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INTERNATIONAL CIVIL AVIATION ORGANIZATION

Green Agenda

CAEP/8 Makes Progress on Aviation's Noise and Climate Objectives in Advance of the 37th Assembly

State Profile Features:
United Arab Emirates and Malaysia

Also in this issue:
Alternative Fuels: Defining Practical Options • AIRE initiative
EUROCONTROL High-level Environment Statement • MIDANPIRG Update
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Vol. 65, No. 3

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CORRECTIONS

In *ICAO Journal* 06, 2009 (Vol.64, No.6), the table on page 8 reflecting IATA ITQI Aircraft Demand projections should have read "32,000" for 2026, rather than "2,000".

On page 32 in *ICAO Journal* 01, 2010 (Vol.65, No.1), the term "Arabian Gulf" should be replaced by "Persian Gulf".

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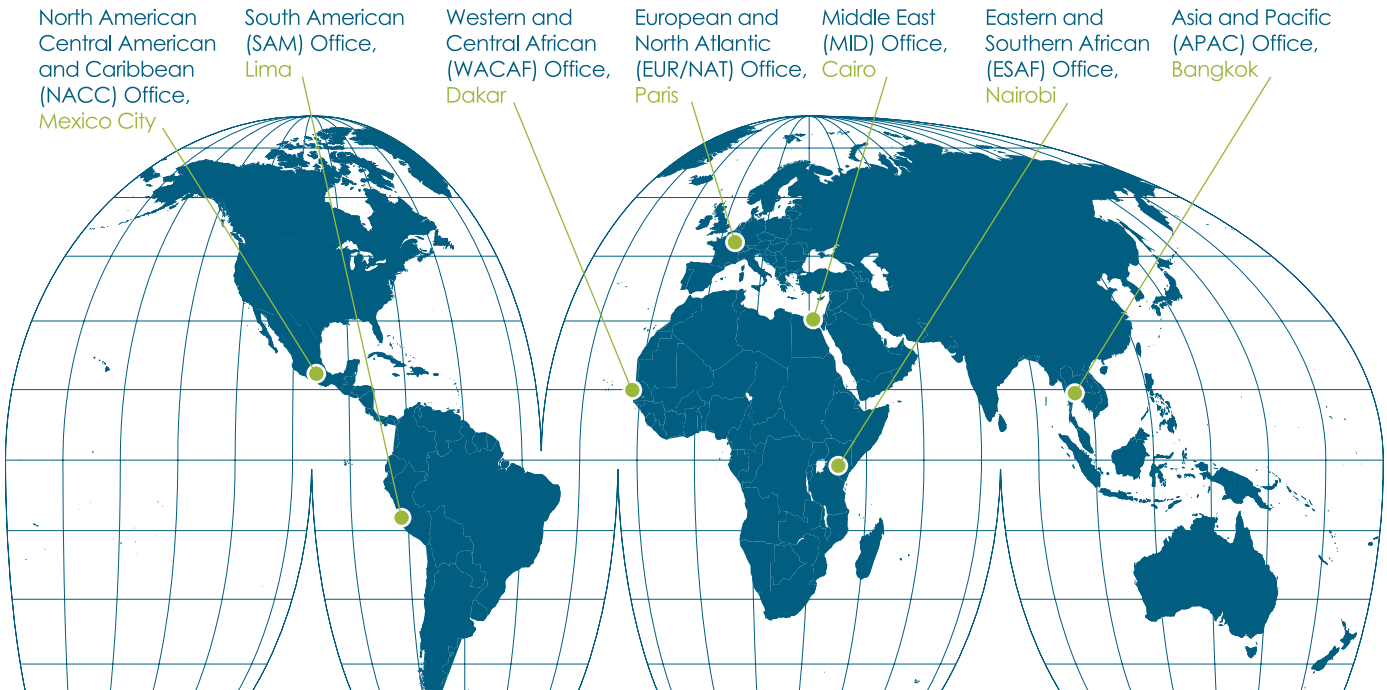
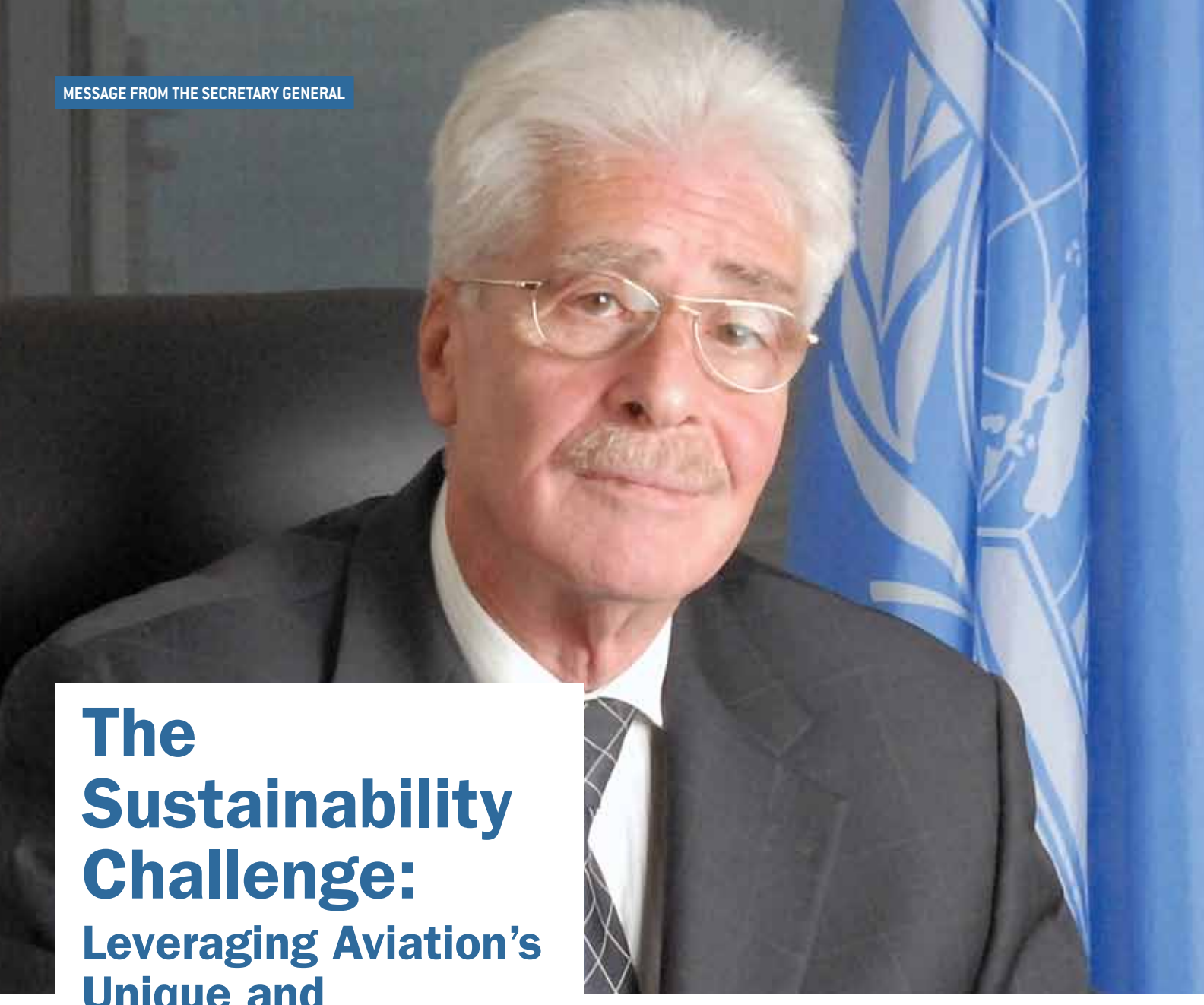
ICAO's Global Presence





The Sustainability Challenge:

Leveraging Aviation's Unique and Historic Ability to Drive International Consensus and Cooperative Action

It has become undeniable that our planet and our species have reached a serious crossroads. In one direction lies waste and ruin, parched soils and starving populations.

In the other direction lies a sustainable future for earth and humanity.

But what does it mean to be truly sustainable? In a basic sense it means that we can no longer expect to take more from systems than we put into them. We must learn to manage our march to progress on the basis of a more determined and focused global consciousness.

As members of the air transport community, the mantle of leadership in achieving global consensus and cooperative, harmonized action rests firmly on our shoulders. Our sector has demonstrated a unique ability to place parochial concerns in context and to transcend borders and cultures in a spirit of cooperative respect and shared achievement.

The result is one of the world's greatest and truly global creations: a system of safe, effective transportation that unites all of our peoples as never before, a driver of economic development and prosperity in all Regions and, perhaps most importantly today, a shining example of how humanity can set aside narrow interests in the pursuit of the greater good.

Aviation is responding to this leadership challenge with precisely the degree of responsibility that is expected of it. At the heart of our task lie the aircraft emissions that still grow as our sector grows, and which ICAO and other stakeholders are now working systematically to manage and limit in line with our environmental imperative.

ICAO's strategy for responding effectively to environmental concerns is largely predicated on the remarkable progress achieved by the world aviation community since the 36th Assembly in 2007. The recognition by Member States attending the Assembly of the urgent need to address aviation emissions that contribute to climate change was both clear and forceful.

An important next stage in ICAO's development of a uniform environment strategy was achieved at last October's High-level Meeting (HLM) on International Aviation and Climate Change. The HLM agreed on a series of measures that could be implemented by governments, working together with industry and concerned stakeholders, to help reduce the impact of aviation on the global climate. In a strong show of unanimity, ICAO Member States, representing more than 93 percent of global commercial air traffic, produced the first globally-harmonized agreement to address climate impacts from a specific industry sector. Among the highlights of this landmark agreement are:

- A two percent annual improvement target in fuel efficiency globally until the year 2050.
- A decision to develop global CO_2 standards for aircraft.
- A framework for market-based measures for international aviation.
- Measures to assist developing States and facilitate access to financial resources, technology transfer and capacity-building.
- Collection and submission of international aviation emissions data to ICAO.
- Continued work on alternative fuels for aviation.

Regarding this last point, an ICAO global framework on the development and implementation of alternative fuels for aviation worldwide was also adopted in 2009, positioning air transport to be the first sector to employ sustainable alternative fuels on a global basis. Many carriers around the world are now beginning to test and move forward this essential requirement on the flight path to aviation climate responsibility, with some recent examples highlighted in the alternative fuels feature article found on page 14.

Another accomplishment of the HLM that is shaping air transport's global environmental strategy is an agreement to continue working on medium- and long-term goals for more ambitious objectives, such as carbon-neutral growth and concrete emissions reductions. This process takes into account the special circumstances and respective capabilities of developing countries and the sustainable growth of the industry while avoiding specific obligations for States.

These achievements, further supported by an HLM cooperative agreement to share Action Plans and a Declaration which unambiguously reaffirmed ICAO Member State commitments to address aviation-related emissions, generated a momentum on environmental issues which I'm happy to report carried through to the Eighth Meeting of ICAO's Committee on Aviation Environmental Protection (CAEP), held this past February.

CAEP represents aviation's pre-eminent Committee addressing international air transport environmental challenges. At CAEP/8, participants committed to a timetable for the development of a CO_2 Standard for commercial aircraft, aiming for the present time at 2013. This would be a true milestone that would establish the first global fuel-efficiency standard for any industry sector.

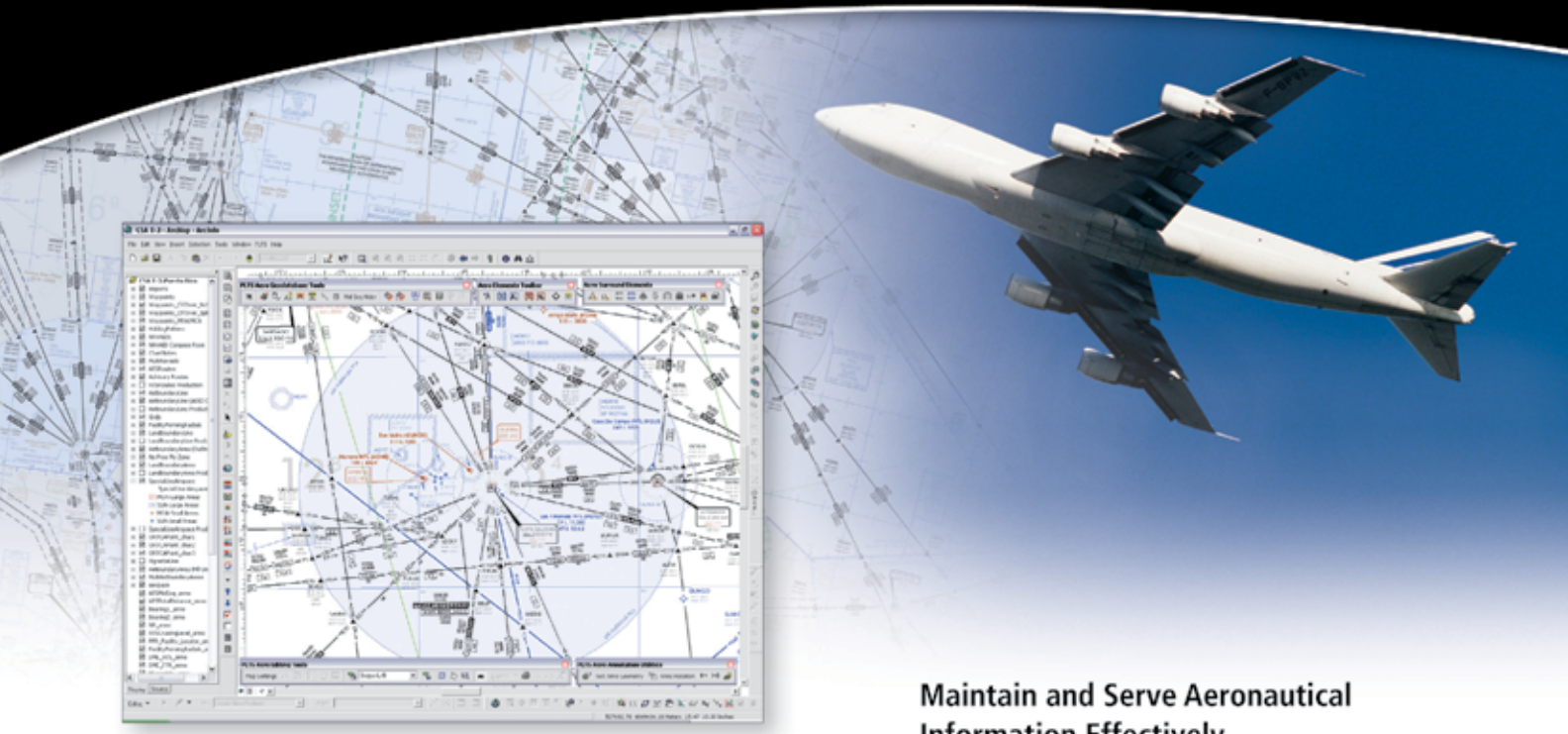
CAEP/8 also recommended NO_x (Nitrogen Oxide) standards up to 15 percent more stringent than the current levels, applicable to new aircraft engines certified after 31 December 2013. A cut-off date of 31 December 2012 was also recommended for engines produced under existing NO_x standards.

Together, these two recommendations would help to ensure that only the most efficient technology is used in the production of aircraft engines in the near and foreseeable future. You can find a more detailed presentation of the process and achievements that have underscored the CAEP's progress in this area on page 6 of this issue.

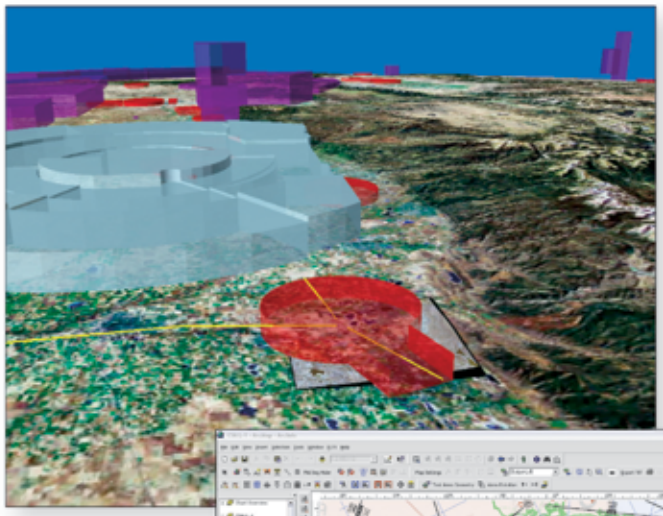
All of these recent accomplishments, coupled with the additional ICAO policies and guidance related to environmental protection and the publishing in 2010 of the second *ICAO Environmental Report*, underscore the role of ICAO as both an important supporter of its respective Member States and a leader of international air transport and environmental progress. All of our Bureaux are now working toward the realization of these goals and all have a share in these achievements.

It's my conviction that ICAO's history and the worldwide nature of the air transport sector have shaped the Organization to uniquely address the consensus and progress on climate change now urgently required of all nations and peoples of the world. I am proud of the accomplishments our Member States have delivered thus far, and I look forward to the additional leadership in this domain that will doubtless be on display at the 37th Assembly this fall. ■

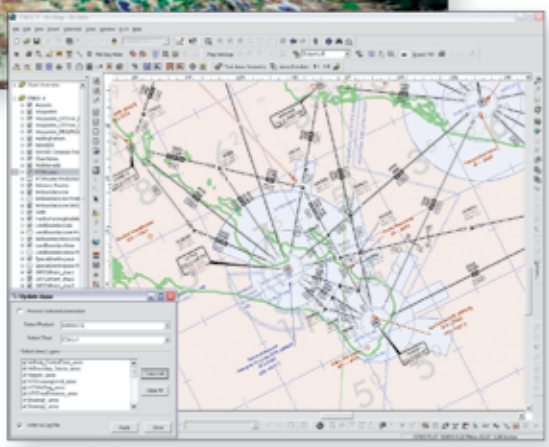
GIS—Modernizing Aeronautical Information Workflow



Maintain current aeronautical information.



3D Visualization



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CAEP/8

Delivering Substantial Proposals to Help Minimize Aviation's Effects on the Environment

CAEP/8, held in February 2010, featured a challenging agenda covering an update of NO_X Standards, a review of progress on CO_2 and Particulate Matter (PM) Standards, and an agreement on priorities over the next work cycle.

As ICAO Environment Chief Jane Hupe reports, the excellent results of the Eighth Meeting of the Committee on Aviation Environmental Protection (CAEP) represent another solid step towards the achievement of ICAO's environmental goals. Through the CAEP process and related activities, the Organization continues to move environmental issues forward with high priority, delivering concrete and actionable results that will help lead international aviation toward a sustainable future.

Jane Hupe is the Environment Chief, in ICAO's Air Transport Bureau. She provides advice to the Organization on aviation related environmental matters; cooperates with UN bodies and International Organizations; manages the recently established Environment Branch and coordinates the activities of the ICAO Council's Committee on Aviation Environmental Protection (CAEP), where she serves as Secretary. Hupe has also worked with ICAO as a consultant to ICAO's Technical Co-operation Bureau, providing direct assistance to ICAO's Contracting States in the environmental field. For 15 years she served as an advisor on environmental protection related subjects for the Institute of Civil Aviation (IAC) in Brazil, developing policies and regulations and representing the Ministry of Aeronautics at government related environmental forums.

CAEP/8 agreed on a comprehensive set of 19 recommendations which will help ICAO fulfil its mandate on the environment. Most of these recommendations cement the work done by CAEP's technical experts over the last three years, while others deal with setting priorities and laying out CAEP's new work programme leading to CAEP/9 in 2013.

The Meeting also recommended for publication important material in order to ensure that the most up-to-date information on aviation environmental concerns are fully available to State authorities and the broader aviation community for future planning and related decisions and actions.

Quantifying Aviation Noise and Emissions

ICAO has set three environmental goals for international aviation. These are related to reducing the number of people exposed to significant aircraft noise as well as reducing

Leadership and Vision in Global Civil Aviation

VACANCY ANNOUNCEMENTS: SENIOR POSTINGS

The International Civil Aviation Organization (ICAO) is the world's global forum for civil aviation. A Specialized Agency of the United Nations, ICAO works through its Member States for the safe, secure and sustainable development of civil aviation.

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VN PC 2010/15/D-2
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All ICAO Vacancies are open to both female and male candidates. In order to increase the representation of women at all levels in ICAO, women are particularly invited to apply for vacant posts or for roster evaluation for future vacancies.

The full details of the above Vacancy Notice and other current vacancy notices, as well as instructions on how to apply, can be found on http://www.icao.int/employment.

ICAO'S COMMITTEE ON AVIATION ENVIRONMENTAL PROTECTION (CAEP)

The Committee on Aviation Environmental Protection (CAEP) is a technical committee of the ICAO Council and the international expertise forum for the study and development of proposals to minimize aviation's effects on the environment. It is composed of 23 Members from all Regions of the world and 13 Observers (key aviation stakeholders and environmental NGO's).

Approximately 400 internationally-renowned experts are involved in the CAEP's activities and all of its proposals are assessed on the basis of four criteria: technical feasibility; environmental benefit; economic reasonability; and interrelationships (how any CAEP proposal will influence other measures—i.e. if measures to minimize noise increase emissions).

The ICAO Council reviews and adopts the CAEP's recommendations, including Annex 16 Standards and Recommended Practices, and in turn reports to the ICAO Assembly (190 States plus international organizations) where the main policies on environmental protection are ultimately defined.

Eighth Meeting of the Committee on Aviation Environmental Protection (CAEP/8) Members and Observers. The ICAO Council reviews and adopts the CAEP's recommendations, including Annex 16 Standards and Recommended Practices, and in turn reports to the ICAO Assembly (190 States plus international organizations) where the main policies on environmental protection are ultimately defined.

the impact of aviation emissions on global climate and local air quality. In support of these goals and its role as global aviation's most prominent environmental body, CAEP has taken a structured approach to determining and delivering solutions to the air transport sector—first by quantifying related environmental effects and then by establishing practical mitigation measures to address them.

Regarding the quantification of international aviation's progress against ICAO's environmental goals, CAEP's experts on forecasting, modelling and analysis carried out a detailed assessment of trends. A range of scenarios were developed for the assessments (noise, LAQ, GHG emissions). Figures 1–4 on the following page help to illustrate these trends. Scenario 1 includes only the operational improvements necessary to maintain current operational efficiency levels, but does not include any technology improvements beyond those available in current (2006) production aircraft. The other scenarios assume increasing levels of implementation of both operational and technological improvements. Scenarios 2 and higher are assumed to be the most likely outcomes. The trend results indicate that, even under the most ambitious scenarios, CO_2 and NO_X emissions from aircraft will continue to increase through 2036. Similarly, the global population exposed to significant aircraft noise will also continue to increase in the forecast period. ICAO environmental standards, however, as well as investments in technology and improved operational procedures, are allowing aviation's noise, local air quality, and greenhouse gas footprint to grow at a rate slower than the demand for air travel.

Readers should note that these are aggregated global results derived from both domestic and international aviation data. The CAEP/8 participants requested that this data be used as the basis for deliberation at the next ICAO Assembly in October 2010, responding to the request from the last Assembly that the evolution of the effects of aviation on the environment should be continually assessed and monitored.

New NO_X Standards and Production Cut-off Dates

In terms of mitigation efforts through technological measures, the CAEP/8 meeting considered an increased NO_X stringency Standard for new aircraft types and production cut-off options for older models.

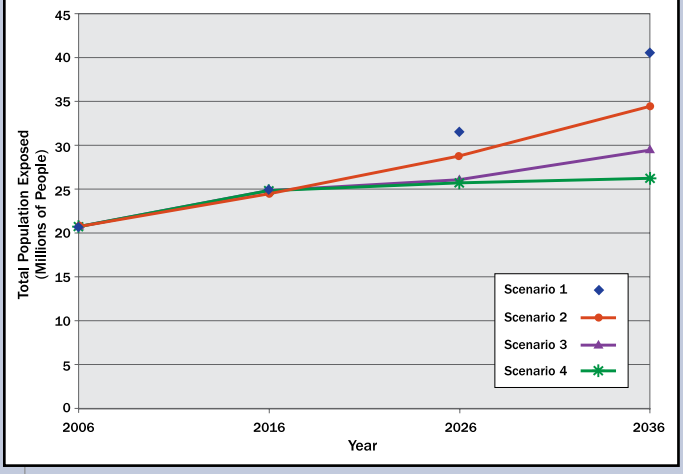
The meeting approved a production cut-off of engines according to the CAEP/6 NO_X Standard (the current Standard), with an effective date of 31 December 2012. CAEP/8 also agreed a new NO_X Standard which drives these emissions down a further five percent for small engines and 15 percent for large engines compared to the earlier CAEP/6 agreed levels. Together, these two recommendations will help to ensure that the most efficient technologies are being employed in the production of aircraft engines in the near future.

The difference between NO_X certification Standards and production cut-offs is that the certification Standards apply to products that are newly-developed. Once these new products are certified,

CAEP/8 Projected Environmental Trends

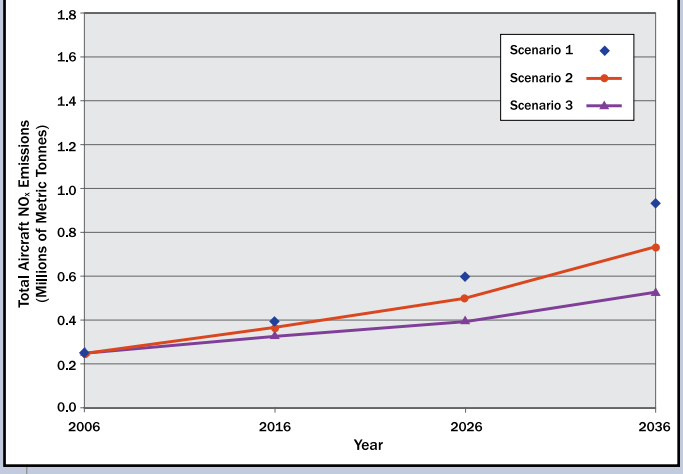
Scenario 1 depicts current capabilities continuing unchanged while Scenarios 2–5 reflect gradually increasing implementation levels for various operational and technical improvements.

Figure 1: Increasing Population Exposure to Noise: 2006–2036



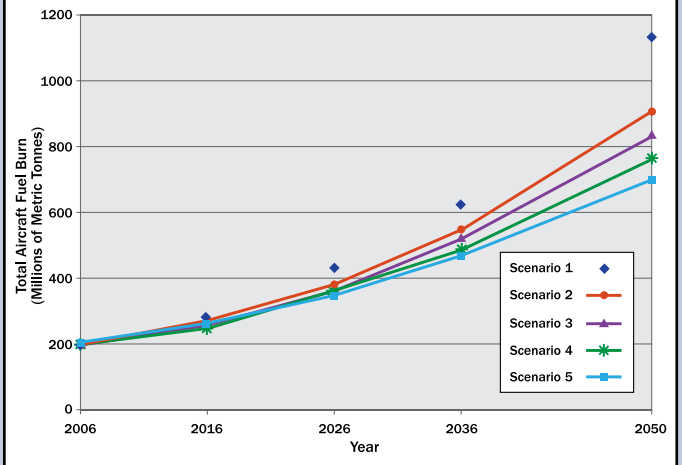
Between 2006 and 2036, population exposure to noise at the 65, 60, and 55 DNL levels is expected to increase. At the 55 DNL level the 2006 baseline value is approximately 21.2 million people. In 2036, total population exposure ranges from approximately 26.6 million people to 34.1 million people (representing absolute growth of between 25 and 61 percent or an average annual growth rate of 0.7 to 1.6 percent—far less than the predicted growth in traffic). All estimates assume constant global population over the period.

Figure 2: Total aircraft NO_x Emissions below 3,000 ft



NO_x below 3,000 feet is expected to grow from a baseline value of 0.25 Million Metric Tonnes (Megatonnes (Mt)) in 2006 to between 0.52 and 0.72 Mt in 2036. This represents an absolute growth of between 208 and 288 percent over the period or an annual average growth rate of between 2.4 and 3.5 percent. This is less than the predicted passenger growth rate and Particulate Matter (PM) below 3,000 feet is expected to grow at a similar rate. NO_x above 3,000 feet is expected to grow from a baseline value of 2.5 Mt in 2006 to between 4.6 and 6.3 Mt in 2036. This represents absolute growth of between 184 and 252 per cent or an annual average growth rate of between two and three percent.

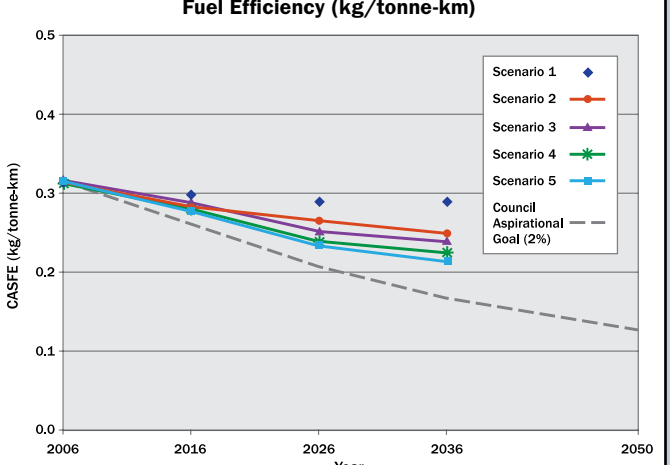
Figure 3: Total Aircraft Fuel Burn



Note: Results were modelled for 2006, 2016, 2026, and 2036, then extrapolated to 2050.

Fuel consumption, which translates directly into CO_2 emissions, is expected to grow from a baseline of 187 Megatonnes (Mt) in 2006 to between 461 Mt and 541 Mt in 2036. This represents absolute growth of between 250 and 290 percent over the period or an annual average growth rate of between three and 3.5 percent. For the 2050 timeframe a 2.9 percent and 3.4 percent annual average growth rate is predicted, which is again less then the forecasted growth in passenger traffic of 4.8 percent per year.

Figure 4: Commercial Aviation System Fuel Efficiency (kg/tonne-km)



Note: Lower CASFE values = more efficient operations

The Commercial Aviation System Fuel Efficiency (CASFE) value was computed with a baseline of 0.32 kg/tonne-km in 2006. In 2036, global CASFE ranges from about 0.25 to about 0.21. On a per flight basis, efficiency is expected to improve over the period.

they can then be produced by the manufacturers for use by operators. For example, an engine certified in 1995 according to the then-applicable CAEP/2 NO_X Standard can continue to be produced or sold even though it does not meet the current CAEP/6 NO_X Standard because it was certified before the CAEP/6 Standard became effective.

The production cut-off according to the CAEP/6 Standard will mean that the production of this engine must stop, effective 31 December 2012, unless new technology is incorporated in it to make it CAEP/6 compliant. In other words, a certification Standard affects the development of new products whereas a production cut-off stops the production of already-developed engines if they do not meet the newer Standard.

It is important to understand in this regard that a production cut-off is intended to address the expansion of an in-service fleet—not the operation of in-service aircraft. For this reason, exemption provisions have been established to account for special cases at the discretion of State authorities. For example, an exemption will let manufacturers produce spare engines that can replace engines already in service but which do not add to the total number of engines that are actually flown.

Toward a First CO_2 Standard

The establishment of CO_2 Standards has been under debate in ICAO for some time. CAEP was tasked to develop an initial scoping analysis regarding an aircraft CO_2 Standard, which was presented to CAEP/8. In light of this analysis the meeting discussed several topics, including applicability thresholds (e.g. Maximum Takeoff Weight (MTOW)) and the aircraft (e.g. new aircraft types, in-production aircraft, in-service aircraft) to which this Standard would apply.

The meeting agreed on a timetable for the development of a CO_2 Standard for commercial aircraft, aiming for its consideration at CAEP/9 in 2013. Such an achievement would be a true milestone in that it would represent the establishment of the first global fuel-efficiency Standard for any industry sector.

This CAEP/8 decision is in line with the Programme of Action on International Aviation and Climate Change, adopted at the ICAO High-level Meeting (HLM) last October that called for the development of a CO_2 Standard as one of the measures to achieve the aspirational goals adopted by the HLM. It will set a clear direction for manufacturers to follow in order to keep producing innovative aircraft designs and materials, as well as more fuel-efficient engines.

But be not mistaken: the development of a CO_2 Standard is not an easy task. Readers may recall that the establishment of the first noise and NO_X Standards took almost a decade of development. There are no national or Regional Standards for aircraft CO_2 emissions that can serve as starting points for a global Standard.

The main challenge in establishing a Standard that provides an additional incentive to improve aircraft fuel efficiency, and thus global fleet fuel-burn performance, is that it needs to accommodate fuel burn performance and relevant capabilities (e.g. range, size, speed) across different aircraft types, while simultaneously ensuring that it is technically robust (now and in the future) and based on an acceptable level of accuracy and equity across products and manufacturers. Similarly, a practical CO_2 Standard needs to allow flexibility and innovation in aircraft design. In addition, the procedure must not require a disproportionate level of resources on the part of National Airworthiness Authorities and manufacturers for it to be implemented. Lastly, it must also be simple, transparent and easily understood by the general public.

Particulate Matter

Regarding Particular Matter (PM) emissions, CAEP/8 decided to focus on non-volatile PM for the time-being as the science is more advanced in this area compared to volatile PM. It was agreed that a certification requirement be targeted by CAEP/9 and a certification Standard would aim to be established by CAEP/10.

New Noise Standards

Based on the presentation of a detailed analysis of state-of-the-art aircraft in terms of their noise performance, CAEP/8 requested an assessment regarding possibly more stringent Standards for aircraft noise certification during the next three years. CAEP/9 would then decide on the need to adopt further increases to noise Standards. Considerations on the use of open rotors technology and their effects on noise will need to be further pursued.

Mid- and Long-term Goals for Noise, NO_X and CO_2

CAEP established three Independent Expert Panels (IEP) to develop mid-term (10 year) and long-term (20 year) environmental improvement goals for technologies related to NO_X, fuel burn and noise. The establishment of a process to inform on mid- and long-term goals responded to an industry need for a broader perspective on the reduction possibilities that could be derived from new technologies. This additional data would inform industry planning and complement the short-term certification Standard process. The first IEP was established in CAEP/7 to consider mid- and long-term NO_X reduction goals.

CAEP/8 based its analysis on the excellent CAEP/7 results. The CAEP/8 IEP NO_X review recommended that the goals adopted by CAEP/7 be maintained. Those goals refer to reductions of approximately 45 percent to the CAEP/6 NO_X levels by 2016 (medium term goal) and a further 60 percent reduction of CAEP/6 levels by 2026 (long term goal).

Regarding the medium-term and long-term goals for noise reduction technologies, the IEP evaluated four classes or categories of aircraft for future noise reduction goals, including: regional jets; small-to-medium range twin aircraft; long range two-engine aircraft; and long range four-engine aircraft. The noise reduction goals for these classes of aircraft are provided in the table below.

When compared to a baseline of today's aircraft, the goals show more promise of noise reduction for larger aircraft because of a broader scope of technologies that can be applied to them.

Mid-term and Long-term Noise Goals
(Cumulative Effective Perceived Noise Level (EPNL) – re: Chapter 4 Limits)

Aircraft Category	Mid-term (2018)	Long-term (2028)
Regional Jet	13.0	20.0
Small-Med. Range Twin	21.0	23.5
Long-Range Twin	22.0	24.5
Long-Range Quad	21.0	23.5

Regarding the results on medium-term and long-term goals for fuel-burn reduction technologies, a workshop to present the status of these developments was held in 2009. This workshop provided extensive information and data that will be used in a formal IEP review in May 2010. It is expected that the IEP will be able to provide medium- and long-term goals for aircraft fuel burn reduction technologies for approval by the by the first CAEP Steering Group event after CAEP/8 (November 2010).

As far as mitigation through operational measures is concerned, CAEP/7 had requested an Independent Expert Operational Goals Group (IEOGG) to examine and make recommendations for noise, NO_X and fuel burn with respect to operational goals in the medium- and long-term. The IEP decided to concentrate first on ATM improvements and to further pursue the refinement of its initial findings over the next three years.

Other Recommendations

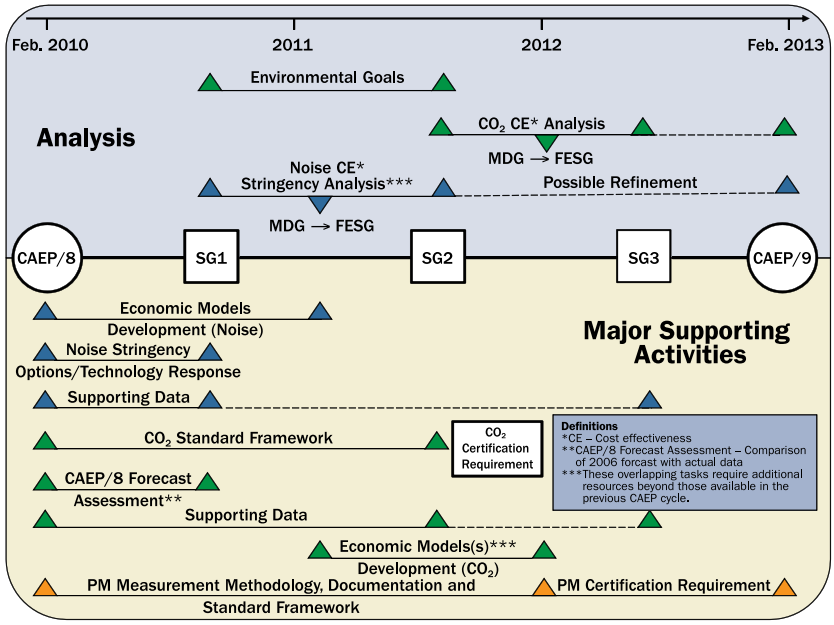
CAEP/8 also reviewed the substantial work undertaken on developing updated information on operational opportunities to save fuel and emissions for a new ICAO publication to replace Circular 303-AN/176—*Operational Opportunities to Minimize Fuel Use and Reduce Emissions*, published in February 2004. Several chapters have been rewritten and finalization of the remaining work is expected by CAEP/9.

Circular 303 describes operational measures that State authorities, airports, Air Navigation Service Providers (ANSPs) and aircraft operators can reference as they develop strategies to reduce fuel burn and emissions. This material served as the basis for the basket of measures developed for the ICAO Programme of Action on International Aviation and Climate Change (PAIACC).

CAEP/8 also considered a study on the environmental impact of the European (EUR) Region's airport curfews on other Regions. The report was based on case

ICAO Secretary General Raymond Benjamin (second from left) Chairs the proceedings of the Eighth Meeting of the Committee on Aviation Environmental Protection (CAEP/8). He is joined by ICAO Air Transport Bureau Director, Folasade Odutola (far left), Dr. Olumuyiwa Benard Aliu, First Vice-President to the ICAO Council (second from right) and Jane Hupe, ICAO Environment Chief (far right).

Figure 5: CAEP Work Programme: 2010–2013



studies for South Africa and India. One main conclusion of the report was that, while European curfews may be a contributing factor to the generation of night time aircraft movements in some case study airports, there are probably a number of other influencing factors such as time zones, airline economics and passenger demand which also play an important role.

In addition to changes to the provisions for new certification stringencies for NO_x, CAEP has developed other technical provisions to keep the Annex 16—*Environmental Protection Volumes I* (aircraft noise) *and II* (aircraft engine emissions) and their respective Environmental Technical Manuals (ETMs) up to date and relevant. CAEP developed a new ETM for emissions and finalized a new noise ETM to replace the current one after six years of intensive efforts.

The proposals for Annex 16 Standards and Recommended Practices (SARPs) that were approved by CAEP will be reviewed by the relevant bodies of ICAO and sent to States and international organizations for consultation as part of the standard SARP adoption process.

Regarding market-based measures, CAEP/8 recommended that reports be published related to voluntary emissions trading systems, the linking of open emissions trading systems, and off-setting emissions from the aviation sector. These reports will provide guidance to aviation stakeholders when evaluating different schemes for environmental mitigation: they will also inform the process to develop a global market-based measure framework for aviation GHG emissions, as requested by the PAIACC. In addition, updated information on voluntary measures was reviewed to update the existing list available on the ICAO Web site.

A total of 13 documents and reports (new or updated) were recommended for publication by ICAO, most of which are to be made available electronically.

As far the Committee's work for the next three years is concerned, it was decided that its priorities would be as follows:

1. The development of a CO_2 Standard.
2. Efforts toward improved noise reduction.
3. Work on Particulate Matter (PM).

Based on these priorities, the meeting developed a comprehensive future work programme and a high-level schedule of activities *(see Figure 5, right)*. A few areas of work were considered essential but could not be accommodated within CAEP's resource constraints. In such cases, the ICAO Secretariat was requested to monitor the progress in relevant areas, provide necessary support, and report back to CAEP/9. These areas requiring Secretariat support included alternative fuels, environmental management systems, balanced approaches for noise mitigation, and adaptation issues regarding climate change.

The CAEP members and observers committed to providing appropriate resources and technical expertise in order to support the future work programme. This commitment is absolutely essential if CAEP is to continue to deliver the impressive quantity and quality of work that has come to be expected of it.

The ambitious work programme of CAEP will require a very intense and continuous effort from all involved. The activities in preparation of CAEP/9 have already begun and CAEP working groups are proceeding at full speed. No rest for the warriors…

The next time CAEP will meet as a Steering Group (SG) will be in November 2010. The SG, in addition to reviewing the progress of the Committee work, will address further requests emanating from the 37th Session of the ICAO Assembly—where environmental issues are expected to be high on the agenda.

The substantial results of the CAEP/8 meeting represent another solid step towards the achievement of ICAO's environmental goals. The Organization will continue to move in this direction, delivering tangible actionable results that will lead aviation to its sustainable future. ■

Sustainable Alternative Fuels for Aviation

A Key Component of Future Air Transport Success Continues on its Path to Commercial Viability

Sustainable drop-in alternative fuels will be an essential component of the future aircraft fuel supply, as they have been proven to offer a technically sound solution that will not require changes to the aircraft or fuel delivery infrastructure. Although they offer the potential to reduce aviation environmental impacts, alternative jet fuels are not yet available in sufficient quantities to meet the overall demand of commercial aviation. New regulatory and financial frameworks will be needed before this will be the case.

As Jane Hupe, ICAO's Environment Chief, reports, the Organization has been facilitating, on a global basis, the promotion and harmonization of initiatives that encourage and support the development of sustainable alternative fuels for international aviation.

Since the last energy crisis and in-line with the world's growing interest in more sustainable energy sources to help meet the challenges of climate change, alternative fuels for aviation have become a major focus of the air transport sector. Today, various consortia are engaged in the development of alternative aircraft fuels and projections for commercial-scale deployments are now being measured in years, not decades.

ICAO Alternative Fuels Framework

ICAO has undertaken efforts to promote improved understanding of the potential use and environmental benefits of sustainable alternative fuels.

Workshop on Aviation and Alternative Fuels

In January 2009, ICAO hosted the Workshop on Aviation and Alternative Fuels (for more details see http://www.icao.int/WAAF2009/). The information presented at the workshop made it clear that aviation alternative fuels represented a win-win solution: reducing aviation's dependence on fossil fuels on the one hand while minimizing its impact on climate change on the other.

Given sufficient demand or incentives, considerable supplies of sustainable jet fuel, which offer a significant reduction in life-cycle CO_2 emissions, could be available in the mid-term.

The Workshop on Aviation and Alternative Fuels also showcased the state of development and identified challenges regarding the use of alternative fuels. Building upon the result of the workshop and in light of rapid developments in this area, it was decided that ICAO should facilitate action with a view to focusing efforts and enabling aviation to become the first sector to use sustainable alternative fuels globally.

High-level Meeting on Aviation and Climate Change

In addition, alternative fuels were recognized by the ICAO High-level Meeting (HLM) on Aviation and Climate Change (October 2009) as an important measure to help reduce aviations' global climate effects. The HLM requested that the results of the conference become part of the message from ICAO to COP/15.

Conference on Aviation and Alternative Fuels and new Global Framework

The first ICAO Conference on Aviation and Alternative Fuels (CAAF/2009) was hosted by the Brazilian authorities in Rio de Janeiro in November 2009. State representatives from all Regions of the world, as well as airlines, engine manufacturers, major fuel suppliers, financing bodies, and environmental NGOs all came together to make this event a success.

The meeting produced a Declaration and endorsed an important new Global Framework for Aviation Alternative Fuels (GFAAF). The purpose of the GFAAF is to communicate to the international community accomplishments and projected activities related to the development and deployment of sustainable alternative fuels for aviation. As these fuels promise to be an intrinsic component of any strategy to help reduce the carbon footprint of aviation, the GFAAF will serve to more effectively consolidate information about the many initiatives already underway in order to promote, facilitate and accelerate their development and deployment over the short-, medium-, and long-term.

The Global Framework is envisaged as a living document, highlighting the work already accomplished and describing the objectives of future activities. An online version is available at www.icao.int/AltFuels and will be updated, as new information becomes available, illustrating the status of key objectives and providing background and reference materials for relevant activities.

The initial Global Framework was approved on the final day of the conference and used to inform COP/15 about the accomplishments and projected activities related to the development and use of sustainable alternative aviation fuels as per ICAO's current strategy. It has since been continuously updated on the web to reflect the recent developments.

Aviation Alternative Fuels

Sustainable drop-in alternative fuels for aviation will be an essential component of the future aircraft fuel supply. As these fuels are certified under the exact same specifications as traditional fuels, there is a growing tendancy to refer to them as "additional fuels".

Drop-in fuels can either be blended with conventional jet fuel or used in a 'neat' form (100 percent alternative fuel). The concept behind both the blended or neat drop-in options is that they can be substituted directly for conventional jet fuel. A drop-in fuel does not require adaptation of the aircraft/engine fuel system or the fuel distribution network, and can therefore be used as-is on currently flying, turbine-powered aircraft.

During the past year, the qualification for some types of fuels was completed and the qualification of others has gotten well underway. Of particular importance is the ASTM D-7566 Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons that was approved on 1 September 2009, as it was the first new jet fuel approval in 20 years!

Today sustainable drop-in alternative fuels offer the potential to reduce aviation environmental impacts but are not yet available in quantities sufficient to meet the overall demand of commercial aviation. Sustainable drop-in alternative fuels, produced from biomass or renewable oils, offer the possibility to reduce life-cycle greenhouse gas emissions and therefore reduce aviation's contribution to global climate change. They could be an important tool in the effort to close the environmental mitigation gap while allowing the sector to respond to growing demand.

Using these fuels may also offer reduced emissions of particulate matter, thus lessening aviation's impact on surface air quality via significantly lowered fuel sulphur contents.

One important issue in making alternative fuels a reality is cost. It is currently estimated that more than 80 percent of the cost of a sustainable fuel derives from the cost of its feedstock. Feedstocks, such as jatropha and camelina are quite attractive options today as they are available now and could demonstrate results in as little as three to five years. Regardless of their longevity as a source of aviation fuel, both of these plant sources will provide valuable experience for the longer-term journey to future viability for alternative fuels. As recommended by the CAAF, ICAO is working with key stakeholders on a framework for financing infrastructure development projects dedicated to sustainable aviation alternative fuels, as well as incentives to overcome initial market hurdles.

There is growing consensus that the fuels of the future will be lignocelluloses or algae-based but those will take a little longer to reach large scale production. With the process for qualifying aircraft fuels developed through new processes having now been established, many different, sustainable feedstocks can continue to be explored that could help make the future of aviation even greener.

Leveraging Aviation's Ability to Embrace Technological Change

Aviation is a technology-oriented activity and as an industry it can be highly motivated when tangible opportunities for new, non-traditional solutions arise. The time needed to embrace changes and new technological challenges is impressively short in this sector. The concept of sustainable alternative fuels in aviation has evolved very rapidly from the idea stage to reality and so far the results are very encouraging.

Table 1 on the following page highlights the air transport sector's alternative fuel accomplishments from 2008 through November 2009, when the CAAF was held. Since that time, however, more and more consortia amongst research and university centres, fuel companies, airlines and manufacturers have been initiated, some of which I have highlighted below:

- Embraer and General Electric are planning a demonstration flight of an aircraft owned by Azul Linhas Aéreas, using a sugar cane-derived fuel developed by Amyris, in early 2012. The goal of the memorandum of understanding between the groups is to accelerate the introduction of a renewable jet fuel that could signifi-

TABLE 1: AVIATION AND SUSTAINABLE FUELS—ACCOMPLISHMENTS

2008

Tests and Demonstrations

- Airbus flies its A380 test aircraft with one of its four engines running on a 40 percent blend of Gas-To-Liquid (GTL) fuel with conventional jet fuel (February 2008).
- Virgin Atlantic flies a Boeing 747-400 with one engine operating on a 20 percent biofuel mix produced from babassu oil and coconut oil (February 2008).
- Air New Zealand flies a Boeing 747-400 with one engine on 50 percent jatropha-derived Hydrotreated Renewable Jet (HRJ) biofuel and 50 percent kerosene (December 2008).

An Airbus A380 became the first commercial aircraft to fly with a synthetic liquid fuel processed from gas (Gas to Liquids or GTL) in a three hour flight between the United Kingdom and France in February 2008. The Airbus tests are running in parallel to the agreement signed in November 2007 with Qatar Airways, Qatar Petroleum, Qatar Fuels, Qatar Science & Technology Park, Rolls Royce and Shell International Petroleum Company to research the potential benefits of synthetic jet fuel processed from gas. Qatar Airways has since flown the first ever revenue flight with alternative fuel on one of its A340-600 flights from London to Doha.

KLM Royal Dutch Airlines operated its first ever passenger flight powered by sustainable biokerosene in November 2009. The flight took place at Schiphol Airport in Amsterdam and test partner Honeywell UOP characterized the endeavour as *"the first green jet fuel demonstration flight in Europe and the first test flight to carry a select group of observers."*

2009

Fuel Certification/Qualification

- ASTM D-7566, the Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons, is approved (September 2009). First new jet fuel approval in 20 years.

Tests and Demonstrations

- Continental Airlines flies a Boeing 737-800 with one engine using 50 percent jet fuel and 50 percent algae/jatropha mix (January 2009).
- JAL flies a Boeing 747-300 on a 50 percent HRJ bio-fuel (derived from camelina, jatropha and algae) and 50 percent kerosene (January 2009).
- Qatar Airways performs the first revenue flight with alternative fuel as an A340-600 flies from London to Doha with its four engines running with a 48.5 percent blend of GTL with conventional jet fuel (October 2009).
- KLM flies a 50 percent HRJ bio-fuel (derived from camelina) and 50 percent conventional Jet A1 mix on a Boeing 747-400 (November 2009).

Policies, Methods and Processes

- European Union requirement that lifecycle greenhouse gas emission savings from the use of biofuels shall be at least percent. *Renewable Energy Directive 2009/28/EC* (April 2009).
- ICAO High-Level Meeting on Aviation and Climate Change (October 2009).
- Conclusions and Recommendations from CAAF 2009 (November 2009) on:
  1. Environmental sustainability and interdependencies.
  2. Technological feasibility and economic reasonableness.
  3. Measures to support development and use.
  4. Production and infrastructure.
- CAAF2009 Declaration and Global Framework in conjunction with the outcomes of the High- Level Meeting on International Aviation and Climate Change (HLM-ENV) presented as the ICAO input to COP/15 (December 2009).
- Roundtable on Sustainable Biofuels (RSB) published version 1.0 of *Principles and Criteria for Sustainable Biofuel Production* (November 2009).

In January 2009, Continental Airlines became the first carrier to demonstrate the use of sustainable biofuel to power a commercial aircraft in North America. The demonstration flight was conducted in partnership with Boeing, GE Aviation/CFM International, and Honeywell's UOP. It also marked the first sustainable biofuel demonstration flight by a commercial carrier using a two-engine aircraft: a Boeing 737-800.

cantly lower GHG emissions and provide a long-term, sustainable alternative to petroleum-derived jet fuel.

- Sky Energy, a joint-venture company aimed at developing sustainable biofuels, was set up in the Netherlands in late 2009 by KLM, North Sea Petroleum and Spring Associates. The World Wide Fund for Nature (WWF) will advise the consortium in relation to ecological aspects. Sky Energy aims at developing bio kerosene in accordance with strict financial, technological and ecological criteria.

- KLM conducted a flight partly powered by a biofuel produced from the plant camelina. The flight took off from Amsterdam Schiphol Airport for a demonstration lasting approximately one hour. A number of Dutch government officials and industry partners were on board—the first time passengers have been included on a biofuel demonstration flight. For this flight, the camelina oil was provided by the Sustainable Oils and Great Plains companies (USA). It was refined and blended together with Jet-A1 by Honeywell UOP, which specializes in refining biofuel.

- Qatar Airways, Qatar Science & Technology Park (QSTP) and Qatar Petroleum (QP) announced the creation of the Qatar Advanced Biofuel Platform (QABP) to research and develop biofuel. With the support of Airbus they will look into ways to produce and supply them. QABP was established to develop an engineering and implementation plan for an economically viable and sustainable bio fuel production system. Its purpose was also to carry out investment, market and strategic analysis with a view to executing advanced bio fuel projects. Qatar Airways is initially meant to be a dedicated end-user.

- A new consortia, being participated in by the Boeing Co., the United Arab Emirates, Etihad Airways, Honeywell and the U.A.E.-based Masdar Institute, announced an agreement to establish a major research and demonstration project in Abu Dhabi dedicated to sustainable energy solutions. In particular, the partners' Sustainable Bioenergy Research Project (SBRP) will use integrated saltwater agricultural systems to support the development and commercialization of biofuel sources for aviation, as well as bi-products. The integrated approach of this pioneering project will use saltwater to create an aquaculture-based farming system in parallel with the growth of mangrove forests and salicornia, a plant that thrives in salty water. These biomass sources will be sustainably harvested and used to generate clean energy, aviation biofuels and other products. The closed-loop system will convert aquaculture effluent into an affordable, nutrient-rich fertilizer for both plant species since developing low-cost, non-petroleum fertilizers is a key to achieving reductions in carbon emissions from any biofuel source.

- The Air Transport Association of America (ATA) and the U.S. Defense Logistics Agency's Defense Energy Support Center (DESC) signed an agreement recognizing a partnership to advance the development and deployment of commercially viable, environmentally friendly, alternative aviation fuels. The intent of this strategic alliance is to establish a collaborative forum focused on spurring aviation alternative fuels market growth. The partners will aim to leverage their collective purchasing power to encourage suppliers to bring commercial aviation alternative fuels into the market place.

- British Airways and Solena Group initiated work to establish a European sustainable jet fuel plant derived from waste biomass, to power part of the BA fleet.

- TAM, South America's largest airline, plans to hold a non-commercial demonstration flight in the second half of 2010 using a mixture of aviation bio-fuel which will include Brazilian vegetable biomass from the jatropha plant. The aircraft will be an Airbus A320 from the TAM fleet that will be equipped with CFM56-5B engines manufactured by CFM International, a 50/50 joint venture between GE of the United States and Snecma (Safran Group) of France.

- A successful engineering validation flight was conducted on 30 April 2010 by United Airlines using certified synthetic fuel. The flight marks the first time a U.S. commercial airline has used synthetic jet fuel in flight.

The above initiatives and other future activities are showcased in the current ICAO Global Framework for Aviation Alternative Fuels, as it represents the global forum for the exchange and promotion of information on aviation alternative fuels.

I am confident that this industry-wide cooperative effort will achieve real progress in finding economically viable, sustainable fuel alternatives. With the qualification, development, and introduction of new feedstocks for jet fuels we are entering a new era in the sustainability of aviation. Governments need to support the aviation sector in this unprecedented endeavour and provide the necessary policy framework to ensure access to aviation-suited sustainable alternative fuels. ■

The alternative fuels field at present is especially dynamic. For the most recent news and developments in this area we highly encourage readers to visit:
http://www.icao.int/icao/en/env/AlternativeFuels/Summary.htm

2010 and Beyond: Aviation's Drive to Sustainability

Aviation environmental momentum has been gathering pace for several years now and Aviation stakeholders, including airports and aircraft operators, Air Navigation Service Providers (ANSPs), manufacturers and organizations such as ICAO and EUROCONTROL, have been making steady progress towards a cleaner and more fuel-efficient industry.

The work being done by organizations such as ICAO and the Air Transport Action Group (ATAG) to develop a clear set of targets for reducing aviation's climate impact makes air transport one of most proactive industries in this regard. Presently it is one of the few to be tackling the climate change issue on a global scale and this progress is set to continue.

2010 is poised to be a year of integration, consolidation and driving forward. Consolidating ongoing projects such as Continuous Descent Approach (CDA) implementation is, of course, essential, as is kick-starting new improvement programmes such as the SESAR Work Packages or advanced mitigation techniques. But, notably, 2010 also looks set to be a year of environmental collaboration.

There is growing movement among aviation's key operational partners—airport and aircraft operators and Air Traffic Management (ATM)—toward increased collaboration in tackling environmental challenges. This involves the operational partners working together to maximize efficiency, minimize costs and reduce environmental impact.

One method of achieving this which seems to be gathering momentum throughout Europe is Collaborative Environmental Management (CEM); a process which aims to improve environmental performance by promoting information-sharing between airport operational stakeholders. Validation of the CEM concept should be completed by the end of this year and will help to pave the way towards meeting the SESAR target of widespread CEM adoption by European airports by the end of 2013.

Of course, if progress is being made it must also be measured. There are many tested and respected sets of environmental indicators (EI), and many organizations develop their own according to specific targets. There is currently no harmonized international set for aviation, however, which would allow for performance evaluation and bench-marking across the industry according to the ICAO Strategic Objective to improve environmental sustainability.

With this goal in mind, EUROCONTROL led a multi-national and multi-disciplinary group in a small but important initial study to inform policy determinations by ICAO's Committee for Aviation Environmental Protection (CAEP) regarding future EI guidance. These results will help to develop methodologies and targets and are expected to be based on the mature and respected ISO 14031 approach.

2010 will also see work begin on the SESAR IP1 Work Packages (WPs), with environmental projects falling under WP16, Transversal Areas. The SESAR programme is targeting a 10 percent reduction in environmental impact per flight by 2020, making 2010, the project initiation phase, a key year as it will be vital to ensure that the environmental benefits of projects are captured in the work plans of the various WPs.

Related SESAR objectives will include measures to shorten track-miles, reduce holding times in the Terminal Control Area

(TMA) and cut back on taxiing times—all of which have both environmental and efficiency benefits.

2010 will also see EUROCONTROL continue its work on the five action points of the joint Flight Efficiency Plan, produced in partnership with CANSO and IATA. These include measures such as the approximately 40 planned enhancements of the terminal airspace structure in 24 European States, as well as the implementation of nearly 220 packages of airspace changes, prepared in cooperation with States and ANSPs, before summer 2010.

2009 was a remarkable year for European CDA implementation progress. Following the launch of the Joint Industry Action Plan with CANSO, ACI and IATA, over 50 airports in Europe are now committed to some level of implementation, while a further 22 have published a CDA that is being formally offered. This progress will continue in 2010, with planning now under way for an event to review the progress achieved to this point. This and other efforts will assist stakeholders as aviation advances toward the ambitious target of achieving functional CDA implementation at 100 airports by 2013.

The UNFCCC COP/15 in Copenhagen has come and gone but COP/16 is now only months away. Nobody knows what will happen in the interim. It is almost certain, however, that pressure to cut emissions and reduce environmental impact is not going to lessen and that the aviation industry will need to continue its good work to maintain its position as a leading sector in the drive for sustainability.

Measures such as continuing CDA implementation, airspace improvements and Collaborative Environmental Management demonstrate clearly that aviation is well-prepared to match the pace of the changes that are now required. ■

SESAR/NEXTGEN DEVELOPMENTS

The Atlantic Interoperability Initiative to Reduce Emissions (AIRE)

Air France (Boeing 747, April 6) and American Airlines (Boeing 767-300ER, April 7) carried out the first complete (gate-to-gate) green transatlantic flights this Spring from Paris-Charles de Gaulle to Miami airport. The flights marked a new milestone for the AIRE (Atlantic Interoperability Initiative to Reduce Emissions) programme, a joint initiative between the European Commission and the FAA.

AIRE is the green component of the SESAR programme. Its research includes gate-to-gate flight demonstrations to test the benefits of technologies targeted for use in both SESAR and FAA NextGen applications.

During the approximately nine hour long flights, enhanced procedures were used to improve the aircrafts' energy efficiency. These procedures, applied at each flight stage and coordinated among all project participants, reduced fuel consumption (and hence carbon dioxide emissions) throughout the journeys—from taxiing at Paris-Charles de Gaulle to arrival at the parking stand in Miami.

Air France estimated that the coordinated application of environmentally-friendly procedures during its flight cut CO_2 emissions by 6–9 tonnes while saving 2–3 tonnes of jet fuel.

The procedures applied by the two airlines in the course of the landmark flights included:

- Shorter taxiing times, coordinated with Aéroports de Paris at Paris-Charles de Gaulle and with the FAA at Miami airport.
- Continuous ascents, coordinated with DSNA, the French air traffic control service provider.
- During the cruise phase for each aircraft, optimum altitude and speed were selected to reduce fuel consumption in conjunction with en route air traffic control centres in France (DSNA), the UK (NATS), Portugal (Nav-Portugal) and the United States (FAA).
- Continuous descents, coordinated by the FAA.

During the departure and arrival phases these procedures also helped minimize noise levels.

Applying these optimizations to all Air France North American long-haul flights would result in an estimated CO_2 emissions reduction of 135,000 metric tonnes per year, and associated fuel savings in the region of 43,000 metric tonnes. ■

State Profile

Malaysia:
Serving Global Aviation

Malaysia consists of two geographical regions divided by the South China Sea: peninsular Malaysia (or West Malaysia) bordered by Thailand on the north, and the Malaysian Borneo (or East Malaysia) located on the northern part of the island of Borneo, bordering Indonesia and surrounding the Sultanate of Brunei.

Malaysia has a population of 28 million, representing a multi-ethnic and multi-religious national character. It is one of the wealthiest and most developed countries in South East Asia; outranked in GNP only by Singapore and oil-rich Brunei.

Since the first heavier-than-air 'Antoinette' monoplane, piloted by G.P. Fuller, landed at Kuala Lumpur in 1911, the civil aviation industry in Malaysia has been an important priority. Malaysia has invested substantially in the aviation industry and today the sector plays a major role in effectively connecting Malaysia to the world economy and competitive global markets.

In tandem with the rapid growth in passenger and cargo traffic in the Asia/Pacific (APAC) Region, as well as commensurate expansions in airline operations, the aviation and aerospace sectors in Malaysia have undertaken significant initiatives to meet the changing market demands that have been a direct off-shoot of the nation's rapidly globalizing air transport environment.

Malaysia's air transport industry is experiencing rapid and significant growth, both in passenger and cargo traffic. Airports in the nation handled more than 45 million passengers in 2007, more than 50 million passengers in 2009, and are expected to reach more than 55 million in 2012 *(see Fig. 1 – below)*.

Malaysian airports handled close to one million metric tonnes of cargo in 2007. This figure declined slightly, due to global economic downturns in 2009, to 0.8 million tonnes. In view of the economic recovery expected in the second quarter of 2010, these airports are projected to handle 1.2 million tonnes of cargo in 2012 *(see Fig. 2 – below)*.

In terms of aircraft movements, Malaysian airports accommodated 451,334 aircraft in 2007; 530,750 in 2009; and some 600,000 aircraft movements are projected by 2012.

Figure 1: Malaysian Passenger Movements (actual and projected – millions)

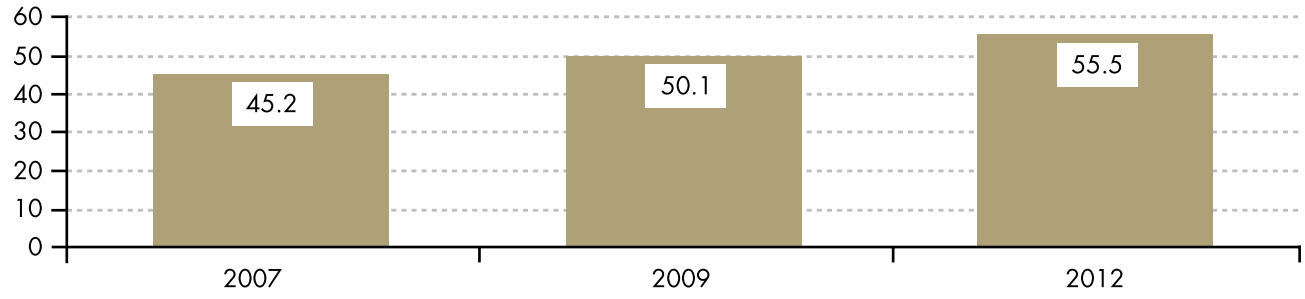
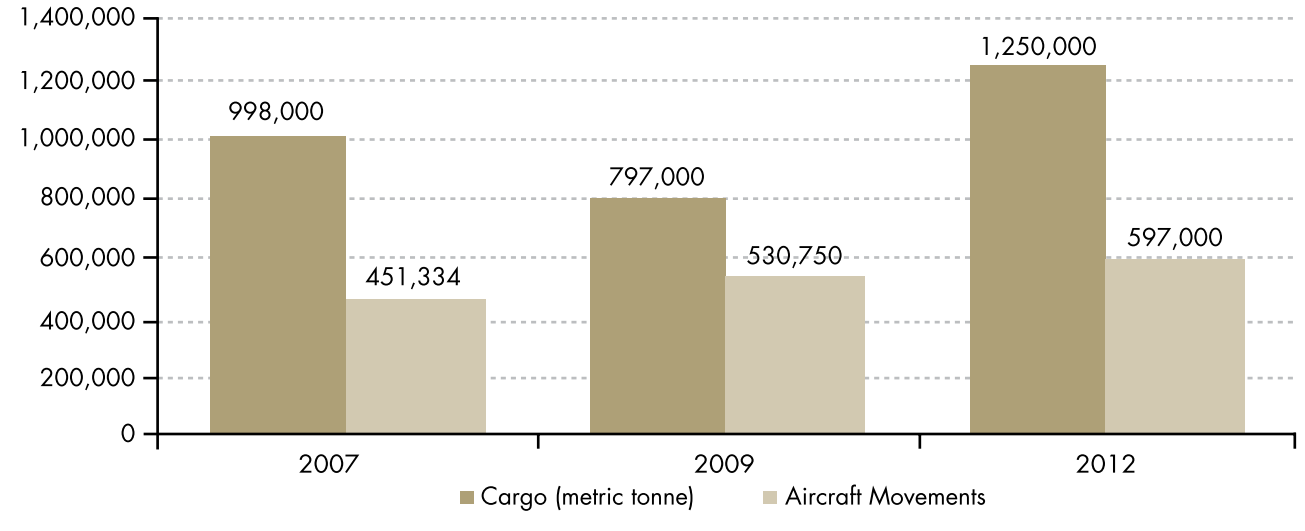


Figure 2: Malaysian Air Cargo (tonnes) in relation to total Aircraft Movements (actual and projected)



"Our vision is to provide an integrated, efficient, cost-effective, technologically-advanced and safe air transport system that will act as a catalyst to facilitate trade, promote socio-economic development and assist Malaysia in achieving its vision to be an industrialized nation by 2020."

– Y.B. Dato' Sri Ong Tee Keat
Minister of Transport, Malaysia

"The Malaysian air transport industry has demonstrated some remarkable achievements and developments in line with its current modernization. We must not be complacent, however, but work harder still to achieve excellence. The Ministry of Transport shall endeavour therefore to continuously enhance its planning and implementation role to assist the ongoing development of the national air transport industry."

– Dato' Long See Wool
Secretary General

In recent decades, Malaysian achievements in the civil aviation and aerospace industries have been numerous. The rapidly-industrializing APAC State designs and builds light aircraft for export and produces aircraft components for major global manufacturers under joint-venture arrangements. The general aviation sector has also made its mark through the development of the Malaysia International Aerospace Centre (MIAC) in 2005.

Since its accession to the International Civil Aviation Organization (ICAO) in 1958, Malaysia has continuously supported and upheld the leadership role of the Organization in promoting the safe and orderly development of international civil aviation. In tandem with the *1Malaysia* concept, regulators and industry players work hand-in-hand in serving the world of aviation. Inspired by ICAO's strategic objectives, Malaysia is ready to take a more prominent role towards the development of a safer and more secured, sustainable, and environmentally-friendly global aviation sector.

The Malaysian Department of Civil Aviation (DCA)

The rapid expansion of Malaysia's aviation sector and air transport industry is largely due to the pragmatic approach taken by the Department of Civil Aviation (DCA) in ensuring compliance to the Standards and Recommended Practices (SARPs) of ICAO.

The DCA has been established as a regulatory agency under the Ministry of Transport and its ongoing mission is to provide for the safe, secure, efficient and orderly flow of air transportation, as well as regulating aviation activities in Malaysia.

With the aim of enhancing the administration of its aviation matters, the Government of Malaysia has decided to restructure the DCA into an autonomous Civil Aviation Authority of Malaysia (CAAM). The new entity is expected to be established in 2011.

The Malaysian Department of Civil Aviation (DCA) provides a wide range of regulatory oversight and licensing services, including but not limited to those relating to:

- Aircraft.
- Air operators.
- Maintenance, repair and overhaul (MRO) organizations.
- Airports.
- The design and manufacturing of aircraft and aircraft components.
- Aircraft maintenance engineers.
- Pilots.
- Air traffic controllers.
- Aviation security.

The DCA also provides air navigation services (ANS) and flight inspection services (FIS), as well as working closely with airport concessionaires to ensure that effective service standards prevail, especially regarding the safety and security for air transportation.

"The DCA's role in ensuring compliance to ICAO SARPs has made the aviation industry in Malaysia among the safest and most secure in the world. Collaboration and partnership with industry players have contributed significantly to this achievement. The management of aviation matters will be further enhanced through the establishment of the fully autonomous Civil Aviation Authority of Malaysia—CAAM."

– Dato' Azharuddin Abdul Rahman
Director General Civil Aviation

Airports

Malaysia has developed an extensive and well-developed airport network. There are currently six international airports serving global air transport: Kuala Lumpur International Airport (KLIA); Penang International Airport; Langkawi International Airport; Senai International Airport; Kota Kinabalu International Airport; and Kuching International Airport.

In addition, there are fifteen domestic airports in Malaysia and twenty-two airstrips providing scheduled services. The management and operations of all airports are privatized.

Kuala Lumpur International Airport (KLIA)

Kula Lumpur International Airport (KLIA) is one of Southeast Asia's major aviation hubs. It commenced operations in June 1998 and, today, KLIA is capable of handling 35 million passengers and 1.2 million tonnes of cargo a year as per its current development phase.

KLIA was voted "Best Airport" (15-25 million passengers per annum) on three separate occasions: once at the 2005 AETRA awards; secondly at the 2006 ACI-ASQ awards; and finally in 2007—again at the ACI-ASQ awards. KLIA was also voted the "Second Best Airport Worldwide" in the Asia/Pacific category at the 2007 ACI-ASQ awards. The facility has matured into a model airport and is fast emerging as the gateway of choice in the Region. It has also been awarded many additional prestigious awards.

Currently, KLIA is comprised of two buildings; the Main Terminal Building (MTB) and the Satellite Building. All domestic and some international arrivals and departures operate from the Contact Pier at the MTB. Departure and arrival formalities (immigration, customs etc.) are also processed at the MTB. The Satellite Building caters solely to international arrivals and departures.

KLIA is linked to the rest of Peninsular Malaysia via a well-designed network of highways and expressways. From Kuala Lumpur, the primary access is through the North-South Central Link Expressway (ELITE) and the North-South Highway (PLUS) eastern route. Other modes of public transportation to and from KLIA include express buses, taxis, limousines and the Express Rail Link (ERL).

The ERL provides the fastest means of transportation to KLIA from the city centre. The KLIA Express and KLIA Transit trains provide dependable and rapid transport from the airport to Kuala Lumpur (KL Sentral – City Air Terminal) and vice-versa. At the City Air Terminal, departing KLIA-bound passengers have the option of checking-in their luggage and receiving their boarding passes

Integrating its award-winning airport with its custom-designed low cost carrier terminal to form the KLIA Next Generation Hub, KL International Airport is creating seamless connectivity between the separate worlds of full-service and budget airlines. Its portal, www.flyklia.com also makes travel simpler, smoother and affordable for millions more. All of which generate higher returns for all airlines who fly through this heart of Asia, well into the next generation.

KLIA NEXT GEN HUB
THE NEW WAY TO THE WORLD

MALAYSIA AIRPORTS

before boarding their train for KLIA. Immigration clearance, meanwhile, is completed at the facility itself. Travel time between KL Sentral and KLIA is 28 minutes on the KLIA Express and 37 minutes on the KLIA Transit. The airport's new Low Cost Carrier Terminal (LCCT-KLIA) is an extension of its existing facilities. LCCT-KLIA was opened in March 2006 and initially operated at a capacity of 10 million passengers annually. It has undergone expansion in recent years that now allows it to cater to 15 million passengers annually. In Nov 2006, LCCT-KLIA was voted "Low Cost Airport of the Year" at the Centre for Asia Pacific Aviation (CAPA) Aviation Awards for Excellence. A new and more permanent LCCT is currently being built at KLIA.

Airlines

Malaysia Airlines

Malaysia's national carrier—Malaysia Airlines or MAS—provides service to sixteen domestic points and flies to more than one hundred international destinations, including those under code-share arrangements.

The carrier, which began operations in 1947 as Malayan Airways Limited, currently has a mixed fleet of Boeing 737s, Airbus 330s, Boeing 777s and Boeing 747s. Its specialized cargo subsidiary, MASkargo, operates eight Boeing 747 freighters. The airline is currently reviewing its network requirements for a total fleet replacement programme.

MAS has achieved a long record of service and best practices excellence, having received more than 100 awards in the last 10 years. The most notable of these include being the first airline with the "World's Best Cabin Crew" by Skytrax UK (consecutively from 2001 until 2004), "5-star Airline" in 2005 and 2006, as well as achieving No.1 status for its "Economy Class Onboard Excellence, 2006" – also by Skytrax UK.

AirAsia

Malaysia is also home to AirAsia, APAC's pioneering and largest low-cost carrier. An emrging Asian brand that has since gone global, AirAsia was voted the "World's Best Low-Cost Carrier" and the "Airline of the Year" for 2009. AirAsia flies to over 70 destinations in 18 countries and, through its "Now Everyone Can Fly" philosophy, has sparked a revolution in Regional air travel as more and more APAC passengers choose it as their airline of choice.

AirAsia X

Introduced in January 2007, AirAsia X has concentrated on the low-cost/long-haul market segment by focusing on the high frequency, point-to-point networks which characterize the long-haul services business. AirAsia X compliments AirAsia's current and extensive route network, operating to destinations in Australia, China, India, Korea, Japan, the Middle East and Europe.

Firefly

Firefly is the first community airline in Malaysia and also a full-service, point-to-point carrier. Firefly is a full subsidiary of Malaysia Airlines and operates from two hubs—Sultan Abdul Aziz Shah Airport in Subang, Selangor, as well as Penang International Airport. Firefly leverages to market growth now being experienced by the dynamic Malaysia, Indonesia, Thailand and Singapore sub-Region—representing over 70 million people.

MASwings

MASwings is the commuter airline of Sabah and Sarawak, the two largest states of Malaysia which are located in Borneo.

Transmile Group

Another home-grown airline, Transmile Air is one of Malaysia's primary cargo carriers. It operates to nine international destinations using a fleet of sixteen aircraft comprised of MD-11s, Boeing 737s and Boeing 727s.

General Aviation

Malaysia has a full-fledged and thriving general aviation industry with twenty-one Air Services Permit (ASP) holders on the Malaysian register. Activities range from off-shore oil rig operations, cloud seeding, aerial photography, agricultural aerial spraying, and flying doctor services.

Aerospace Industry

MIAC

The Malaysian International Aerospace Centre (MIAC) is strategically positioned at the former international airport at Subang. Following its launch in 2005, MIAC has helped to support and generate a thriving aerospace industry in the Region. MIAC supports various aerospace-related facilities and activities, including: Maintenance, Repair and Overhaul (MRO); Helicopter Centre; General Aviation Centre; Aerospace Training Centre; Aerospace Technology Centre (e.g. component manufacturing and aircraft assembly); and a Business Support Centre.

Malaysia's aerospace industry is expected to expand some 8 percent in 2010, supported by increased activity in the aero-manufacturing and maintenance, repair and overhaul sub-sectors. Revenue from the industry is projected to reach $7.6 billion this year from $7.3 billion last year, despite the economic downturn worldwide. From 2006 to 2008, Malaysia has attracted foreign investment of over $500 billion in 13 aerospace projects, including the proposal by a first-tier manufacturer to set up operations in the country.

Bilateral Aviation Safety Agreement (BASA)

Malaysia achieved a significant milestone in the maturation of its aerospace development blueprint when it signed the FAA Bilateral Aviation Safety Agreement (BASA) in 1997.

This recognition was a first in Asia and only the fifth worldwide at the time. The BASA, in conjunction with the Category One Rating the FAA assigned to Malaysia in its International Aviation Safety Assessment (IASA) created an environment that was much more conducive to foreign investment in aviation-related industries. Major achievements since the signing have included:

- The export of Malaysian-designed and manufactured aircraft (Eagle 150 series and MD-3 160s) to the USA, Australia and New Zealand.
- The award of Airbus contracts to the Malaysian Composite Manufacturing Company (CTRM) for the design and manufacture of parts for the Airbus A320, A330 and A380. The CTRM has also been contracted by BAE Systems to design and manufacture aircraft composite parts and components.
- A joint-venture arrangement between Boeing, Hexzel, Naluri and Sime Darby for the manufacture and production of composite components and parts for Boeing aircraft.
- The award of a Honeywell contract to KOB Aviation to produce avionics parts and components for Boeing aircraft.
- The establishment of Malaysian-based MROs, like MAS, Airod and GEESM, to service aircraft.
- The setting-up of foreign MRO bases in Malaysia such as Eurocopter, AAR, General Electric, Hamilton Suntrands, Parker Hannifin and Honeywell, as well as aircraft component manufacturers such as Spirit Aerosystems and Honeywell.

Flight Training Schools

The airline industry is facing an increasing shortage of commercial pilots worldwide. To help mitigate any shortages in the supply of trained personnel, Malaysia has embarked on a deliberate policy to set up professional flight training schools—eight of which are now already in operation. More than one thousand pilots have graduated from these schools over the last three years and all are planning to increase their capacity to cater to the growing and global demand projected industry-wide for pilots globally as this century progresses.

Aviation Training Centres

In the field of human capital development, the DCA has a comprehensive range of facilities and highly-qualified instructors at the newly built Malaysia Aviation Academy (MAVA). MAVA is self-sufficient in both radar and non-radar air traffic control (ATC) training and Malaysia has so far offered more than 350 fellowships to train air traffic controllers from more than 55 ICAO Member States under the Malaysian Technical Co-operation Programme (MTCP).

Another 800 participants from more than 40 countries have also benefited from the aviation security training programmes conducted at the Malaysia Airports Training Centre, an additional ICAO-accredited training facility.

ICAO Audit Performance

In compliance with applicable ICAO Annexes and SARPs, Malaysia had successfully undergone the following audits:Universal Safety Oversight Audit Programme (USOAP). This audit of Malaysian aviation was conducted in May 2000 regarding compliance with Annexes 1, 6 and 8. ICAO USOAP audit employing its new Comprehensive System Approach in June/July 2005. This process verified compliance by Malaysia with 16 ICAO Annexes.ICAO Universal Security Audit Programme (USAP) in January 2006. This process verified Malaysian compliance with ICAO Annex 17.

Malaysia continuously addresses the findings and recommendations that were generated through these audit processes and has authorized ICAO to make available, on its public Web site, an executive summary depicting

Malaysia's level of implementation of the critical elements associated with the USOAP.

Compliance and Contributions

Malaysia is fully committed to the strategic objectives of ICAO with respect to the Organization's goal of enhancing global aviation safety and security, improving the efficiency of aviation operations, minimizing adverse environmental impacts from air transport and strengthening the laws governing civil aviation. Malaysia also remains fully supportive of the objectives and procedures related to the ICAO USOAP and USAP programmes. Malaysia has contributed its auditors, on a long-term secondment basis to ICAO, to support these programmes and will continue to do so under the new Continuous Monitoring Approach (CMA).

As a Contracting State to ICAO, Malaysia consistently participates in meetings and hosts conferences held under the auspices of ICAO, both at the Regional and international levels. Malaysia has also participated and contributed its experts to ICAO's various panels, task forces and meetings, particularly at the ICAO APAC Regional level.

Towards a More Prominent Role for Malaysia in Global Aviation

Malaysia's expanding aviation activities, thriving aerospace industry, and dynamic aviation sector demonstrate its capability and potential to contribute more meaningfully towards the progress and advancement of international aviation. The State's aviation capabilities and potential were clearly in focus when Malaysia was elected to the ICAO Council for the first time in 2007.

As an ICAO Council Member, Malaysia contributes positively to the work of ICAO through deliberations with and membership in the Council's various working groups and committees. Consistently inspired by ICAO's vision of the safe, secure and sustainable development of civil aviation, and with the support of other Member States, Malaysia stands ready to play a more prominent role in global aviation in collaboration with ICAO.

It is the hope of all Malaysian aviation stakeholders that their State will therefore be re-elected to the ICAO Council, so that it can continue to pursue and support ICAO's important objectives. ■

HIGHLIGHTS

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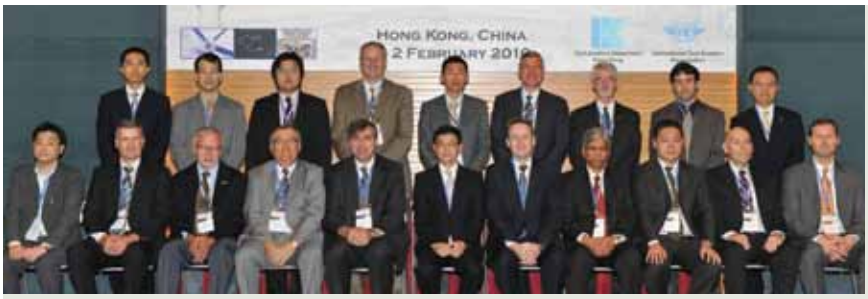
Second Meeting of the MIDANPIRG Steering Committee

Participants to the Second Meeting of Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) Steering Committee (MSG/2). The event was hosted by the Jordanian Civil Aviation Commission and held in Amman, Jordan, March 2010. Several issues of concern to MIDANPIRG were discussed, including: the status of Regional air navigation measures; updates to the action plan decided at the MIDANPIRG/11 meeting; and outcomes of a recent coordination meeting between ICAO MID and the Arab Civil Aviation Commission (ACAC). ■

Fifth Meeting of the South East Asia Sub-Regional ADS-B Implementation Working Group

The Fifth Meeting of the South East Asia Sub-Regional ADS-B Implementation Working Group was hosted by the Directorate General of Civil Aviation (DGCA) of Indonesia in January 2010 in Jakarta. Experts were on hand from six Civil Aviation Administrations, ANSPs in the South East Asia area, CANSO and IATA. The Working Group, established by APANPIRG, has developed implementation frameworks and a sample agreement for sharing of ADS-B data across FIR boundaries in the Region. ■



APAC PBN Implementation Seminar and Sixth Meeting of the PBN Task Force

A Performance-Based Navigation (PBN) Implementation Seminar and the Sixth Meeting of the PBN Task Force (PBN/TF/6) was hosted by China's Civil Aviation Department in Hong Kong in February 2010. One hundred and fifty-four participants from 26 CAAs, three international organizations and several industry partners attended the Seminar, while 101 participants attended the Meeting. The Seminar covered various aspects of PBN implementation and facilitated a practical exchange of information and experience between the attendees. The PBN Task Force Meeting further progressed tasks assigned by APANPIRG and reviewed the planning and implementation status of PBN in the APAC States. ■

The United Arab Emirates

Working with ICAO to Establish Effective Aviation Leadership in the Gulf Region

"Real wealth is the hard work that benefits both the individual and the community. It is immortal and eternal, and it becomes the value of the person and the nation."

– His Highness Sheikh Zayed bin Sultan Al Nahyan
Founding Father of the UAE

Established in 1971 as a federation of seven emirates and strategically situated in the southeast of the Arabian Peninsula in Southwest Asia, the United Arab Emirates (UAE) has a stable political and economic system capable of supporting long term civil aviation planning.

Immediately after its foundation and in realization of the enormous potential for civil aviation to serve as a catalyst for economic growth and to enhance the quality of life of its citizens, the UAE joined the International Civil Aviation Organization (ICAO) in 1972.

Without the benefit of ICAO's Standards and Recommended Practices, and the expert assistance of its staff, the extra-ordinarily rapid growth of the UAE's aviation sector could never have been achieved while still respecting ICAO's ongoing global objectives to improve the safety, efficiency and environmental sustainability of the global air transport network.

The growth of the UAE's aviation industry over recent years has been without precedent. This rapid development has brought with it crucial challenges at a scale beyond the capacity of any country to resolve alone. The UAE has therefore unhesitatingly taken recourse to ICAO as the global aviation regulating authority.

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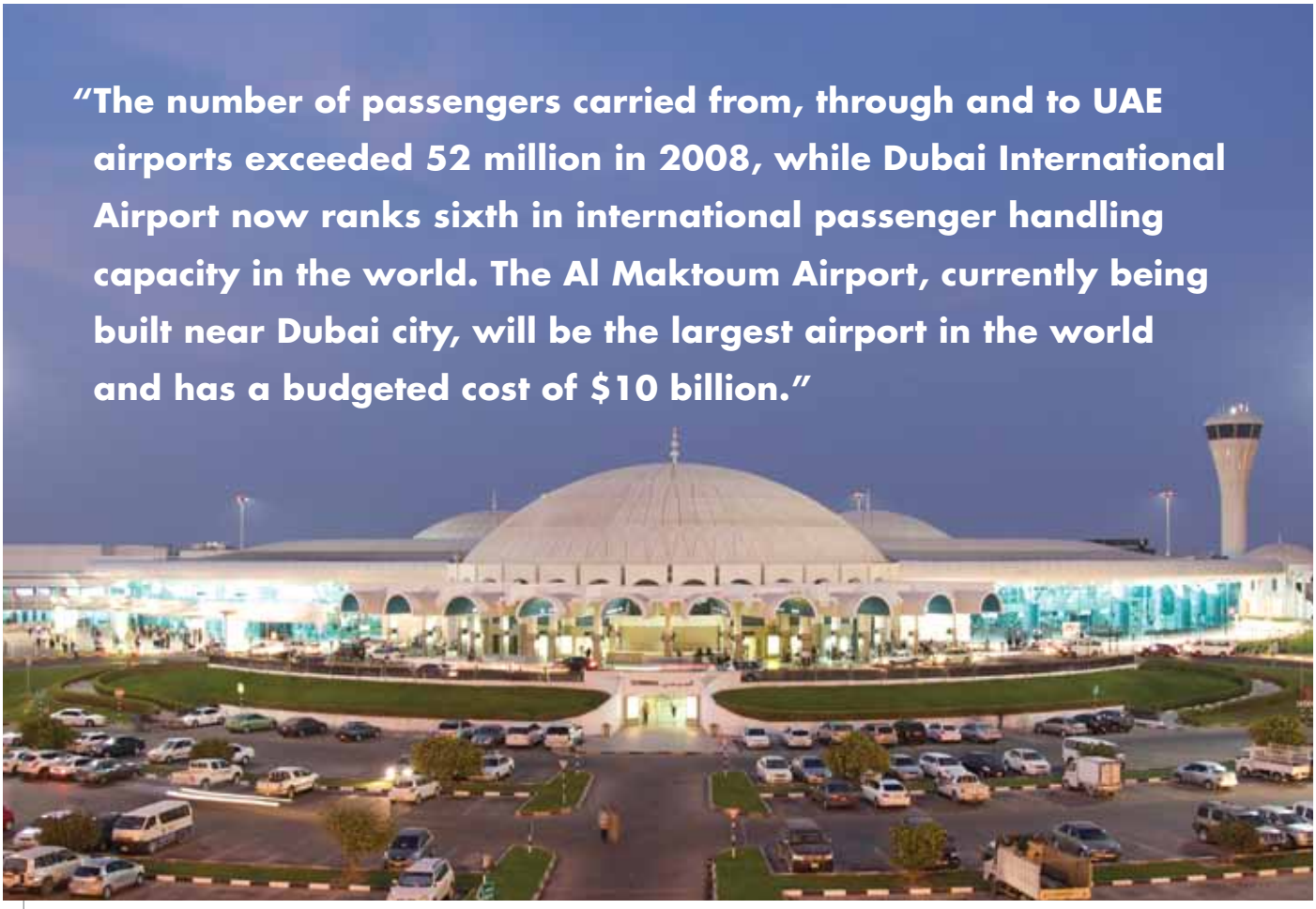


Sharjah International Airport, pictured above, opened in 1977 and was the first Category II airport in the Gulf region with an annual capacity of two million passengers. The Institute of Transport Management named Sharjah the best Global Airport of the year in 2005.

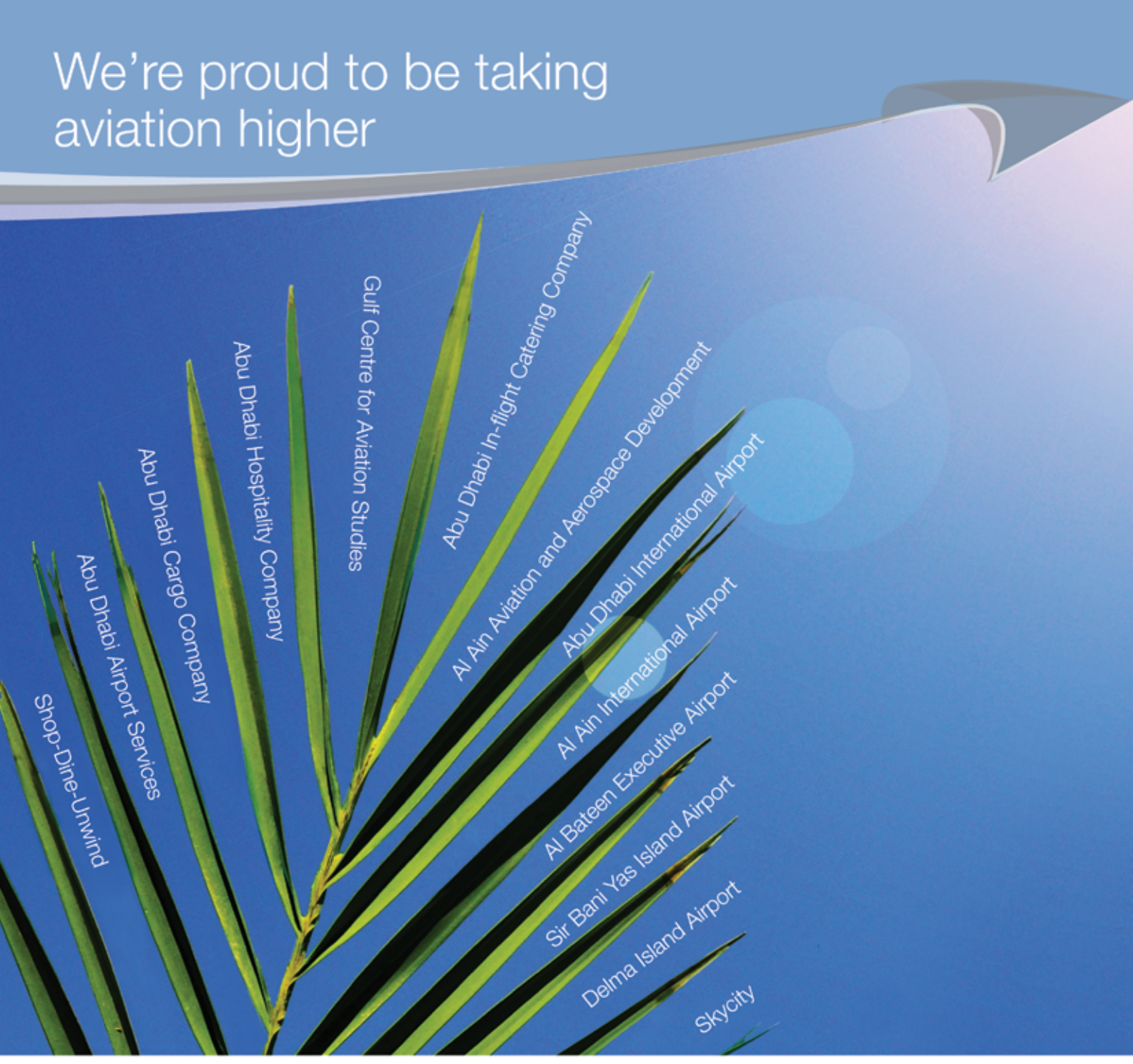
International Airports

The UAE has six international airports that support an enormous 'hub and spoke' complex of civil aviation operations to destinations around the world. The number of passengers carried from, through and to UAE airports exceeded 52 million in 2008, while Dubai International Airport now ranks sixth in international passenger handling capacity in the world. The Al Maktoum Airport, currently being constructed near Dubai city, will be the largest airport in the world and has a budgeted cost of $10 billion.

The UAE continues to generate annual passenger growth figures in the 20 percent range and an annual increase in air traffic movements of 10 percent—among the highest in the world in both categories and contrasting dramatically with the market contractions being experienced in many other global Regions.

Dubai International's new T3 will increase its capacity to over 60 million passengers a year. The airport is connected to over 200 destinations across six continents and services some 123 airlines. Passenger throughput at Dubai has increased by approximately 15 percent a year since 2002.

We're proud to be taking aviation higher



ADAC. Offering world-class standards at the region's finest airports.

Through our commitment to operating safe and secure environments at our five airports, we at ADAC are amongst the pioneers in raising standards for the aviation industry. Our vision for growth and progress has translated into one of the world's most ambitious airport development projects at Abu Dhabi International Airport. We are also investing in the future of aviation at the Gulf Centre for Aviation Studies (GCAS) – providing the region's employees exclusive training delivered by internationally renowned professionals. GCAS is designed to help deliver the best training solutions to meet the real needs of airports in the region. And as yet another example of our commitment to both travellers and stakeholders alike, Abu Dhabi International Airport has just been voted the *World's Most Improved Airport* at the 2009-2010 Skytrax Awards.

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Navigation and Air Traffic Control Systems

Recently opened in Abu Dhabi, the Sheikh Zayed Air Navigation Centre is one of the most modern air traffic control centres in the world. It has sufficient control stations to easily accommodate the burgeoning air movement growth in the Region and has been designed to accommodate growth projections stretching twenty years into the future.

The UAE General Civil Aviation Authority, in its roles as both service provider and regulator, seeks to maintain the highest practical levels of safety while ensuring the most efficient use of airspace for the expeditious flow of UAE domestic and international air traffic. Initiatives such as the recent establishment of a more direct air route connecting Abu Dhabi to the Kingdom of Saudi Arabia significantly reduces flight times, fuel consumption, and related carbon emissions.

Airlines

Airlines of the UAE operate no less than 208 modern aircraft. Supplementing that enormous fleet is a total or 350 aircraft presently on order. The average life span of aircraft operating in the UAE is only five years. This has a positive impact on the safety, convenience and comfort of passenger services and, equally importantly, on the environmental performance of the UAE fleet.

Maintenance and Manufacturing Companies

The UAE has concrete plans in place to expand its capacity for manufacturing and maintenance plants. By way of example a State-owned project has recently been initiated in Abu Dhabi by Mubadala for the manufacture of spare aircraft parts—the first project of its kind in the Middle East. Mubadala also aims to be manufacturing aircraft by 2017.

"Recently opened in Abu Dhabi, the Sheikh Zayed Air Navigation Centre is one of the most modern air traffic control facilities in the world. It has sufficient control stations to easily accommodate the burgeoning air movement growth in the Region and has been designed to accommodate growth projections stretching twenty years into the future and to an annual movement rate in excess of two million passengers."

With ultra-quiet GP7200 engines and fuel economy as low as 3.1 litres per 100 passenger kilometres, Emirates' A380s help put our fleet's fuel efficiency 25% lower than the ICAO global fleet average.

Civil Aviation Education and Training Centres

Another key component of the UAE's civil aviation agenda relates to human resource capacity building. In recent years, the global growth of the aviation industry has resulted in a serious shortage of worldwide aviation expertise; demand has far exceeded supply. The UAE has therefore established a range of civil aviation education and training facilities that offer both undergraduate and post-graduate academic studies, as well as specialized operational and technical training.

Of particular note in this regard, the UAE recently joined with ICAO to establish the Gulf Centre for Aviation Studies *(see sidebar, below)*. This facility is a premier training institution that will foster policy development and implementation skills to ensure the effective governance of related civil aviation activities at the local, Regional, and international level. The Gulf Centre is also instrumental as a host institution for research projects and advanced studies in the technical, operational and human factors aspects of security, safety, and environmentally-related aviation objectives and programmes.

The Dubai Police Training Academy has additionally been certified by ICAO as a leading Regional training institution in the field of aviation security. Likewise, the UAE's Academy of Technical Training, centrally located in Dubai's renowned Knowledge Village, provides a full range of training courses in aviation-related disciplines.

The UAE has also begun to pursue training outreach initiatives in cooperation with the African Civil Aviation Commission (AFCAC) and the Arab Civil Aviation Commission (ACAC). More details on these initiatives may be found under the 'International Cooperation' section on the last page of this profile.

SPECIAL TRAINING FOCUS:

The Gulf Centre for Aviation Studies

Bringing Global Levels of Excellence to Gulf Region Aviation Training

GCAS
مركز الخليج لدراسات الطيران
GULF CENTRE FOR AVIATION STUDIES

Through the expansion of existing facilities, construction of new terminals or the development of entirely new Greenfield projects, the Gulf Region's airports are currently estimated to be spending upwards of $85 billion on their ongoing expansion plans. This figure is expected to double after 2025.

Abu Dhabi Airports Company (ADAC), the operator of the five airports in the emirate of Abu Dhabi, is no exception to the Gulf growth phenomenon. ADAC's chief asset, the Abu Dhabi International Airport, experienced solid growth in both passenger and cargo traffic (7.3 and 7.0 percent respectively) during 2009 despite the significant downturns seen in many other Regions.

Responding to these exceptional and robust levels of aviation growth has opened the door on a new type of challenge, however: how to provide the human resources and skilled personnel training that would be required if existing and planned Gulf facilities were to be operated in accordance with the highest global standards of efficiency and safety.

A New Training Facility for a New Generation of Skilled Gulf Region Aviation Personnel

Inspired initially by the need to meet the challenges connected to Abu Dhabi International Airport's rapid development and, especially, its multi-billion dollar Midfield Terminal Complex, ADAC led development on the new Gulf Centre for Aviation Studies (GCAS) to address its related personnel and operational needs.

ADAC and concerned Gulf aviation stakeholders soon recognized, however, that this new facility could respond not only to the training needs for Abu Dhabi personnel, but also to the effective airport and general aviation training needs being experienced across the entire Gulf Region. With other significant airport-related investments being made in Dubai, Qatar, Saudi Arabia, Oman and Kuwait, the new Gulf Centre is optimally positioned to help ensure the operational efficiency and target customer service levels that are demanded by today's international carriers and passengers alike.

In order to become a leader in the provision of world-class airport services in an increasingly competitive sector, GCAS's future business success is largely dependent on having properly trained staff and by introducing internal policies that nurture an environment of continuous learning and development.

This ethos is the driving principle underlying why the new Gulf Centre for Aviation Studies was created as the Region's first dedicated airport training facility.

"The UAE has established a range of civil aviation education and training facilities that offer both undergraduate and post-graduate academic studies, as well as specialized operational and technical training."

The Gulf Region in particular is still experiencing significant air transport growth despite predominant worldwide trends to the contrary. With this growth comes the responsibility to train the dedicated aviation professionals who will ensure that Gulf aviation progress respects and reinforces the high levels of safety and efficiency that global operators and passengers expect from modern air transport networks.

ADAC's workforce alone currently stands at over 7,000 and will continue growing as new developments come on line. The workforce at Abu Dhabi International Airport (ADIA) is expected to more than quadruple from an estimated 12,000 employees in 2009 to some 50,000 by 2025.

GCAS is currently designing, developing and set to deliver optimal training solutions to meet the needs of ADAC and Gulf stakeholders. Its training programmes consist of proprietary GCAS offerings and, as it formalizes agreements with global aviation training partners such as ACI, JAA-TO, and IATA, additional internationally-approved courses will also be made available.

Special UAE Training Support for Emerging States

As part of its support of the UAE's mandate to contribute to improving aviation and airport business practices worldwide, GCAS has also committed, through the UAE's Civil Aviation Authority (GCAA), to offer *pro bono* training to emerging civil aviation authorities around the world.

In the short-term, the robust growth of Middle East Region air transport alone is expected to generate most of the GCAS work-load. A recent MOU signed with the Bahrain Civil Aviation Authority is a testament to this initial and promising success.

Abu Dhabi International Airport's workforce is expected to more than quadruple from 12,000 employees in 2009 to 50,000 by 2025. The new GCAS will respond to the associated training needs for this facility as well as many others experiencing similar growth levels across the Gulf region.

"It is our primary focus to create an active working strategy that promotes higher aviation safety initiatives through the combined efforts of regulators, industry professionals, manufacturers and stakeholders."

– Saif Al Suwaidi, Director General, UAE GCAA

Security and Safety

The UAE has placed a high priority on its cooperation with the ICAO Universal Safety Oversight Audit Programme (USOAP) and many other international and foreign organizations and authorities with respect to the conduct of their industry inspections.

In meeting its own responsibilities to regulate UAE operators and providers, the General Civil Aviation Authority (GCAA) now employs 46 specialist security and safety inspectors, whose main duties are to oversee equipment, training and operationally-related areas to ensure their close compliance with ICAO safety and security provisions.

The UAE was also recently elected to membership of the ICAO Hazardous Materials Committee and currently presides over the Standards and Air Safety Committee in the Arab Civil Aviation Commission. These are but two of the representative roles accepted by the UAE in meeting its Regional and global responsibilities as a determined contributor to proactive security and safety measures for air operations.

Middle East Aviation Safety Roadmap

In January of this year, members and observers of the Top Level Safety Team of the Middle East Aviation Safety Roadmap held their summit meeting in Dubai, UAE. The summit attendees focused their efforts on evaluating the steps that have been outlined to implement the Global Aviation Safety Roadmap.

The Aviation Safety Roadmap is a collaborative strategy designed by the Industry Strategy Safety Group (ISSG) to identify weaknesses and recommend enhancements in air safety. It compliments and supports the principles and programmes in ICAO's Global Aviation Safety Plan (GASP).

His Excellency Mr. Saif Al Suwaidi, Director General of the UAE GCAA, addressed attendees of the Middle East Top Level Safety Team in Dubai last January. To help ensure more equal Regional representation, the new body will be co-chaired by both government and industry experts on a rotating basis.

The members of the ISSG include the International Civil Aviation Organization (ICAO); International Air Transport Association (IATA); Airport Council International (ACI); International Federation of Airlines Pilots Association (IFALPA); Flight Safety Foundation (FSF); Civil Air Navigation Services Organization (CANSO); and aircraft manufacturers Airbus and Boeing, all of whom were represented at the Summit.

"It is our primary focus to create an active working strategy that promotes higher aviation safety initiatives through the combined efforts of regulators, industry professionals, manufacturers and stakeholders," commented Saif Al Suwaidi, Director General of the GCAA. "We are delighted to welcome the support and participation of key Gulf Cooperation Council (GCC) States and look to align effective policies with a broader Regional perspective."

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Al Suwaidi informed Member Countries on the progress and challenges being faced following the first year of implementing the Aviation Safety Roadmap. Ensuring equal Regional representation, the Middle East Safety Team will be co-chaired by both government and industry experts on a rotating basis, thereby increasing involvement and including a wider range of viewpoints.

Participants to the UAE's Middle East Top Level Safety Team Meeting in January 2010.

The resolutions established following the summit hosted in 2008 in Abu Dhabi received strong support from leading global aviation councils, including ICAO, FSF, EASA and others.

"Both Regional and global aviation leaders recognize the challenges aviation departments face during a period of widespread growth and expansion," Suwaidi added. "The necessity of ensuring sufficient numbers of aviation professionals, changing cultural protocol systems, preparing to adopt and include the latest in aviation technology and larger aircraft, as well as more effectively coordinating commercial and military air traffic priorities are just a few of the many primary concerns facing a rapidly developing region like the GCC."

not only a legal obligation under the Chicago Convention but moreover an essential humanitarian service.

To ensure more consistent levels of service across some national territories that have had difficulty in complying with ICAO's high standards, the UAE GCAA is hosting the ICAO Global Civil Aviation SAR Forum in Abu Dhabi during June 21–22, 2010. Leading global SAR experts will be present at this event and will provide in-depth analyses of the shortcomings of the current global SAR service. Advanced organizational, technological and procedural improvements which respond to these shortcomings to the worldwide system will then be highlighted to Forum participants.

"As a further demonstration of its leadership and commitment in the field of SAR, the GCAA is presently funding and managing an ICAO project petitioned by a number of African States to advance the sub-Regional provision of SAR services in southern Africa. This is a strategy to ensure more consistent levels of service across some national territories that have had difficulty in complying with ICAO's high standards."

Search and Rescue (SAR):
Ongoing Efforts and the June 2010 ICAO Global Civil Aviation SAR Forum in Abu Dhabi

Consistent with its emphasis on safety, the UAE's GCAA is paying particular regard to effective Search and Rescue (SAR) services, recognizing the findings of many ICAO evaluations, audits and technical projects which have revealed that the provision of SAR services throughout the world is decidedly uneven.

SAR is the last line of defence when all other support services fail and aircraft crash, ditch or are forced to land. It is, therefore,

As a further demonstration of its leadership and commitment in the field of SAR, the GCAA is presently funding and managing an ICAO project petitioned by a number of African States to advance the sub-Regional provision of SAR services in southern Africa. This is a strategy to ensure more consistent levels of service across some national territories that have had difficulty in complying with ICAO's high standards. The GCAA is also seconding an SAR specialist to various ICAO Working Groups, Seminars and Meetings in order to improve the level and quality of expert information in this area which is available to international SAR stakeholders.

Leadership and Vision in Global Civil Aviation

"The selection of UAE to be the first country outside Europe to host the EASA international forum stresses the position of the UAE in aviation safety circles and underlines the trust which international civil aviation organizations and authorities have in the State."

EASA's International Cooperation Forum

The European Aviation Safety Agency (EASA) recently selected the UAE to host EASA's international cooperation forum in its second session, the first outside Europe, which discussed the latest developments in safety standards applied by EASA and followed by several civil aviation authorities around the world.

The forum, which was held in the Monarch hotel in Dubai from April 27-29 of this year, benefitted from the participation of more than 100 delegations representing 50 States and aviation organizations from various countries which apply the EASA standards in their national and regional jurisdictions.

The aim of the EASA forum is to share experience and knowledge among States and authorities adopting EASA standards and to update participants with regards to latest developments in European air safety legislations.

The selection of UAE, as represented by GCAA, to be the first country outside Europe to host this international forum stresses the position of the UAE in aviation safety circles and underlines the trust which international civil aviation organizations and authorities, especially EASA, have in the UAE.

Liberalization of International Air Transport

The UAE has established one of the most comprehensive market access frameworks in international air transport. UAE-designated carriers are capable of operating in more than 129 countries in the world. Since its creation, the UAE has pursued the liberalization of air services agreements and is widely recognized for promoting initiatives such as the Arab Air Transport Liberalization Agreement (Damascus Agreement), the successful ICAO Conferences on Air Services Negotiations (ICAN), and IATA's Agenda for Freedom, which concluded last year with the adoption of the Montebello Declaration.

Aviation and the Environment

Environmental protection and sustainable development are core elements of the UAE's policy agenda. The UAE is actively committed to the stabilization of the global climate system, as evidenced by numerous initiatives and substantial investments in improved technology and infrastructure.

Following in this vein, the UAE's Masdar City initiative will incorporate climate change, economic opportunity and clean energy objectives in the world's first comprehensive effort to create a truly twenty-first century urban planning development. Masdar City funding is currently being focused on completion of a variety of infrastructure, manufacturing, and renewable energy projects such as solar, hydrogen and wind power generation, carbon reduction and waste management technologies, and carbon capture and storage (CCS). When completed in 2016, Masdar City will be the world's first carbon-neutral, zero-waste city.

The UAE's new Masdar City initiative will link climate change, economic opportunities, and clean energy. Its funding will go into infrastructure, manufacturing, and renewable energy projects such as solar power, hydrogen, wind power, carbon reduction, management technologies, and carbon capture and storage (CCS).

In March 2009, Etihad Airways entered into a partnership with the Masdar stakeholders aimed at establishing a range of activities to reduce the airline's carbon footprint through sustainable and energy efficient measures and initiatives.

The UAE is also hosting the headquarters of the International Renewable Energy Agency (IRENA) in Abu Dhabi. IRENA's mandate is to promote sustainable use of renewable energy sources globally.

The imperative to operate efficient, commercially-driven airlines and airports is a key dimension of 'sustainability.' The UAE's airlines have consequently invested heavily in the most modern aircraft in order to leverage their vastly superior performance in terms of fuel consumed and environmental impact and the UAE aviation sector in general has been aggressive in its pursuit of reductions in fuel usage and emissions.

Emirates Airlines led and promoted the development of the A380 aircraft to help ensure its realization and ordered 58 of these ultra-efficient aircraft. It is also in possession of the largest ever fleet of the new B777 aircraft—considered one of the most fuel-efficient aircraft ever produced. Etihad Airways placed one of the largest orders of aircraft in 2008 with 100 firm aircraft orders and options, and purchase rights for a further 105 aircraft which will be delivered between 2011 and 2020. This was followed up in 2009 with confirmation of the 239 engines needed to maximize the efficiency of these aircraft in the long run. Similarly, Air Arabia operates one of the most modern fleets of A320s with an existing order of 49 additional aircraft.

Attention is also being paid to ground handling operations and catering to reduce environmental impacts through recycling, waste management and community partnership. Energy saving and waste reduction measures have been introduced by airport operators across the State.

"Environmental protection and sustainable development are core elements of the UAE's policy agenda. The UAE is actively committed to the stabilization of the global climate system, as evidenced by numerous initiatives and substantial investments in improved technology and infrastructure."

"As part of its ongoing mandate to provide effective cooperative support and leadership in its local and neighbouring Regions, the UAE has recently signed Memoranda of Understanding (MOUs) with the African Civil Aviation Commission (AFCAC) and the Arab Civil Aviation Commission (ACAC). These MOUs are in line with the GCAA's strategic objective to strengthen international cooperation in civil aviation with various Regional organizations and to tackle human resource and other capacity building challenges with partnering States."

International Cooperation

The UAE has become increasingly aware that there can be no variation or compromise in standards of safety, security and treatment of the environment amongst the 190 ICAO Member States, and that its responsibility as an aviation leader is to balance its pursuit of specific benefits to the UAE with cooperative support for the aspirations of all ICAO Members.

As part of its ongoing mandate to provide effective cooperative support and leadership in its local and neighbouring Regions, the UAE has recently signed Memoranda of Understanding (MOUs) with the African Civil Aviation Commission (AFCAC) and the Arab Civil Aviation Commission (ACAC). These MOUs, are in line with GCAA's strategic objective to strengthen international cooperation in civil aviation with various Regional organizations and to tackle human resource and other capacity building challenges with partnering States.

Under the auspices of these new strategic partnerships, the UAE will organize a number of on-site, one-week training courses in each of these Regions. Among others, these courses will focus on topics including Safety Management Systems (SMS), airport economics and airline business strategies. In addition, the UAE will grant fellowships to Regional professionals who could benefit from the many courses now on offer at the UAE's highly-qualified training institutions.

These efforts will significantly contribute to the development of safer, more efficient and more sustainable civil aviation in these Regions. In a similar vein, the UAE has already started discussions on ways to effectively strengthen cooperation with the Latin American Civil Aviation Commission (LACAC) and the Interstate Aviation Committee (IAC).

COSCAP GS Initiative

The Cooperative Development of Operational Safety and Continuing Airworthiness Programme for the Gulf States Region (COSCAP GS) is a cooperative arrangement between Bahrain, Kuwait and UAE aimed at cost-effectively enhancing the safety and efficiency of air transport operations in the Gulf States sub-Region.

The five-year COSCAP GS project will serve as a Regional forum for addressing flight safety oversight activities with a view toward harmonization of related regulations, policies and procedures. Participating States will be able to more effectively share associated flight safety resources, enhance the professional and practical knowledge and qualifications of safety oversight personnel through formal and on-the-job training, carry out air operator certification and surveillance tasks on behalf of CAAs currently unable to do so (upon request) and foster stronger Regional ties through improved and more comprehensive relationships with local States.

In addition, COSCAP-GS will assist local stakeholders to organize seminars, workshops and training-related activities on any new requirements which are indicated by ICAO.

His Excellency Mr. Saif Al Suwaidi (left), Director General of the UAE GCAA, accompanied by Captain Aysha Al Hamili, UAE Permanent Representative on the ICAO Council.

Strengthening our Commitment to Civil Aviation and to ICAO

Just as the UAE has benefited greatly from the authority and expertise of ICAO, it is now committed to the closest cooperation with this vital Organization. The UAE seeks, by its active participation in ICAO activities and through substantial contributions to the Organization's work programmes, to share the lessons it has learned and the expertise it has gained.

We seek your endorsement in our efforts to support ICAO and, through it, the entire international civil aviation community. ■

خدمات هلا:

تقدم مجموعة من الخدمات مثل إجراءات السفر السريعة, تقديم الأزهار و حجز سيارات الليموزين و غيرها لكي يشعر بالتميز.

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