, and report on, status of SST projects and expectations for their operation (nature, frequency etc.)	CAEP/9	Report	All WG1
N.05.03	SUPERSONIC: Sonic boom research monitoring	Monitor and report on research to characterize, quantify and measure (including metric) sonic boom signatures and their acceptability while also assisting in promoting and defining such research. Assess the extent of knowledge on sonic boom and decide if it is appropriate to consider drafting Standards for sonic boom.	CAEP/9	Report	All WG1
N.06.01	STANDARDS: Stringency option development	Review and analyze certification noise levels for subsonic jet and heavy propeller-driven aeroplanes. This work will include review of BP database application and content. Based on the analysis, develop a range of stringency options up to 10-12 dB cumulative margin relative to Chapter 4. The stringency options should take into account the margins at each of the 3 certification points. The stringency options shall apply to new aircraft types only, starting 1 Jan 2017 to 1 Jan 2020. No phase out of aircraft should be considered as part of the options investigated. The options considered for the analysis should anticipate more information on new technologies by the end of the CAEP/9 cycle. Other options can be considered following SG1 based on data availability. Any subsequent recommendation should not preclude low carbon technology such as the open rotor.	SG1	Report on stringency options and technology response (market impacts of regulatory levels is product of cost-effectiveness analysis conducted by MDG and FESG)	All WG1
N.06.02	STANDARDS: Interdependencies	Coordinate with WG3 to assess interdependency effects of noise stringency options with respect to CO ₂ /fuel burn and NO _x .	SG1 and when WG3 has provided request	Interdependency effects	All WG1
N.06.03	STANDARDS: Interdependencies	Respond to WG3 requests to assess interdependency effects of CO ₂ emissions stringency options with respect to noise.	SG1 and when WG3 has provided request	Interdependency effects	All WG1

Project Number	Short Title	Description	Target Date	Deliverable	Support
N.06.04	STANDARDS: Growth and replacement database	Review and update the Growth and Replacement (G&R) database for stringency analysis by MDG and FESG. Coordinate with WG3 to ensure consistency in assumptions. (Dec 2011 deliverable to MDG will include updates on project airplanes that changed to in-production and addition of new project airplanes where available as well as including seat class update)	every SG (Final data approval in Dec 2011 WG1 meeting. Data handoff to MDG per 1/1/2012)	up-to-date G&R database	All WG1
N.06.05	STANDARDS: emerging technologies	Review data on emerging technologies.	CAEP/9	supplement to Report in N.06.01	All WG1
N.06.06	STANDARDS: Open rotor	Investigate methodologies for noise certification of aircraft with new engine concepts such as open-rotor, etc.	CAEP/9	Report	All WG1
N.06.07	STANDARDS: Input for low mass analysis	Investigate a structural change to the relevant noise limits in the mass range below 10,000 kg (i.e. amending the lower (flat) portion of the limit) according to the 'double knee' approach. In particular <ul style="list-style-type: none"> · Verify completeness of the G&R database for light aeroplanes, · Define the lower 'knee point' MTOM, · Define the slope of the lower sloped portion, and · Coordinate with MDG and FESG in evaluating the workload associated with incorporating a structural change to the limits. 	18-Jan-11 (3 Weeks Before FESG)	WG1 Working Paper to MDG and FESG with the WG1-proposed change to the structure of the noise limits	
N.06.08	STANDARDS: Low mass structure change	Propose a change to the structure of the relevant noise limits for low mass aeroplanes in combination with the already approved stringency options. (It is assumed that the results of the cost/effectiveness analyses on this issue by MDG and FESG will be included in their main report).	SG2	WG1 Paper for SG	
N.06.09	STANDARDS: Noise reduction technologies	If needed, report on potential for using ANDES beyond 2 dB for in production aircraft and up to 1 dB for project aircraft. If requested by FESG and MDG in order to resolve lack of compliant aircraft in certain seat classes at higher stringency scenarios	SG3	Report	All WG1
N.06.10	STANDARDS: Unintended mission change	Support MDG and FESG in addressing unintended changes of mission (range, seating capacity) or propulsion format.	SG3	Contribution to cost effectiveness report of MDG/FESG to SG3	All WG1

Project Number	Short Title	Description	Target Date	Deliverable	Support
N.06.11	STANDARDS: Production rates	Support MDG and FESG in assessing the feasibility of production rates required for various higher stringency scenarios, including special considerations for project aircraft certification, production and delivery.	SG3	Contribution to cost effectiveness report of MDG/FESG to SG3	All WG1
N.06.12	STANDARDS:Cost impact to in-production airplanes	Support FESG in analyzing the cost impact due to in-production aircraft failing various stringency scenarios	SG3	Contribution to cost effectiveness report of MDG/FESG to SG3	All WG1

CAEP/9 Working Group 2 Work Programme

Members: ACI, Brazil, Canada, CANSO, EC, EUROCONTROL, Egypt, Germany, IATA, ICCAIA, Italy, Singapore, Spain, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
O.01.01	Independent Expert Operational Goals review	Using the IE process, carry out a robust Air Traffic Operational review (as outlined Appendix H), and make recommendations for operational goals for noise and fuel burn in the mid term (10 years) and the long term (20 years), using information and results from the limited CAEP/8 review, following a process similar to those of WG1 and 3, and addressing issues identified at SG/2009 and in the CAEP/8 IE report.	see O.01.02 and O.01.03	see O.01.02 and O.01.03	All WG2 Members
O.01.02	Independent Expert Operational Goals review (Action Plan) COMPLETE	Develop an action plan and schedule (based on CAEP/8 Report, Appendix H) for addressing issues raised by CAEP/SG and IEs, and conducting a more robust IE process	SG 2010	Action plan and schedule for addressing issues raised by CAEP/SG and IEs, and conducting a more robust IE process	All WG2 Members
O.01.03	Independent Expert Operational Goals review (Report)	Facilitate an IE review including: a) Generate the guidance, information and material needed for the IE process; b) Hold a workshop and the IE Review; c) Hold follow-on meetings and regular telecons with the IEs to facilitate IE assessment and formulation of findings and report. This could involve providing additional information to the IEs. This task will include harmonising the processes and planning (e.g., base year) for operational goal setting with other IE processes to the extent possible. Coordination with WG3 ad-hoc group on CASFE (E.04) on metrics for operational goals.	SG 2012	IE Report on recommendations for noise and fuel burn with respect to air traffic operational goals in the mid term (10 years) and the long term (20 years)	All WG2 Members
O.02.01	Operational Opportunities to reduce fuel burn and emissions GM (Initial Chapters) COMPLETE	Refine the 4 draft chapters submitted to CAEP/8 (Chapter 2 - Airport Operations, Chapter 6 - Air Traffic Management, Chapter 7 - Non-Revenue Flying, and Chapter 12 - The Effect of Load Factor on Fuel Efficiency) to address outstanding comments and ensure the documents are harmonized with other ICAO provisions and industry best practices	Aim for SG 2010	4 Completed Chapters for SG approval Make 4 completed Chapters publically available by SG2012	All WG2 Members

O.02.02	Operational Opportunities to reduce fuel burn and emissions GM (Completion)	Complete updates to the Circular 303 guidance material initially via the ad hoc group approach utilized at the end of the CAEP/8 work cycle. This task will include informally briefing the ANC on progress.	Aim for SG 2012, depending on resources available	Completed draft final guidance material for SG approval	All WG2 Members
O.03.01	CNS/ATM Environmental Assessment High-Level Principles (Program Plan) COMPLETE	Draft a Program Plan to develop CNS/ATM environmental assessment guidance material. The plan should include compiling information on environmental assessment current best practices and identifying high-level principles to inform States, airports, ANSPs, and others.	SG 2010	Program Plan	All WG2 Members
O.03.02	CNS/ATM Environmental Assessment High-Level Principles (Guidance)	Develop CNS/ATM environmental assessment guidance material by compiling information on environmental assessment current best practices and identifying high-level principles to inform States, airports, ANSPs, and others. The task will be focused in scope on environmental impacts assessment (including both engine emissions and noise) related to proposed operational procedures changes, airspace redesigns, and other similar operational aspects. a) The task will develop approach/methodology and metrics coherently, rather than treating them as separate guidance tasks as in CAEP/8; b) The principles must be high-level and flexible to account for state-specific requirements and needs with respect to methodologies and metrics; c) The best practices should be requested directly from ANSPs and others as appropriate for use in developing the guidance material; d) The high-level principles will seek to identify information to populate proposed metrics and/or to validate or apply assessment methodologies	Complete main document and Appendices 1, 2, 3, 4 and 6 by SG 2012 Target the development of Appendix 5 by SG2012	Guidance material	All WG2 Members
O.04	Task Coordination	The "operations" tasks will be coordinated within CAEP as necessary (e.g., WG1, WG3, MDG, FESG), Secretariat, external expert groups (e.g., CANSO), and external international initiatives (e.g., AIRE, ASPIRE). Liaisons from these groups will be encouraged to participate.	Ongoing	Coordination	All WG2 Members

CAEP/9 Working Group 3 Work Programme

Members: ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Italy, Japan, Netherlands, Nigeria, Russian Federation, Singapore, Spain, Sweden, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.01	Interdependencies	Co-ordinate with other working group Rapporteurs on interdependencies related to (a) technology, operational issues and goals (b) management and update of noise and emissions databases (c) environmental impacts (d) SARPs for future SST aircraft.	Ongoing	Coordination report for each SG	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat
E.02	Technology Goal: Fuel Burn COMPLETE	Using the IE process, carry out a Fuel Burn Improvement Technology review and make recommendations for technology goals and any necessary metric for timelines to be consistent with other working groups and UNFCCC	SG2010	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.03	Technology Goal: NOx	Dependent on demonstrable need and available resources, using the IE process, review progress towards achievement of NOx Technology Goals already set for 2016 and 2026; and, if requested, make recommendations for technology goals for timelines to be consistent with other working groups and UNFCCC.	There will not be an IE review during CAEP/9 cycle	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat
E.04	Fuel Efficiency metrics (Fleet level)	Continue scoping and development of fuel/CO2 efficiency metrics for specific application to CAEP work, including business aircraft, including the GIACC “Net CO2 Intensity Metric” and the CASFE metric	During CAEP/9	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat
E.05	Alternative fuels & emissions	Examine and report on the emissions consequences resulting from the use of alternative fuels for aviation [both ‘drop-in’ replacements and ‘non-drop-in’]. Does not include lifecycle CO2 emissions.	During CAEP/9	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.06	Fuel composition & emissions	Monitor trends in aviation kerosene fuel supply composition and assess consequences for emissions.	During CAEP/9	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat
E.07	Technology advances	Provide assessment of advances in aircraft and engine design technologies for subsonic aircraft and the degree to which these technologies could influence gaseous emissions, smoke, particulate matter and fuel consumption; including the potential benefits and trade-offs amongst various emissions and noise, the likely timescales for introduction.	CAEP/9	a stand-alone report or as part of a goal review.	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat
E.08.01	CO ₂ - Emission Standard (aircraft)	<p>Conduct broad analysis to develop metric and methodology for a certification requirement pertaining to an aircraft CO₂ emissions standard.</p> <p>Plans for future work to develop the Standard:</p> <ul style="list-style-type: none"> • 2nd half Nov. – CO₂TG progress telecom with CAEP Members • Feb. WG3 Meeting – Metric System decision • 2nd half Feb. – CO₂TG progress telecom with CAEP Members 	SG2012	Progress report on work to develop the certification requirement; plans for future work to develop the standard	ACI, Brazil, Canada, China, EC, Egypt, Germany, IATA, ICCAIA, ICSA, Italy, Japan, Netherlands, Singapore, Spain, Sweden, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.08.02	CO2 - Emission Standard (aircraft)	Develop stringency proposals, including technology responses, regulatory levels and applicability and dates for evaluation of cost effectiveness and market impacts by FESG and MDG	CAEP9	Inputs for Cost effectiveness analysis	ACI, Brazil, Canada, China, EC, Egypt, Germany, IATA, ICCAIA, ICSA, Italy, Japan, Netherlands, Singapore, Spain, Sweden, UK, USA, Secretariat
E.08.03	CO2 - Emission Standard (aircraft)	Recommend an aircraft CO ₂ emissions standard including applicability	Aiming for 2013, adjusting programme plans as necessary to ensure quality and effectiveness	Aircraft CO ₂ emissions standard	ACI, Brazil, Canada, China, EC, Egypt, Germany, IATA, ICCAIA, ICSA, Italy, Japan, Netherlands, Singapore, Spain, Sweden, UK, USA, Secretariat
E.09	Interdependencies	Coordinate with WG1 to assess interdependency effects of CO ₂ emissions stringency options with respect to noise	As required	Assessments as needed	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.10	Interdependencies	Respond to WG1 requests to assess interdependency effects of noise stringency options with respect to CO2/fuel burn and NOx	As required	Assessments as needed	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat
E.11	Annex 16, Vol. II maintenance	Maintain Annex 16, Volume II, taking account of updates to SAE-E31 documentation	CAEP/9	Proposed Annex changes	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat
E.12	ETM maintenance	Maintain the emissions Environmental Technical Manual;	CAEP/9	Proposed ETM changes	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.13	Emissions Database maintenance	Maintain the ICAO engine emissions certification databank.	on-going	up-to-date databank	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat
E.14	G&R database maintenance	Review and update a "Growth & Replacement" database in order to support development of models used to populate future fleets and the replacement of retired aircraft. Coordinate with noise group to ensure consistency in assumptions.	During CAEP/9	up-to-date G&R databank	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat
E.15.01	NOx cruise - Climb relationship	Review the LTO NOx - cruise climb NOx relationship for staged combustion technologies, to quantify control of mission emissions of NOx, and identify any methodology issues with respect to the correlation between LTO and climb/cruise.	During CAEP/9	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.15.02		In addition monitor the need for the possible further development of the LTO NOx - cruise climb relationship for other future engine technologies to quantify control of mission emissions of NOx			ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat
E.16	Certification Requirements - SST	Review and revise as appropriate the existing methodology and requirements for supersonic aircraft engine certification	During CAEP/9	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat
E.17	Certification requirements - new engine concepts	Develop methodologies for emissions certification of new engine concepts such as open-rotor, etc	During CAEP/9	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Russian Federation, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
E.18.01	PM - Non-volatile	Evaluate and document sampling and measurement methodologies for aircraft engine non-volatile PM emissions. Note input from SAE-E31	Early CAEP/10 cycle	Certification requirement	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat
E.18.02		Develop an aircraft engine based metric and methodology for application as a non-volatile PM emissions certification requirement for new engine types.			ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK.
E.19	PM - volatiles	Evaluate and document sampling and measurement techniques to characterise the formation of volatile PM; Note input from SAE-E31	CAEP/10	Report	ACI, Brazil, Canada, China, EC, Egypt, France, Germany, IATA, IBAC, ICCAIA, ICSA, Japan, Nigeria, Switzerland, UK, USA, Secretariat

CAEP/9 FESG Work Programme

Members: ACI, Brazil, Canada, EC, Germany, IATA, ICCAIA, ICSA, Netherlands, Nigeria, Norway, Singapore, Spain, Switzerland, UK, USA, Secretariat

Project Number	Short Title	Description	Target date	Deliverable	Support
F.01	Review of Economic Models	Review of economic models as needed for the CAEP/9 analyses	During CAEP/9	Report	All FESG Members
F.02	Cost-effectiveness analysis of potential noise stringency options	<p>Conduct the cost-effectiveness analysis of potential noise stringency options under consideration for CAEP/9 (including impacts on passengers, airports, airlines, etc.) as directed by SG2.</p> <p>In addition, conduct sensitivity analyses to assess the potential impacts (including fleet asset value) of the announcement date of a new standard (taking into account the applicability date) given the proximity of the adoption of two consecutive standards.</p> <p>Work in coordination with WG1, WG3 and MDG to:</p> <p>i. Assess the extent to which the fleet evolution process employed in the noise stringency analysis may have resulted in an unintended mission change by quantifying the payload/range capacity provided by seat class, route and stringency scenario and compare results to the FESG CAEP/8 route-specific forecasted demand.</p> <p>ii. Re-examine the applicability of the fuel burn scaling factor by modelling full flight fuel burn.</p> <p>iii. Assess the production rates required to provide the project and in-production aircraft projected for the stringency scenarios.</p> <p>iv. Develop and test a fleet evolution process that constrains the available fleet within reasonable production rates.</p> <p>v. Investigate and address the equal market share assumption using a market driven process that provides the most cost effective aircraft that meets the FESG CAEP/8 forecasted demand.</p>	SG3	Report	All FESG Members
F.03	Cost-effectiveness analysis of potential CO ₂ policy options	Cost-effectiveness analysis of potential CO ₂ policy options under consideration for CAEP/9	During CAEP/9	Report	All FESG Members
F.04	Review of FESG CAEP/8 forecast COMPLETE	Conduct a comparison of the CAEP/8 forecast with actual data	SG1	Report	All FESG Members

F.05	Assessment of the potential impact of constraints	Conduct a study on the potential impact of constraints on forecasting results	During CAEP/9	Report	All FESG Members + MDG
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CAEP/9 MDG Work Programme					
Members: ACI, Brazil, Canada, EC, France, Germany, IATA, ICCAIA, ICSA, Japan, Netherlands, Russian Federation, Spain, Switzerland, UK, Ukraine, USA, Secretariat					
Item Number	Short Title	Description	Target date	Deliverable	Support
M.01	Interdependencies	Coordinate with other working group Rapporteurs on interdependencies related to technology, operational issues, goals, environmental impacts and management and update of noise and emissions databases.	Ongoing	Coordination	All MDG
M.02	Noise Stringency	Conduct policy option analyses of the environmental benefits and interdependencies of a potential noise stringency as directed by CAEP and SG.	CAEP/9	Report on policy option analyses results	All MDG
M.03	CO ₂ Standard	Coordinate with other working groups with regard to preparing for policy option analyses of the environmental benefits and interdependencies of a potential CO ₂ standard as directed by CAEP and SG.	CAEP/9	Progress Report	All MDG
M.04	ICAO Environmental Goals Assessment	To support ICAO Environmental Goals and HLM Recommendation 9, conduct an updated GHG assessment, for the baseline case (both 2005 and 2006) and forecasts, and for various cases which consider technology and operational improvements. Assemble available data on alternative fuels life cycle for consideration in the CAEP/9 assessment.	During CAEP/9	Report on fuel burn, fuel efficiency and CO ₂ trends	All MDG
M.05	Model and database management	Model and Database management. Maintain version control of models and databases to be used in support of specific CAEP analyses. Determine if updates to models or databases require a re-evaluation. Model evaluation may now include dispersion and consideration of particulate matter.	During CAEP/9	List of model and database versions	All MDG
M.06	Summarize Capabilities	If new models are introduced to support CAEP/9, continue the candidate model evaluation process initiated in the previous work program, which calls for sensitivity tests, comparisons with “gold standard data, and sample problems. Refine the process as appropriate on the basis of relevant criteria, to better inform CAEP which tools are sufficiently robust, rigorous and transparent, and appropriate for which analysis, and why there might be differences in modelling results.	During CAEP/9	Report	All MDG
M.07	Updated Databases	Working with the appropriate working groups, develop updated databases, as required	By Steering Group 2	Databases	All MDG

Item Number	Short Title	Description	Target date	Deliverable	Support
M.08	Document 9911	Review and update ICAO Document 9911, as appropriate.	CAEP/9	Report	All MDG
M.09	Fuel Burn Reporting	Seek to improve modelling and State reporting of fuel burn data by conducting a comparative assessment of modelled and reported data, as reported data becomes available.	CAEP/10	Report	All MDG
M.10	CAEP Support	Provide support to CAEP Secretariat in dissemination of MDG results.	CAEP/9	As Required	All MDG
M.11	LAQ Guidance COMPLETE	Finalize the mitigation and interdependencies chapters of the air quality guidance manual.	By Steering Group 1	Report	All MDG

CAEP/9 ISG Work Programme

Members: Dr. Lourdes Maurice and Prof. David Lee. Additional scientific experts to be nominated following the finalization of the Terms of Reference. The following CAEP members and observers have offered their support, subject to nomination: ACI, Brazil, Canada, IATA, ICCAIA, Norway, UK, USA

Project number	Short Title	Description	Target date	Deliverable	Support
I.01.01	Coordination (internal group)	Coordination on activities	Ongoing	Coordination	FAA (LM), UK (MMU, DSL)
I.01.02	Coordination (internal ICAO)	Coordination with other WGs, TFs, RFPs, etc. Rapporteurs and Secretariat on activities	Ongoing	Coordination	FAA (LM), UK (MMU, DSL), WG Rapps, Sec.
I.01.03	Coordination (external)	Consultation with experts from external agencies (e.g. WHO, WMO, IPCC, UNFCCC, etc.)	Ongoing	Consultation	<u>Principally</u> FAA (LM), UK (MMU, DSL), <u>Also</u> relevant core science impacts experts
I.02.01	Group task development	Review CAEP work programme and identify critical science needs	SG1 to 3	WP to SG	FAA (LM), UK (MMU, DSL), relevant core science impacts experts
I.02.02	Group task development	Review with co-rapps on implementation possibilities arising from Impacts Workshop	SG1	WP to SG1	FAA (LM), UK (MMU, DSL), WG Rapps, Workshop clim, AQ, noise, interdependencies co-chairs

I.02.03	Group task development COMPLETE	Development of TORs, modus operandi to clearly define the scope of the work programme of the ISG.	SG1	WP to SG1	FAA (LM), UK (MMU, DSL), WG Rapps, Workshop clim, AQ, noise, interdependencies co-chairs
I.03.01	Climate context (CO ₂)	Development of underlying science thinking on aviation within context of UNFCCC discussions and other national/regional climate initiatives to inform ICAO-CAEP	SG2	WP to SG2	FAA (LM), UK (MMU, DSL), relevant core science impacts experts
I.03.02	Climate context (non-CO ₂)	Coordination of non-CO ₂ issues for consensus science to inform ICAO-CAEP	SG2, 3	WPs to SG2, SG3	FAA (LM), UK (MMU, DSL), relevant core science impacts experts
I.03.03	Local and surface air quality context	Development of thinking on aviation impacts and relevance to CAEP activities	SG2, 3	WPs to SG2, SG3	FAA (LM), UK (MMU, DSL), relevant core science impacts experts
I.03.04	Noise context	Development of thinking on aviation impacts and relevance to CAEP activities	SG2, 3	WPs to SG2, SG3	FAA (LM), UK (MMU, DSL), relevant core science impacts experts
I.03.05	Interdependencies context	Development of thinking on aviation impacts and relevance to CAEP activities	SG2, 3	WPs to SG2, SG3	FAA (LM), UK (MMU, DSL), relevant core science impacts experts

I.04.01	Monitoring, Reporting, and Verification (MRV)	Review IPCC guidance to identify appropriate standard methodologies to measure/estimate, monitor and verify global GHG emissions from international aviation. Define the scope and resources necessary for a task that would propose methodologies and a mechanism to carry out such measurement/estimation, monitoring, and verification.	SG2	Report to SG2 on relevant IPCC guidance and definition of scope/resources required for the task	
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CAEP/9 ACCS Work Programme

Members: Australia, Brazil, Canada, IATA, ICCAIA, ICSA, Poland, Sweden, Secretariat

Project number	Short Title	Description	Target date	Deliverable	Support
C.01	ICAO Fuel Consumption Form COMPLETE	Provide CAEP comment and recommendations on the proposed fuel data collection form	Mar-10	Report and recommendations to the Statistics Division	All members
C.02	Enhancements to passenger Carbon Calculator	Refine the methodology and database associated with the passenger Calculator by (a) updating the current database (b) updating the methodology and underlying data sources using flight level global emissions inventories generated by AEDT/SAGE, AEM III, Aero 2k and FAST, and (c) transiting from modelled to measured values using measured fuel consumption data at the city pair level from industry bodies.	During CAEP/9	Enhancements to Carbon Calculator	All members
C.03	Estimating CO ₂ emissions from air freight	Develop <i>Frequently Asked Questions</i> text for the ICAO website, on the difficulties of accurately estimating the CO ₂ emissions attributable to air freight at this time. As a next step, develop a set of non-binding guidelines to enable interested parties to develop a carbon calculator methodology for belly freight.	During CAEP/9	Text and Guidelines for inclusion on ICAO website	All members
C.04	Explore ways to collect data on offsetting and its use	Report on ways in which ICAO could collect data on the quantity of offsetting associated with air travel and how such data would be used by ICAO.	SG3	Report	All members
