# ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION


# 36th Assembly Review

**A new plan for Africa and multiple resolutions designed to improve the safety, security, efficiency and sustainability of global aviation feature prominently in the results of the 36th ICAO Assembly.**

Also in this Issue: SMS—New Perspectives on Safety; ISD Profile; Climate Impact of Aviation; Smithsonian Birdstrike Overview; Printing Section Feature; ACI Feature on Noise and Local Air Quality; ACI Director General Message.

Vol. 62, N° 5

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# Leadership and Vision in Global Civil Aviation

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# The 36th Assembly: Efficiency as a Guiding Principle

The 36th Regular Session of the ICAO Assembly, held from 18 to 28 September 2007, endorsed and consolidated major initiatives undertaken by the Organization during the past three years to increase the overall efficiency of the global air transport system. Improving efficiency is fundamental to international civil aviation and has a direct impact on the level of safety, security and sustainability of passenger and cargo operations.

The 39 Resolutions adopted by a record 179 Member States and 44 observer delegations, representing 1488 delegates, send a powerful message as to the critical strategic importance of ICAO in establishing the future direction of air transport over the next three years and beyond.

On practically every issue, decisions were again arrived at through consensus. The notable exception was the subject of market-based options. While the Assembly agreed that these instruments were valuable for addressing aircraft emissions, a majority of the delegations felt, however, that States should not apply emissions trading systems to the airlines of other States except when pursuant to mutual agreement.

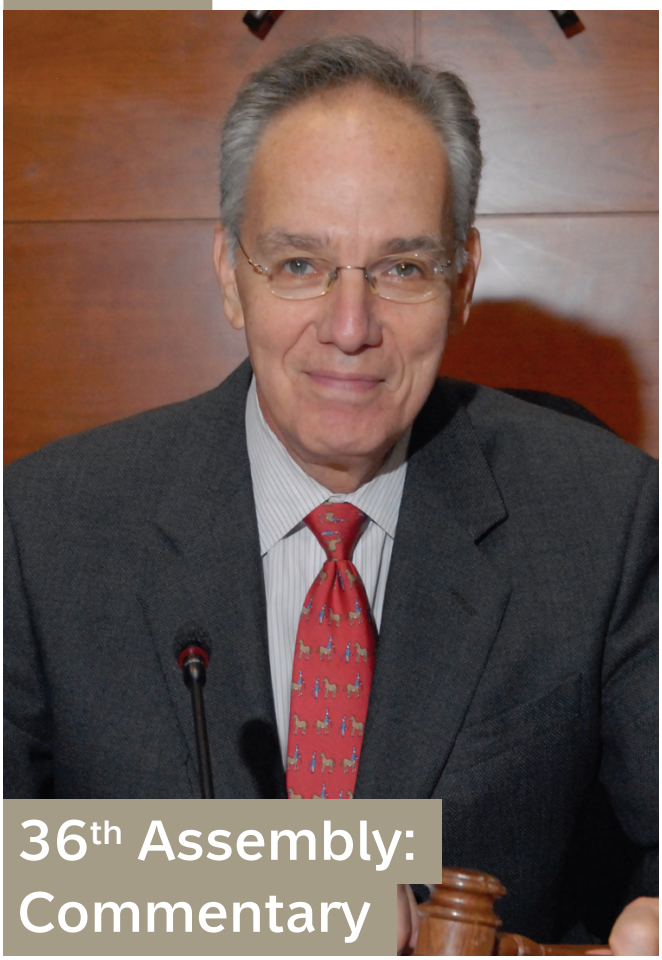
In his commentary, the President of the Assembly, Mr. Jeffrey N. Shane, Under Secretary for Policy at the United States Department of Transportation, provides his analysis of the discussion on the subject and his personal appreciation of the meeting. I take this opportunity to thank Mr. Shane for his invaluable contribution to the success of the Assembly.

Increasing the efficiency of air transport means that ICAO itself has to become more efficient. As the Secretary General pointed out in his report to the Assembly, the Organization undertook a major shift in management philosophy and practice in 2004, based on the concepts of performance, results, accountability and transparency. In three short years, significant achievements have been made under this new way of doing business, based on the creation of an ICAO Business Plan which translates each Strategic Objective of the Organization—Safety, Security, Environmental Protection, Efficiency and Continuity of aviation operations and the Rule of Law—into specific Action Plans. These make it possible to utilize resources more effectively as we move to results-based planning and results-based budgeting.

I am confident that the substantial progress we have made in transforming ICAO into a more integrated, cohesive and productive organization will allow us to serve our Member States and the world aviation community in a more focussed and timely manner than ever before.

I look forward to the next triennium as we implement the Resolutions of the Assembly and continue to do our share, as the central institution for global governance in civil aviation, in providing air travellers and shippers worldwide with the safest and most efficient global air transport system possible. ■

**Roberto Kobeh González**
President, ICAO Council



# 36th Assembly: Commentary

By Jeffrey N. Shane
Under Secretary for Policy, U.S. Department of Transportation
President, 36th Session of the ICAO Assembly

It was an enormous privilege to serve as President of the 36th Session of the ICAO Assembly. Indeed, for someone who has devoted so much time to aviation policy and law, it is difficult to imagine a more profoundly enriching experience, both professionally and personally. I recall, during the final plenary meeting, looking out at nearly 1500 colleagues from 179 countries and wondering about the life journeys that had brought all of us together in Montreal for this historic gathering. So many different and wonderful stories! And yet all of us, from whatever background, shared a common purpose: to enhance the growth of our economies through the betterment of international air transport. It was very special to be in such extraordinary company.

Newspaper readers might be forgiven for thinking that we spent two weeks arguing about emissions trading systems. As we all know, the Assembly was about much more than that. We established a budget and work programme for the next three years; we elected 36 members to the ICAO Council; we set term limits for ICAO's Secretary General and Council President; we embraced the AFI Plan for advancing aviation in Africa; and we produced a great many resolutions that will further enhance the safety, efficiency, and security of international aviation. As I listened to the Commission chairs reporting on their work during the final plenary meeting—each summing up in just a few information-packed minutes the results of untold efforts of countless participants over months or years—my sense of wonder only grew. It was a very busy and productive two weeks.

Nevertheless, our deliberations about international aviation and climate change did receive more attention in the press than anything else. There are two reasons for that. First, there is a growing dissatisfaction among a great many observers—most conspicuously in Europe—with the pace at which the industry is perceived to be addressing the emissions problem. Second, everyone knew that we would be discussing the European Commission's proposed emissions trading system and its application to flights operated by non-European airlines—an application to which many Member States had objected. The press expected the ICAO equivalent of a World Wrestling Federation "smackdown".

But something very different happened at the 36th Session, and it is important the story be told more fully.

First, there was no disagreement among the delegations that more concerted and effective action was required to reduce the carbon footprint of international aviation. Nor was there disagreement that, in taking that more concerted action, an array of tools—technological, operational, and economic—would have to be employed. Notably, there was no disagreement about the importance in this context of market-based mechanisms in general, and emissions trading systems in particular. Many delegations explicitly expressed support for emissions trading as a potentially valuable strategy.

The only disagreement related to a few words in a resolution on market-based mechanisms that urged member states not to apply an emissions trading system to other states' aircraft operators "except on the basis of mutual agreement between those States."

Those words, while supported by a majority of the delegations present, were predictably opposed by all 42 of the delegations comprising the EU and European Civil Aviation Conference bloc. The European delegations entered a formal reservation with respect to the resolution on market-based mechanisms and said that they did not intend to be bound by it.

But that reservation isn't really the centrepiece of the story. Far more important, in the view of most participants, was another resolution that put ICAO on an aggressive path to addressing aircraft emissions more effectively. That resolution called on the ICAO Council to form a new "Group on International Aviation and Climate Change," composed of senior government officials. Its purpose would be to develop "an aggressive Programme of

"Far more important, in the view of most participants, was another resolution that put ICAO on an aggressive path to addressing aircraft emissions more effectively. That resolution called on the ICAO Council to form a new "Group on International Aviation and Climate Change," composed of senior government officials. Its purpose would be to develop "an aggressive Programme of Action on International Aviation and Climate Change." The programme will feature an "implementation framework" for States to use in achieving emissions reductions, including voluntary measures, technology improvements, more efficient operational measures, improvements in traffic management, positive economic incentives, and, yes, even market-based measures."

Action on International Aviation and Climate Change." The programme will feature an "implementation framework" for States to use in achieving emissions reductions, including voluntary measures, technology improvements, more efficient operational measures, improvements in traffic management, positive economic incentives, and, yes, even market-based measures. Importantly, the new programme will also include specific ways of measuring progress, the identification of "global aspirational goals in the form of fuel efficiency for international aviation," and progress reports from Member States. Finally, ICAO will convene a high-level meeting for the purpose of reviewing the plan and taking next steps. That meeting will most likely take place in late 2009 or, at the latest, early 2010. Importantly, there were no reservations to that resolution, which was adopted by consensus.

Regarding emissions trading systems, the assembled delegations—including those of the EU and the ECAC Member States—worked long and hard, in an atmosphere of professionalism and mutual respect, to find compromise language. We never found it. But the widespread view among the delegates in Montreal was that, but for the European Commission's insistence on a more robust response to the emissions question, the issue of climate change and the importance of ICAO's role in addressing it would not have featured so prominently on the Assembly's agenda. Europe, where the public attaches great urgency to the implications of climate change, has challenged the rest of us in ways that we need to take seriously. The bottom line is that we agreed about far more than we disagreed about, and the historic result is that ICAO is now on a course to address the emissions issue far more effectively.

> "The bottom line is that we agreed about far more than we disagreed about, and the historic result is that ICAO is now on a course to address the emissions issue far more effectively."

I would be remiss if I didn't express my personal gratitude to ICAO Council President Roberto Kobeh and Secretary General Taïeb Chérif for their wise counsel and kindness throughout the 36th Session. I am also grateful to the ICAO Secretariat for their extraordinary support. The assembled delegations all benefited beyond measure from the staff's professionalism and dedication, without which we simply could not have accomplished so much.

# The ICAO 36th Assembly: The Review

**THE 36TH REGULAR SESSION OF THE ICAO ASSEMBLY WAS HELD FROM 18 TO 28 SEPTEMBER 2007. AS WITH SUCH SESSIONS, THE COMPLETE WORK OF THE ORGANIZATION IS REVIEWED IN DETAIL, AND GUIDANCE IS GIVEN TO THE OTHER BODIES OF ICAO FOR THEIR FUTURE WORK IN THE FORM OF ASSEMBLY RESOLUTIONS. THE 39 RESOLUTIONS ADOPTED DURING THIS SESSION WILL GUIDE THE ORGANIZATION IN FULFILLING ITS MANDATE OVER THE NEXT THREE YEARS AND BEYOND.**

**THE LIST OF RESOLUTIONS IS REPRODUCED BELOW ALONG WITH A BRIEF DESCRIPTION OF THE MAIN ACTION POINTS TO BE UNDERTAKEN BY THE ICAO COUNCIL AND THE SECRETARIAT OF THE ORGANIZATION. FOR EACH RESOLUTION, THE RELATED WORKING PAPER (WP) AND PLENARY ACTION SHEET (PAS) ARE REFERENCED FOR ADDITIONAL BACKGROUND. THESE ARE AVAILABLE ON THE ICAO WEBSITE AT *WWW.ICAO.INT.***

### RESOLUTION A36-1 (WP/369 and PAS No. 3)

COMPREHENSIVE REGIONAL IMPLEMENTATION PLAN FOR AVIATION SAFETY IN AFRICA

*(For a description of the AFI Plan, please see Issue 4/2007 of the* ICAO Journal*)*

**ICAO to:**

1. execute a gap analysis;
2. assist States to ensure transparency with regard to the progress achieved with implementation through the AFI Plan;
3. assist States to strengthen cooperation through regional and sub-regional projects in all sectors of civil aviation; and
4. assist stakeholders to address priorities through projects.

**Council to:**

1. notify all stakeholders of the priority projects identified through the gap analysis;
2. establish a mechanism to receive voluntary contributions for the coordination of the AFI Plan;
3. ensure a stronger ICAO leadership role and allocate resources to the relevant Regional Offices;
4. implement the AFI Plan in line with programme management and business plan principles and practices;
5. monitor and measure the status of implementation in the AFI Region throughout the triennium;
6. report to the next ordinary session of the Assembly on the progress made; and
7. integrate capabilities and develop new working relationships with all stakeholders.

### RESOLUTION A36-2 (WP/340 and PAS No. 3)

UNIFIED STRATEGY TO RESOLVE SAFETY-RELATED DEFICIENCIES

**A State letter to be sent in early January 2008 to all Contracting States reminding them of the need for:**

1. surveillance over all aircraft operations, including foreign aircraft operations;
2. sharing critical safety information, and pertinent data concerning aircraft registrations pursuant to Article 21 of the Convention;
3. developing and further strengthening regional and sub-regional cooperation; and
4. developing partnership initiatives with other States and other stakeholders, in order to strengthen safety oversight capabilities.

**Secretary General to:**

1. foster coordination and cooperation between ICAO USOAP and audits of other organizations;
2. promote the concept of regional and sub-regional safety oversight systems;
3. develop an annual report on global deficiencies in the aviation sector in conjunction with banks and other donors;
4. specify deficiencies that need to be treated on a priority basis, in order for donors to have the opportunity to allocate support to States;
5. conduct a study for developing guidelines for staffing levels in civil aviation authorities; and
6. strengthen the Implementation Support and Development (ISD) Programme to ensure its continued effectiveness.

### RESOLUTION A36-3 (WP/324 and PAS No. 3)

IMPLEMENTATION SUPPORT AND DEVELOPMENT (ISD) PROGRAMME – SAFETY

*(For a profile of the new ISD Branch, please see Issue 4/2007 of the* ICAO Journal*)*

**Secretary General to:**

1. continue to operate the Implementation Support and Development (ISD) Programme based on transparency and sharing of safety-critical information, promotion of regional safety oversight systems and provision of support to States;
2. conduct safety information analysis in partnership with Contracting States and other stakeholders for the purpose of rectifying deficiencies identified through ICAO USOAP;
3. clearly define the objectives of the Implementation Support Programme and identify and re-allocate adequate resources;

4. send State letter in January 2008 reminding States to support the Programme through the secondment of specialists and provision of other resources;
5. enhance the Flight Safety Information Exchange (FSIX);
6. inform States of any enhancements planned for the FSIX, for facilitating the sharing and exchange of information;
7. determine means of providing assistance to States in need, and develop processes for determining actions for those States which have not rectified safety deficiencies; and
8. periodically report to Council on the overall implementation of the ISD Programme.

**RESOLUTION A36-4 (WP 329 and PAS No.3)**
APPLICATION OF A CONTINUOUS MONITORING APPROACH FOR THE UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP) BEYOND 2010

Secretariat to examine during the upcoming triennium the feasibility, among the various options that could be considered, of a new approach for USOAP based on the concept of continuous monitoring, to be implemented at the end of the current audit cycle in 2010. Report to be presented to the next ordinary session of the Assembly on the overall implementation plan for this new auditing approach to commence after 2010.

**RESOLUTION A36-5 (WP/332 and PAS No.3)**
INTERNATIONAL FINANCIAL FACILITY FOR AVIATION SAFETY (IFFAS)

Progress made by IFFAS in funding safety-related projects to be consistently monitored to ensure the smooth functioning of IFFAS; Efforts to continue to promote and expand IFFAS, for example, by holding workshops and seminars; Efforts to continue to reduce administrative costs to a minimum; Letter to be sent to States and other contributors urging them to make contributions to IFFAS; and letter to be sent to Contracting States inviting them to take advantage of IFFAS assistance as a means to correct safety-related deficiencies identified through USOAP.

**RESOLUTION A36-6 (WP/357 and PAS No. 1)**
STATE RECOGNITION OF THE AIR OPERATOR CERTIFICATE OF FOREIGN OPERATORS AND SURVEILLANCE OF THEIR OPERATIONS

ICAO to continue development of guidelines and procedures to verify conditions for recognition as valid of certificates and licences.

**RESOLUTION A36-7 (WP/357 and PAS No. 1)**
ICAO GLOBAL PLANNING FOR SAFETY AND EFFICIENCY

1. ICAO to implement and keep current the Global Aviation Safety Plan (GASP) and the Global Air Navigation Plan (GANP) to support the relevant Strategic Objectives.
2. Council to provide a report on the implementation and evolution of the global plans to future regular sessions of the Assembly.

**RESOLUTION A36-8 (WP/358 and PAS No. 1)**
NON-DISCLOSURE OF CERTAIN ACCIDENT AND INCIDENT RECORDS

1. States to be informed of the amended Resolution.
2. Council to provide a progress report to the next ordinary session of the Assembly.

**RESOLUTION A36-9 (WP/358 and PAS No. 1)**
PROTECTING INFORMATION FROM SAFETY DATA COLLECTION AND PROCESSING SYSTEMS IN ORDER TO IMPROVE AVIATION SAFETY

1. States to be informed of the amended Resolution.
2. Council to develop guidance to support the establishment of safety reporting systems in cooperation with States and international organizations.
3. Council to provide a progress report to the next ordinary session of the Assembly.

**RESOLUTION A36-10 (WP/358 and PAS No. 1)**
IMPROVING ACCIDENT PREVENTION IN CIVIL AVIATION

States to be informed of the amended Resolution.

**RESOLUTION A36-11 (WP/359 and PAS No. 1)**
PROFICIENCY IN THE ENGLISH LANGUAGE USED FOR RADIOTELEPHONY COMMUNICATIONS

Refer to the Air Navigation Commission for prioritization within the overall air navigation work programme.

**RESOLUTION A36-12 (WP/359 and PAS No. 1)**
HALON REPLACEMENT

Refer to the Air Navigation Commission for prioritization within the overall air navigation work programme.

**RESOLUTION A36-13 (WP/366)**
CONSOLIDATED STATEMENT OF CONTINUING ICAO POLICIES AND ASSOCIATED PRACTICES RELATED SPECIFICALLY TO AIR NAVIGATION

States to be informed of amended Appendices A, C, D, K, L and P and deletion of Appendix I.

**RESOLUTION A36-14 (WP/365 and PAS No. 1)**
USE OF CROSS-POLAR ROUTES

ICAO to coordinate, through the relevant Regional Offices, initiatives related to the use of cross-polar routes.

**RESOLUTION A36-15 (WP/367 and PAS No. 6)**
CONSOLIDATED STATEMENT OF CONTINUING ICAO POLICIES IN THE AIR TRANSPORT FIELD

1. Letter to be sent to States informing them of the Resolution.
2. Council, Secretary General and the Secretariat to act in accordance with the relevant clauses of the Resolution.

**RESOLUTION A36-16 (WP/326 and PAS No. 4)**
ASSEMBLY RESOLUTIONS NO LONGER IN FORCE

Secretary General to revise and send to States document containing Assembly resolutions in force.

**RESOLUTION A36-17 (WP/354 and PAS No. 3)**
CONSOLIDATED STATEMENT OF ICAO POLICIES ON TECHNICAL COOPERATION

**Secretary General to:**
1. initiate the recruitment of Technical Co operation Officers for all Regional Offices as of 2008, subject to no increase in project costs;
2. continue to pursue the gradual reduction of administrative support costs to projects;
3. inform civil aviation authorities of technical aspects of projects to be implemented at the request of non-State entities upon the start of negotiations;
4. consider, together with participating States, the expansion of COSCAPs and their evolution towards the establishment of regional safety oversight organizations (RSOOs); and
5. take into account, when developing the policy on cost recovery, that costs recovered by the Organization in regard to the Technical Co-operation Programme must be directly related to costs of implementing the projects.

States and donors to be encouraged to provide funding for ex-post evaluations of their projects.

**RESOLUTION A36-18 (WP/335 and PAS No. 3)**
FINANCIAL CONTRIBUTIONS TO THE AVIATION SECURITY PLAN OF ACTION

**Secretary General to:**
1. send a State letter to all Contracting States to make the required contributions; and
2. prepare an Integration Plan for the Council for total integration of the Aviation Security Plan of Action into the Regular Programme Budget for the next triennium (2011-2013).

**RESOLUTION A36-19 (WP/335 and PAS No. 3)**
THREAT TO CIVIL AVIATION POSED BY MAN PORTABLE AIR DEFENCE SYSTEMS (MANPADS)

Resolution to be conveyed to States with the request to inform the Organization regarding the status of implementation of the Resolution and the measures taken to fulfil its requirements.

Council and Secretary General to monitor, on an on-going basis, the threat to civil aviation posed by MANPADS in close cooperation with international and regional organizations such as the United Nations Counter-Terrorism Committee (CTC), the Organization for Security and Cooperation for Europe (OSCE), the Organization of American States (OAS) and the Asia-Pacific Economic Cooperation Secure Trade in the Asia and Pacific Region (STAR) as well as with States.

Secretariat, with the assistance of the Aviation Security Panel, to develop appropriate countermeasures, as necessary, which will be placed on the MANPADS secure website.

**RESOLUTION A36-20 (WP/335 and WP/336 and PAS No. 3)**
CONSOLIDATED STATEMENT ON THE CONTINUING ICAO POLICIES RELATED TO THE SAFEGUARDING OF INTERNATIONAL CIVIL AVIATION AGAINST ACTS OF UNLAWFUL INTERFERENCE

Resolution to be conveyed to States with the request to implement the relevant parts. Council, subsidiary bodies and the Secretary General to act in accordance with the relevant clauses of the Resolution.

Subjects include implementation of technical security measures, assistance to States in the implementation of technical measures for the protection of international civil aviation, continuation of the USAP following the initial cycle of audits at the end of 2007, validation of State corrective action plans and the introduction of a limited level of transparency with respect to ICAO aviation security audit results.

**RESOLUTION A36-21 (WP/353 and PAS No. 6)**
PREVENTING THE INTRODUCTION OF INVASIVE ALIEN SPECIES

1. Letter to be sent to States urging them to support one another's efforts in this field.
2. Work will continue with appropriate organizations such as the Global Invasive Alien Species (GISP) and the Secretariat to the Convention on Biological Diversity (CBD) on the subject.

### RESOLUTION A36-22 (WP/355 and PAS No. 3)
CONSOLIDATED STATEMENT OF CONTINUING ICAO POLICIES AND PRACTICES RELATED TO ENVIRONMENTAL PROTECTION

States to be informed. Council and Secretary General to act in accordance with the relevant clauses of the Resolution. New and additional tasks to be brought to the attention of Committee on Aviation Environmental Protection (CAEP). Council to form a new Group for the purpose of developing and recommending to the Council an aggressive Programme of Action on International Aviation and Climate Change.

**Subjects include:**

- development of Standards, Recommended Practices and Procedures and/or guidance material relating to the quality of the environment;
- policies and programmes based on a "balanced approach" to aircraft noise management;
- aviation impact on local air quality;
- aviation impact on global climate - Scientific understanding;
- aviation impact on global climate - Cooperation with UN and other bodies;
- ICAO Programme of Action on international aviation and climate change;
- market-based measures, including emissions trading.

### RESOLUTION A36-23 (WP/359 and PAS No. 1)
PROFICIENCY IN THE ENGLISH LANGUAGE USED FOR RADIOTELEPHONY COMMUNICATIONS

Refer to the Air Navigation Commission for prioritization within the overall air navigation work programme.

### RESOLUTION A36-24 (WP/360 and PAS No. 3)
NON-CHEMICAL DISINSECTIZATION OF THE AIRCRAFT CABIN AND FLIGHT DECK FOR INTERNATIONAL FLIGHTS

Secretary General to write to the World Health Organization asking that it holds a consultation on disinsectization of the cabin and flight deck; and

Council to present a report to the next ordinary session of the Assembly.

### RESOLUTION A36-25 (WP/361 and PAS No. 1)
SUPPORT OF THE ICAO POLICY ON RADIO FREQUENCY SPECTRUM MATTERS

1. ICAO to urge States and international organizations to support the ICAO position on radio frequency spectrum matters.
2. ICAO to bring to the attention of ITU the importance of adequate radio frequency spectrum allocation and protection for the safety of aviation.

### RESOLUTION A36-26 (WP/341 and PAS No. 5)
CONSOLIDATED STATEMENT OF CONTINUING ICAO POLICIES IN THE LEGAL FIELD

States to be informed.

### RESOLUTION A36-27 (WP/340 and PAS No. 3)
GENDER EQUALITY

**Secretary General to:**

1. continue to take steps with respect to attaining gender equality and equity in order to achieve the goal of 50/50 gender balance at all levels; and
2. continue to advance the work on the Affirmative Action Programme which should be renamed the Gender Equality Programme.

Family-friendly policies to continue to be developed in the context of the ICAO Secretariat; and

State letter to be sent encouraging States to appoint women as their representatives at the Assembly, in the Council and in other meetings or bodies of the Organization.

### RESOLUTION A36-28 (WP/368 and PAS No. 3)
TERM LIMITS FOR THE OFFICES OF SECRETARY GENERAL AND PRESIDENT OF THE COUNCIL

States to be informed. Council to act in accordance with the Resolution.

### RESOLUTION A36-29 (WP/349 and PAS No. 2)
BUDGETS 2008, 2009 AND 2010

1. Secretary General to issue Budget Document.
2. Council to review the method of assessing Contracting States, consistent with Financial Regulation 6.6, in order to determine whether the Secretary General should routinely seek contributions in more than one currency beginning in 2008, given the need to manage exchange rate risk effectively and also avoid imposing inordinate administrative burdens on either Contracting States or the Secretariat.

### RESOLUTION A36-30 (WP/331 and PAS No. 2)
CONFIRMATION OF COUNCIL ACTION IN ASSESSING THE CONTRIBUTIONS TO THE GENERAL FUND AND DETERMINING ADVANCES TO THE WORKING CAPITAL FUND OF STATES WHICH HAVE ADHERED TO THE CONVENTION

No action required.

**RESOLUTION A36-31 (WP/334 and PAS No. 2)**
APPORTIONMENT OF EXPENSES OF ICAO AMONG CONTRACTING STATES
*(Principles to be applied in the determination of scales of assessment)*

No action required.

**RESOLUTION A36-32 (WP/334 and PAS No. 2)**
ASSESSMENTS TO THE GENERAL FUND FOR 2008, 2009 AND 2010

Secretary General to inform States at the appropriate time each year of their annual assessments.

**RESOLUTION A36-33 (WP/328 and PAS No. 2)**
DISCHARGE BY CONTRACTING STATES OF FINANCIAL OBLIGATIONS TO THE ORGANIZATION AND ACTION TO BE TAKEN IN CASE OF THEIR FAILURE TO DO SO

1. Secretary General to dispatch to all Contracting States at least three times in the year, schedules showing the amounts due to the Organization.
2. Council to discuss and conclude arrangements with Contracting States for the settlement of accumulated arrears as set forth in the Resolutions.
3. Secretary General to monitor procedures on the status of compliance with the measures outlined in Clauses 9 and 10.
4. Secretary General to monitor and review, during the next triennium, the existing incentives for the payment of long-outstanding arrears and make proposals to the next ordinary Session of the Assembly, as necessary, to reinforce the measures taken to reduce contributions in arrears.
5. Secretary General to report to Council any voting rights deemed to be suspended and suspension revoked under Clause 6, and to apply measures stipulated in Clause 9 accordingly.

**RESOLUTION A36-34 (WP/331 and PAS No. 2)**
WORKING CAPITAL FUND

1. Council to review the level of the Working Capital Fund each year, no later than November 2007, 2008, 2009 and 2010, to determine if an increase is urgently needed during that year or for the following year.
2. Council to report to the next ordinary session of the Assembly on the adequacy of the level of the Fund, and on the appropriateness of the level of the borrowing authority.

**RESOLUTION A36-35 (WP/328 and PAS No. 2)**
AMENDMENT TO THE FINANCIAL REGULATIONS

Include the amendments in the ICAO Financial Regulations and publish a new edition of Doc 7515.

**RESOLUTION A36-36 (WP/328 and PAS No. 2)**
APPROVAL OF THE ACCOUNTS OF THE ORGANIZATION FOR THE FINANCIAL YEARS 2004, 2005 AND 2006 AND EXAMINATION OF THE AUDIT REPORTS THEREON

Secretary General to ensure appropriate action is taken on External Auditor's recommendations.

**RESOLUTION A36-37 (WP/328 and PAS No. 2)**
APPROVAL OF THOSE ACCOUNTS WITH RESPECT TO THE UNITED NATIONS DEVELOPMENT PROGRAMME ACTIVITIES ADMINISTERED BY ICAO AS EXECUTING AGENCY FOR THE FINANCIAL YEARS 2004, 2005 AND 2006 AND EXAMINATION OF THE AUDIT REPORTS ON THE FINANCIAL STATEMENTS OF THE ORGANIZATION WHICH ALSO COVER THE UNITED NATIONS DEVELOPMENT PROGRAMME ACCOUNTS

Secretariat to transmit the financial statements and Audit reports to the Administrator of the UNDP.

**RESOLUTION A36-38 (WP/328 and PAS No. 2)**
APPOINTMENT OF THE EXTERNAL AUDITOR

1. Secretary General to inform Mr. Philippe Séguin, the First President of the Cour des comptes of France, of information by the Assembly on his appointment as the External Auditor of ICAO for the financial years 2008, 2009 and 2010.
2. Council to discuss the extension of the appointment term to a six-year non-renewable term.

**RESOLUTION A36-39 (WP/331 and PAS No. 2)**
STUDY ON THE APPORTIONMENT OF COSTS BETWEEN THE ADMINISTRATIVE AND OPERATIONAL SERVICES COST (AOSC) FUND AND THE REGULAR PROGRAMME BUDGET

Council to consider and approve a cost-recovery policy and work with the Secretariat to ensure the pilot project provides accurate and timely information for the Council's decision.

# The Climate Impact of Aviation

By Robert Sausen, Head of the Department of Dynamics of the Atmosphere at the Institute of Atmospheric Physics, and Ulrich Schumann, Director of the Institute of Atmospheric Physics.

*The following article is reprinted with the permission of the **AeroSpace and Defence Industries Association of Europe (ASD).***

**THE CLIMATE IMPACT OF AVIATION HAS BEEN RECEIVING INCREASED ATTENTION OF LATE—IN PARTICULAR SINCE THE EUROPEAN COMMISSION PUBLISHED A CONCEPT FOR INCLUDING AVIATION INTO THE EUROPEAN EMISSION TRADING SYSTEM, AND ALSO SINCE IPCC PUBLISHED ITS FOURTH ASSESSMENT REPORT ON CLIMATE CHANGE.**

**THE GLOBAL AVIATION FLEET PRESENTLY CONTRIBUTES ABOUT 2% OF ALL MAN-MADE CARBON DIOXIDE ($CO_2$) EMISSIONS. HOWEVER, LIKE OTHER SOURCES, AVIATION ALSO EMITS OTHER GASES AND PARTICLES AFFECTING THE CLIMATE. SEVERAL QUESTIONS ARISE AS A RESULT OF THESE FACTS, NAMELY: HOW CAN AVIATION IMPACT CLIMATE? WHAT IS PARTICULAR ABOUT AVIATION-INDUCED CLIMATE CHANGE? WHAT IS THE RATIO BETWEEN THE TOTAL CONTRIBUTIONS AND THOSE FROM $CO_2$, AND HOW CAN WE REDUCE THE CLIMATIC IMPACT OF AVIATION?**

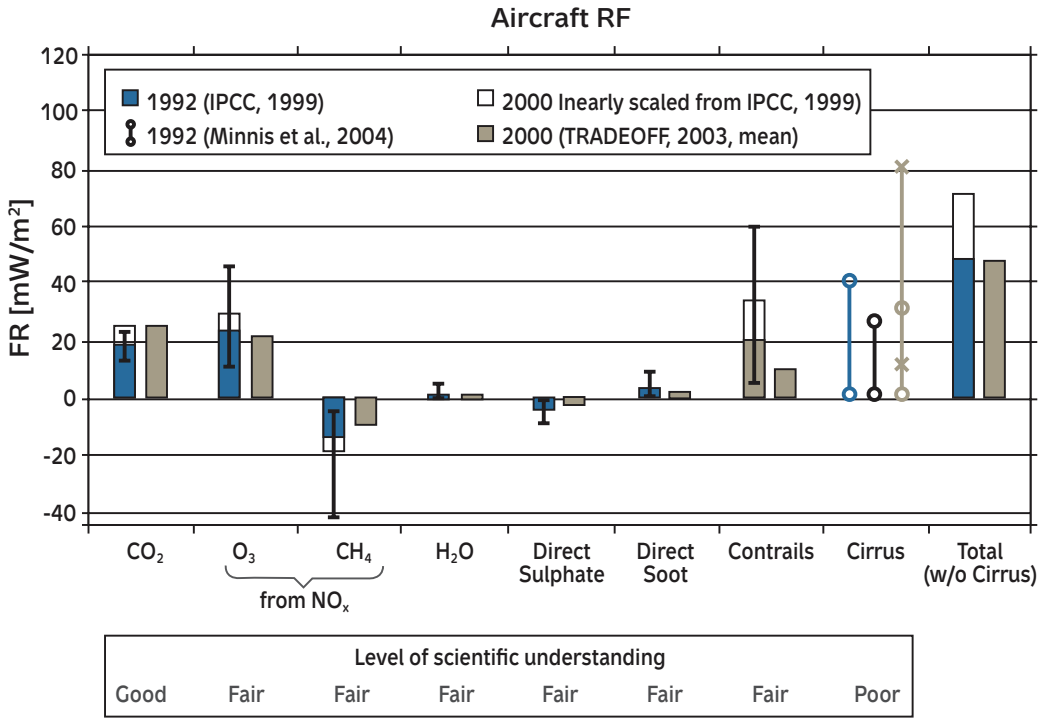
## Radiative Forcing

Aviation emits gases and particles which change the composition of the atmosphere or change clouds and hence disturb the radiation budget of the Earth. In particular, aviation emits the greenhouse gases $CO_2$ and $H_2O$ (water vapour). Aircraft also emit nitrogen oxides ($NO_x$). Through photochemistry in the atmosphere, the additional $NO_x$ enhances the formation of ozone ($O_3$) and destroys methane ($CH_4$). Both $O_3$ and $CH_4$ are greenhouse gases.

It is well-documented that the water vapour emitted by an aircraft at cruise altitude can trigger the formation of contrails—initially visible as line-shaped clouds. In cold and moist air masses contrails may spread and in some cases eventually form so-called contrail cirrus, which resemble natural cirrus clouds. Finally, aviation induces aerosols (soot and particles formed from sulphur oxides). These aerosols may interfere with the atmospheric radiation directly or indirectly after modifying clouds.

The magnitude of the perturbation of the atmosphere's radiative budget is measured by radiative forcing (RF). A positive RF warms the atmosphere, a negative RF cools. For constant RF, after many decades, the Earth approaches a new climate, with a changed global mean temperature at the Earth surface approximately proportional to RF. RF is used therefore as a metric to compare the relative strengths of various perturbations to the atmosphere.

**Fig. 1: Radiative Forcing (RF) due to aviation activity.**




*RF [mW/m²] from aviation for 1992 and 2000, based on IPCC (1999) and results of the TRADEOFF project (Sausen et al., 2005). The whiskers denote the 2/3 confidence intervals of the IPCC (1999) value. The lines with the circles at the end display different estimates for the possible range of RF from aviation-induced cirrus clouds. In addition, the dashed line with the crosses at the end denotes an estimate of the range for RF from aviation induced cirrus. The total does not include the contribution from cirrus clouds. The level of scientific understanding is indicated by the subjective grades "Good", "Fair" and "Poor".*

In 1999, the IPCC special report "Aviation and the Global Atmosphere", showed a first estimate of the aviation-related radiative forcings. An update to those estimates was provided in 2005. *Figure 1* displays the results with the taupe bars showing the most recent estimate. The largest contributions come from $CO_2$, $O_3$, contrails (all positive, warming) and $CH_4$ (negative, cooling). Small contributions are from $H_2O$, direct sulphate aerosol and direct soot aerosol. As can be seen from *Figure 1*, the total aviation-induced radiative forcing RF is about twice that from $CO_2$. Note that no best estimate for RF from cirrus clouds (beyond contrails) is provided due to presently poor knowledge. The total amounts to about 3% of the radiative forcing from all man-made activity since the 18th century, with a substantial uncertainty. The largest uncertainty comes from aviation contributions to changes in cirrus clouds, which are therefore not included in the total.

## Impact of Emissions

Carbon dioxide has an atmospheric lifetime of more than 60 years and becomes well-mixed during this period regardless of where the emission occurred. Hence, $CO_2$ emissions from aviation have the same effect as $CO_2$ emissions from other sources. However, the RF caused by other emissions depends strongly on where and when they are emitted.

Because of a longer life-time and lower ambient pollution, an $NO_x$ molecule emitted at cruise altitude (8–14 km) produces a larger amount of $O_3$ than when emitted at the earth's surface. As the atmospheric temperature at cruise altitude is lower than at the earth's surface, the radiative forcing per unit of ozone is larger than the RF from the same amount of ozone near the surface (e.g., from road transport).

Contrails and cirrus clouds only form at the low temperatures typically occurring at cruise altitudes. Long-lived contrails occur mainly in the humid and cold regions near and below the tropopause. Thin cirrus clouds and contrails most probably cause a positive RF.

## Non-$CO_2$ Effects Under Scrutiny

International aviation and international shipping are not included in the Kyoto Protocol because the parties could not agree on a national allocation of these emitters during the negotiation of the Kyoto Protocol. Therefore, the parties mandated the respective UN specialised agencies, ICAO and IMO to find a solution to the allocation problem, which has not yet been achieved.

Recently, the European Commission has developed a scheme on how to include aviation (domestic and international) in its Emission Trading Scheme. In this context, it has been discussed how to include the non-$CO_2$ effects of aviation into such a scheme *(Editor's note: please see the Jeffrey Shane Assembly Commentary on page 4 for an update on the current position of ICAO vis-à-vis the EC stance).*

Is there a good method to account for the non-$CO_2$ effects of aviation? One question is how to weigh the non-$CO_2$ effects in relation to the $CO_2$-induced climate change. One might be tempted to use the ratio between the total aviation induced RF to the RF only from the $CO_2$ emissions of aviation, the so-called Radiative Forcing Index (RFI). However, RF is a backward looking metric, i.e., it accounts for all the effects of processes that happened in the past. Aviation RF for the year 2000, as displayed by the taupe bars in *Figure 1*, accumulates all contributions of aviation since 1940 weighted with the life-time of the various species. While RF from $NO_x$-induced ozone and contrails is essentially only from air traffic in 2000, RF from $CO_2$ is from the accumulated $CO_2$ since 1940. For constant air fleet and aviation emissions, RF from ozone and contrails were constant, but aviation $CO_2$-induced RF would grow because $CO_2$ would further accumulate. Therefore, neither the total aviation-induced RF nor the RFI are suitable measure to weigh the non-$CO_2$ climate effects of aviation.

The fact that RF at a given time does not include any information about the atmospheric lifetime of a perturbation to the atmosphere is one of the reasons why RF was not used in the Kyoto Protocol to weigh non-$CO_2$ gases; i.e. to transfer them into equivalent $CO_2$. The Kyoto Protocol instead makes use of the Global Warming Potential (GWP), which is the time-integrated RF arising over a given time horizon (100 years) from a unit emission of a particular gas, normalised by the time-integrated RF from unit $CO_2$ emission. In this way the individual life-times of the various gases are considered.

## Further Research

The GWP concept cannot directly be applied to aviation, mainly because the atmospheric lifetimes of important aviation effects are much smaller than the lifetimes of the Kyoto gases. Among the Kyoto gases, $CH_4$ has the shortest lifetime, on an order of approximately 10 years. In the case of aviation, we also deal with phenomena which only live for a few hours, e.g., contrails. Moreover, the aviation-induced climate effect depends not only on the magnitude of the emissions but also on geographical region and altitude, as well as daytime and season of the emissions. Currently several concepts for an inclusion of the non-$CO_2$ effects are being discussed in the science community, including time-integrated RF from an aviation induced perturbation of the atmosphere, or the temperature change resulting from such a perturbation after a certain time (e.g., after 100 years).

The integrated RF would be analagous to the GWP currently applied by the Kyoto Protocol and the temperature change would more directly measure the contribution of the perturbation to long-term global climate change. Proper methods for accounting for the climate effects of non-$CO_2$ results have still to be established, and further research must be undertaken to reduce uncertainties.

A scientifically sound solution for the inclusion of non-$CO_2$ effects in an emissions trading scheme (or other approach) would eventually call for something other than a simple multiplication factor. Such a simple multiplication factor would weaken incentives to reduce the total climate impact beyond a reduction of the fuel consumption, which is to say there would be no benefit in reducing non-$CO_2$ effects. ■

# Targeting Need: The ICAO ISD Branch

**THE ICAO IMPLEMENTATION SUPPORT AND DEVELOPMENT BRANCH WAS ESTABLISHED TO SUPPORT ICAO CONTRACTING STATES THAT HAVE SIGNIFICANT SAFETY OVERSIGHT AND/OR SECURITY DEFICIENCIES, AS IDENTIFIED THROUGH THE ICAO AUDITS, IN THEIR EFFORT TO IMPLEMENT THEIR CORRECTIVE ACTION PLANS AND THUS MEET THEIR AVIATION SAFETY AND SECURITY OBLIGATIONS.**

**THE ISD BRANCH WORKS TOGETHER WITH THE OTHER BUREAUX OF THE ORGANIZATION AND SPECIFICALLY ICAO'S TECHNICAL COOPERATION BUREAU (TCB) IN ADDRESSING SAFETY- AND SECURITY-RELATED CHALLENGES IDENTIFIED BY ICAO AUDIT PROGRAMMES. THE *ICAO JOURNAL* PROFILES THIS IMPORTANT NEW BRANCH AND OUTLINES ITS ESSENTIAL MANDATE IN IDENTIFYING AND DETERMINING SPECIFIC PROJECT NEEDS.**

The ISD Branch supports Contracting States whose aviation activities suffer from significant safety oversight and/or security deficiencies, as identified through ICAO audits. In its efforts to address the deficiencies, ISD coordinates with TCB to develop partnerships and collaborative agreements among States, industry, financial institutions and other required stakeholders in coordinating safety and security assistance projects.

The ISD Branch also works with other ICAO Bureaux and Offices to contribute to safety and security implementation support and development activities, the intent of which is to strengthen the capability of States to implement ICAO Standards and Recommended Practices (SARPs) through the development, organization and coordination of seminars and workshops.

The impetus for the Organization's newest Branch dates back to the early 1990s, when it was revealed that, in the case of certain aviation accidents, a lack of adequate oversight by States was the probable cause. For more than ten years, ICAO audit programmes have been used to identify deficiencies by assessing the level of compliance by States with international standards. Despite the success of these programmes, ICAO and its Contracting States agreed that an implementation support programme was necessary to ensure that States would be able to successfully correct the deficiencies identified by the audits.

Prior to the establishment of ISD, the Air Navigation Bureau's Unified Strategy Programme (USP) administered safety initiatives and the Coordinated Assistance and Development (CAD) Section of the Aviation Security and Facilitation Branch (ATB) undertook the support-related activities of the Aviation Security Plan of Action. With the important implementation needs for States foremost in his priorities, the Secretary General asked several of his officers to develop a new programme that would oversee both safety and security by combining CAD and USP—resulting in the creation of the ISD Branch on 15 June 2007.

## The Support and Development Process

Because each State has widely differing assistance requirements, ISD enters into its support efforts understanding that results will vary significantly from project to project. As they are being implemented, ISD aims to monitor the progress of project objectives on a timely basis, identifying deficiencies and monitoring the metrics that have been developed to ensure deficiency resolution.

"All ISD programmes are initiated with the audit programme, which identifies specific deficiencies", remarked Haile Belai, Chief of ISD. "The audit also determines if a State cannot correct the deficiencies without the help of ICAO. After the deficiency report is sent to ISD, an internal analysis determines how the deficiencies need to be resolved. TCB—with ISD assistance—then develops the necessary project and measures to resolve the problem. The State involved has to finance the project, or find a donor State or organization to support the intended rectifications."

*ISD Chief Haile Belai.*

# ISD Safety Metrics— The Critical Elements (CEs)

**CE-1 Primary aviation safety legislation**
The provision of comprehensive and effective aviation safety law.

**CE-2 Specific operating regulations**
The provision of adequate regulations to address, at a minimum, national requirements.

***Note:*** *The term 'regulations' is used in a generic sense to include instructions, rules, edicts, directives, sets of laws, requirements, policies, orders, etc., which are enforceable in the State.*

**CE-3 State civil aviation safety system and oversight functions**
The establishment of an appropriate aviation safety organization headed by a Chief Executive Officer, supported by appropriate and adequate technical and non-technical staff and provided with adequate financial resources. The appropriate organization must have stated regulatory functions, objectives and safety policies.

***Note:*** *The term 'State civil aviation safety system' is used in a generic sense to include all authorities with aviation safety oversight responsibility which may be established or designated by the State as separate entities, such as airport authorities, national safety authorities, etc.*

**CE-4 Safety personnel qualification and training**
The establishment of minimum requirements regarding the knowledge and experience of the aviation safety personnel performing safety oversight functions, and the provision of appropriate training to maintain and enhance their competence at the desired level.

**CE-5 Technical guidance, oversight tools and the provision of safety-critical information**
The provision of technical guidance tools and safety critical information to aviation safety personnel to enable them to perform their safety oversight functions in accordance with established requirements and in a standardized manner.

**CE-6 Licensing, certification, authorization and approval obligations**
Ensuring that personnel and organizations performing an aviation safety activity meet the established competency requirements before they are allowed to exercise the privileges of conducting the relevant aviation safety activity.

**CE-7 Surveillance obligations**
The implementation of quality control processes, such as inspections and audits to ensure that aviation safety licence, certificate, authorization and/or approval holders continue to meet the established requirements and function at State required levels of competency and safety.

**CE-8 Resolution of identified safety deficiencies**
The implementation of processes and procedures to resolve identified deficiencies which impact upon aviation safety.

The ICAO audit programme conducts a follow-up visit two years after conducting the initial audit to ensure that all rectification objectives have been successfully implemented and are being satisfactorily sustained by the State in question.

### The Critical Elements (CE) System

To assist them in their analysis and follow-up studies, ISD utilizes the ICAO-developed Critical Elements (CE) of a Safety Oversight system, which helps to identify and categorize a particular State's safety needs. The critical elements are also used in the identification of State capability for safety oversight, making the work of ISD a bit easier than it would otherwise be *(see sidebar left for a more detailed overview of all eight Critical Elements).*

In most of the cases where ISD believes there is a major problem, three of the eight Critical Elements will always be present. Belai noted that "if we help States to establish an appropriate organization (CE-3), staffed by competent technical experts (CE-4), provided with adequate guidance material tools and critical information (CE-5), they will be enabled to implement the other five Critical Elements."

### ISD-FSIX: The Technological Advantage

Technology increasingly plays an important role in the ability to collect and disseminate information on safety oversight and/or security deficiencies. Although ICAO takes advantage of Assemblies to meet face-to-face with State representatives to address deficiencies, the Internet remains a key tool in achieving ISD goals. When ICAO started the Safety Oversight Programme, many States still did not have IT capability. Six years ago, ICAO made sure that every Contracting State had e-mail access in their Civil Aviation Authority. This has greatly facilitated communication and oversight.

This improvement in ICAO-State communications is reflected very clearly by ISD's Flight Safety Information Exchange (FSIX) (www.icao.int/fsix), a web site with links to essential and important aviation safety- and security-related data. The importance of FSIX is two-fold. On the one hand it responds to the need for increased transparency, and on the other it facilitates the sharing of safety-critical information, for example, lists of aircraft that are no longer airworthy.

These are early days for ISD and the FSIX, but tomorrow already looks bright for the Branch and its intended impact on global aviation safety levels.

"I believe that in the future ISD will be a fundamental core activity of the Organization alongside the making of Standards and the assessment of compliance", commented Belai. "Safety and security are always evolving and ISD will evolve with them to meet the needs of ICAO's Member States." ■

# Unlocking Partnerships for Change

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DR. CARLA DOVE


# Birdstrike

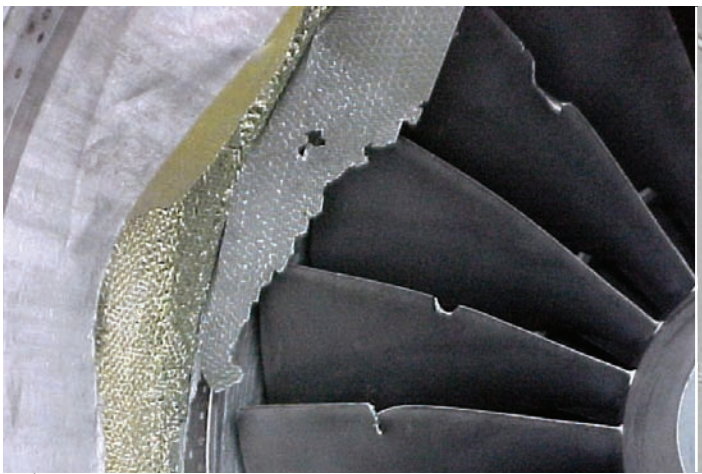
**BIRDSTRIKE REPORTING HAS RISEN DRAMATICALLY IN RECENT YEARS, AS FORENSIC TECHNIQUES HAVE ASSISTED IN IDENTIFYING SPECIFIC SPECIES AND INTERNATIONAL AWARENESS OF THE ISSUE HAS INCREASED. DR. CARLA DOVE, OF THE SMITHSONIAN INSTITUTE'S FEATHER IDENTIFICATION LAB, REVIEWS CURRENT TECHNOLOGIES BEING EMPLOYED AND STRESSES THE IMPORTANCE OF EFFECTIVE AIRPORT ENVIRONMENTAL MANAGEMENT OF AVIAN SAFETY RISKS—WHICH ARE FAR MORE PREVALENT AND FAR MORE COSTLY THAN MANY ARE LED TO BELIEVE.**

*(r-to-l) Carla Dove, Marcy Heacker and Nancy Rotzel with a partial cross-section of the Smithsonian's bird research collection used to identify species involved in birdstrikes. The team employs traditional morphological and molecular (DNA) techniques (Photo: James DiLoreto).*

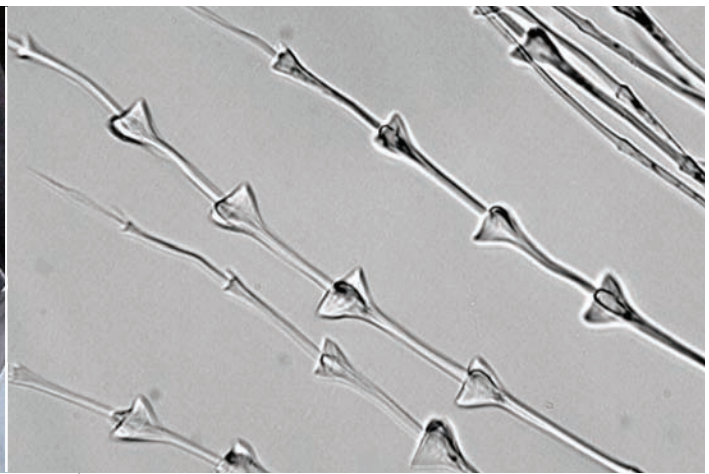
Bird/aircraft collisions—or birdstrikes—have been documented since the beginning of powered flight. As long as birds and man continue to share the skies, birdstrikes pose an inevitable but also manageable threat when the proper measures are taken to minimize their occurrence.

In many parts of the world, well-intended wildlife conservation efforts have resulted in the increase in populations of many of the larger bird species. As well, more and more bird species are adapting to urban and airport environments. The increase in urbanized avifauna, coupled with the design of quieter engines, faster aircraft, and increased air traffic, makes it nearly impossible for birds and aircraft to avoid colliding. It is now clear, however, that one way to help prevent birdstrikes is to understand the specific types of birds that are causing the problem... in other words, identify the 'culprits.' Once the bird species is identified, knowledge of food prefrences, migration patterns and lifestyles can help mitigate dangerous situations.

The Smithsonian Institution's Feather Identification Lab in Washington, DC, has been identifying birdstrike remains for



*American Airlines flight 549. Photograph of engine damage caused by a Canada Goose. The birdstrike resulted in an emergency landing after departing LaGuardia Airport, New York, September 2003 (Photo: FAA).*



*Photomicrograph of downy barbules of mallard duck. The microscopic structures in downy feathers can lend clues to the identification of the type of bird involved in birdstrikes (Photo: C. Dove).*

many years. The lab's team of three (Carla Dove, Marcy Heacker and Nancy Rotzel) is now combining new technologies with old skills to positively identify bird species that are involved in birdstrikes.

### Report Levels Increasing Due to Multiple Factors

Birdstrikes cost the US civil aviation industry about US$ 600 million per year between 1990 and 2006, and the estimates for global damages easily top US$ 1 billion annually. What species of birds cause this kind of damage? Although the usual suspects are larger birds, many would be surprised to know that smaller birds also play a major role, with a recent US incident seeing a single 74.2 g American Robin causing over US$ 500,000 in damage to a large aircraft.

The number of birdstrikes reported on an annual basis in the United States continues to rise as traffic levels increase. The US Federal Aviation Administration (FAA) operates under a 'volunteer reporting' system for birdstrikes and has noted an increase in the number of reported birdstrikes from 1,744 in 1990 to 7,089 in 2006. ICAO has also issued mandatory standards regarding bird hazards to aviation (Annex 14 to the Convention on International Civil Aviation) and recommends that airports throughout the world develop and implement wildlife hazard management plans.

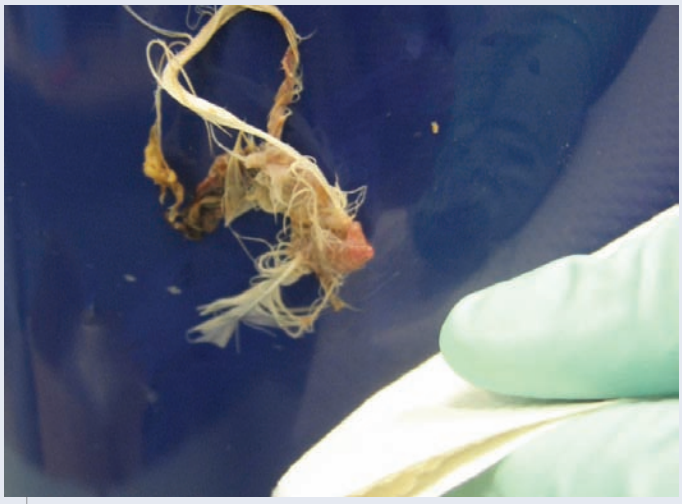
It's likely that several related factors have contributed to the rise in birdstrike reporting: increased awareness of birdstrikes; increased aircraft operations; increased populations of birds, and; increased number of birdstrikes. Other factors, such as the ease of online birdstrike reporting, educational training, and accurate, timely species identifications have undoubtedly also contributed to higher reporting rates.

Approximately half of the current birdstrike evidence collected is identified based on whole-feather samples. In the past, if blatant feather remains were not present, no sample would be submitted for possible identification. A big change in contemporary birdstrike reporting has therefore been due to field personnel and investigators becoming much more effective at detecting and processing birdstrikes based on less obvious accident scene evidence.

While other wildlife such as deer, wild dogs, coyotes and bats also present hazards for aircraft, birds comprise about 98 per cent of the aggregate wildlife strikes reported by airport and airline sources.


*Birdstrike evidence collection kits are inexpensive and easy to assemble. Basic supplies include gloves, plastic bags and a birdstrike reporting form (Photo: M. Heacker).*

# Smithsonian Feather Identification Lab: Birdstrike FAQ



*Blood and tissue, known in the birdstrike world as 'snarge', is a good source of material for birdstrike identification using DNA barcoding technology (Photo: M. Heacker).*

The following contains information for both US and International authorities regarding recommended birdstrike evidence collection and identification. ICAO Doc 9332, *Manual on ICAO Bird Strike Information System (IBIS)*, provides further information on recommended procedures and practices for international civil aviation.

### 1. How do I report birdstrikes?

The ICAO Bird Strike Information System (IBIS) has been in operation since 1980. At the present time, more than 145,000 birdstrikes are stored within the system. Although the problem is world-wide, on average only 60 of ICAO's Member States regularly report birdstrikes. States are urged to use the IBIS reporting form or file structure when reporting bird strikes to ICAO. Bird strike reporting forms (available through ICAO's Aerodromes, Air Routes and Ground Aids (AGA)Section) should be filled out as accurately and completely as possible since even minor inconsistencies in reporting practices make comparative analysis of data difficult. Regardless of the resources at their disposal when reporting birdstrike incidents, States are always encouraged to do so.

In the US, birdstrikes can be reported on-line. Civil aviation personnel complete the on-line FAA 5200-7 obtained at: http://wildlife-mitigation.tc.faa.gov/public_html/index.html.

### 2. What kind of material is needed to identify birdstrikes?

Feathers, blood, tissue, or any other minute evidence or bird part that is left on the aircraft or found after the incident can be used to identify birdstrike. The blood evidence should be collected from the aircraft using 70% ethanol to spray the area and either a paper-towel or cotton swab. The alcohol helps preserve the DNA. Do not use bleach, formalin, or cleansing solutions to remove smears as they may damage DNA. Water is acceptable, but it does not inhibit the growth of mould which is problematic for DNA sampling. A DNA fixing card is being tested for minute samples and should be available in the near future.

Whole feathers or dried material should be collected by scraping or removing all material available. If the whole bird carcass is available, feathers from the breast, back, wing and tail should be removed. Feathers should be pulled, not cut, from the birds body and stored in a sealable plastic bag for shipping.

### 3. Will the Smithsonian Feather Identification Lab identify birdstrike samples from other countries or other organizations?

As long as the birdstrike material is from an American-flagged civil aircraft, or a U.S. Air Force aircraft, the Feather Identification Lab will identify the remains free-of-charge. Other countries such as the United Kingdom, The Netherlands, Israel, and Australia also have birdstrike identification laboratories. If no specialized laboratory is available, contact a local museum or University Ornithologist for assistance. You may also locate DNA laboratories world-wide that are participating in the CBOL initiative through the map of members located at: http://www.barcoding.si.edu/CBOLMembersMap.htm.

### 4. How do I ship feather remains?

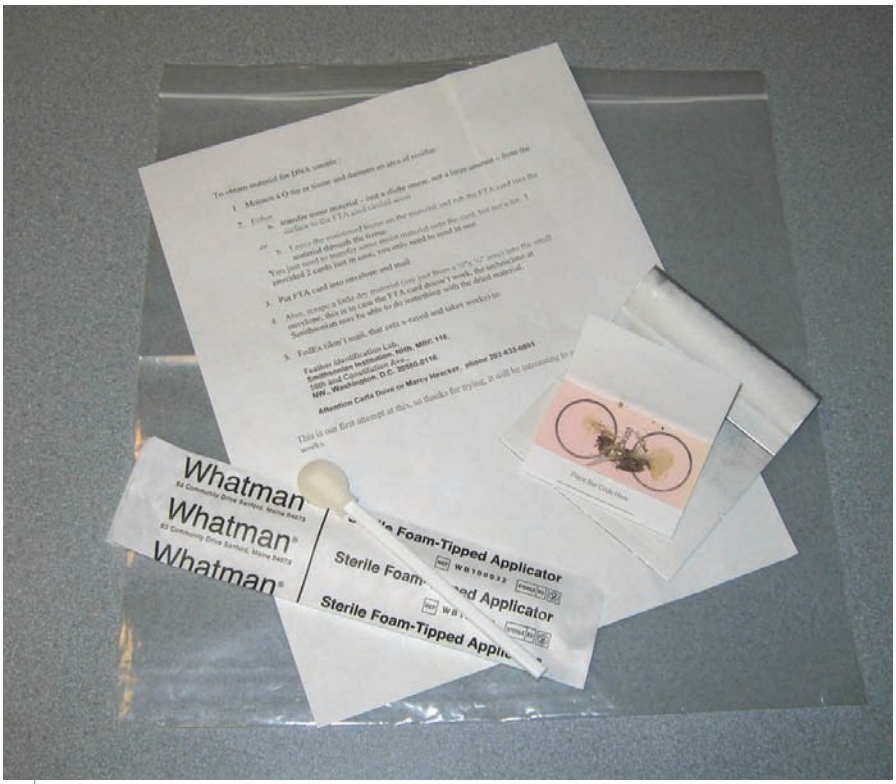
Feather or blood remains should be placed in a sealable plastic bag with the case number (if using FAA online reporting) and shipped as soon as possible. If the feathers or blood remains are being shipped from a foreign country, the Feather Identification Lab should be consulted for instructions.

### 5. What human health precautions should I take when collecting bird remains?

Safe handling precautions established by each organization should be followed. Although the transfer of avian disease to humans is extremely rare, recent concerns over avian influenza and the global spread of disease is a warning to take care when handling and collecting bird remains. Wearing gloves and practicing common-sense hygiene such as thoroughly washing hands with soap and water and using hand sanitizers is recommended. The American Ornithologists' Union maintains a web site with up-to-date information regarding avian influenza. It contains information about the safe handling of birds by researchers and field workers and can be referenced at: http://www.nmnh.si.edu/BIRDNET/OC/avianinfluenza.html.

## New Forensic Approaches

In 2001, more than 90 per cent of the birdstrike samples submitted to the Smithsonian Feather Identification Lab were identified by comparing whole feathers or feather fragments to the specimen collection. This method involves cleaning the feathers to regain their natural shape and color and then comparing the sample with the Smithsonian's vast collection of bird specimens to find an exact species match.




*The use of a DNA collecting card, such as the one shown here, is used to fix DNA in the field and prevent degradation of the sample if it contains only blood or tissue (Photo: M. Hecker).*

It is now commonplace for the Feather Identification Lab to receive only blood or tissue smears that are then used to confirm and quantify a birdstrike event. If fragments of downy (plumulaceous) feathers are found in the samples, they are examined using microscopy. Due to the large increase in minute samples that were being submitted and the limitations of microscopy to correctly identify these types of specimens, the Smithsonian team eventually sought additional tools to assist them in their identification efforts. Foremost among these was DNA barcoding.

In 2003, the US FAA funded a five-year Smithsonian/US Air Force joint project to develop a DNA library of bird sequences, and to investigate user-friendly ways of collecting minute birdstrike samples. One of the ongoing goals for the project is to sequence all 10,000 species of birds globally by 2010.

Once the DNA library was complete for the birds of the United States and Canada, the Feather Identification Lab began conducting birdstrike identifications using DNA technology. During the autumn of 2006 alone, the Feather Identification Lab received over 800 samples that contained only tissue, blood, or non-diagnosable feather fragments for identification using DNA barcoding. The DNA analysis provided positive species identification in over 68 per cent of those cases. The identified cases for this short period of time comprised 128 species representing 14 orders of birds, and the DNA identification procedure for a sample was typically completed in 1 to 6 days.

About 32 per cent of the cases submitted for DNA analysis did not contain viable DNA and thus depended on traditional methods of feather comparison and microscopy for identification to the lowest taxonomic level. The types of material that most often failed at DNA extraction included samples that contained mould or samples collected with paper towels—which do not provide for adequate preservation of the sample.

Correct species identification has been invaluable in the development of proper management strategies. A recent (January 2006) crash of a US Air Force T-38 in Mississippi initially was blamed on snow geese (3 kg birds). Once the feather material and DNA analysis were conducted, however, the culprit turned out to be a much smaller mallard (1 kg). In November 2006, a B-737 passenger aircraft taking off at night from a Colorado airport had to make an emergency landing after ingesting what was identified by the pilot as a 'coyote' into the #2 engine. After the evidence was examined, the animal turned out to be a great horned owl.

As science continues to progress in this field and additional States begin to recognize the importance of managing the safety issues posed by birdstrike, it is hoped that global aviation safety levels will increase, especially relating to the crucial take-off and landing flight segments that pose the greatest safety risks. ICAO and the Smithsonian Feather identification Lab will continue in their efforts to enhance the quantity and quality of information available to authorities seeking to improve their birdstrike measures. ■

CAPT. DANIEL MAURINO

# Safety in Perspective

**ICAO'S SAFETY MANAGEMENT SYSTEMS (SMS) INITIATIVE IS AT THE FOREFRONT OF A PERFORMANCE-BASED APPROACH TO IMPROVING AVIATION SAFETY LEVELS. THE *ICAO JOURNAL* SPOKE TO CAPTAIN DANIEL MAURINO ON THE STATE OF GLOBAL SMS IMPLEMENTATION AND THE CHALLENGES THAT LIE AHEAD.**

*Capt. Daniel Maurino is the ICAO Coordinator, Flight Safety and Human Factors Programme. Since 2004 he has been in charge of the coordination of SMS activities within ICAO.*

**SMS regularly utilizes reactive, proactive and predictive data. As context for our readership please explain the nature of these different data types and how they affect safety management programmes that are currently being developed.**

The underlying truth of all SMS initiatives is that you cannot manage what you cannot measure. I cannot stress this point enough. All forms of data are therefore extremely important to the overall success of the SMS programmes ICAO is currently assisting with around the world.

*Reactive data* in the context of safety management refers to the information that is collected from a specific safety-related event—for instance an accident or an incident. This data is collected, monitored closely, and then later systems are developed to help minimize the probability of a repeat occurrence. It is in this sense therefore that it is 'reactive' data.

*Proactive data* refers to information which is collected by States and operators using surveys, audits and other solicitation tools employed in an ongoing, intentional and directed manner. This data is collated and analyzed to provide a better understanding of both the general context and specific frameworks in which accidents and incidents may occur, providing important safety-related information that is therefore independent of source events.

Lastly, *predictive data* refers to a wide range of information types that are also collected without the trigger of a source event. This refers specifically to aggregate data sources that are collected without a safety-related intention or instrument (such as a survey or audit) being involved, yet which safety managers can collate and analyze to help them identify possible trouble-spots in the safety chain before they reach critical points. It is in this sense that this is 'predictive' data.

I must stress again that all three sources of data are very important. Today we are examining data from operational conditions that 20 years ago would have been considered simply innocuous—for instance a deviation of a couple of hundred feet from an assigned altitude. As safety management analytical tools progress, all data types become valuable components in assisting safety professionals in both their responses to, and avoidance of, safety-related events.

*SMS Training Course, Bangkok, 11-15 September 2007. Conducted by: Capt. Miguel Ramos, ICAO Technical Officer—SMS Programme, SMS OJT Trainer—Flight Safety Section; and, Capt. Jorge Gelso, ICAO SMS OJT Trainier.*

**Who shoulders the primary responsibility with respect to the collection of safety-related data?**

Predictive data is always captured at the level of the service provider. States will capture reactive data through incident and accident investigations, and might capture some proactive data with voluntary reports, but predictive data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basically belongs to the airlines, airports and ATC operators. For example, an airline would alert the authorities that it has detected something—not necessarily an incident, but an operational event where margins of safety have been reduced. Open cockpits and air traffic control rooms become necessary at this stage to access the data and allow for an exchange of information on the aggregate level. After informing the providers and facilities involved that a concern has emerged, generally a plan is implemented to address the safety-related issues that have arisen. Within a specified period of time, safety managers will perform follow-up studies to determine if the mitigation strategy was successful.

**As of 23 November 2006, States have been required to have established a safety programme. Which areas of safety are covered by these programmes?**

Our message to service providers is that they have to organize their safety activities following a pattern—the system we call SMS. We are asking States to do exactly the same thing. It is necessary for them to organize safety responsibilities following a framework that we have entitled the State Safety Programme. The four basic components are—just like in an SMS—safety policies and objectives, safety risk management, safety assurance and safety promotion.

SMS requirements are already a standard for air traffic services and airports. The requirements will become standard for airlines on 1 January 2009. The specific levels of data-sharing between government and industry are something that States will determine individually.

**How have States responded to the ICAO SMS training initiatives deployed thus far?**

I believe that we have achieved our mandate, which was to try and provide a standardized perspective on SMS. When we were first tasked with implementing the SMS programme, the information was there, but it was not packaged in a manner that was accessible or "user-friendly". We managed to build a package in a manner that flows from A to Z. That has been ICAO's major contribution and the States have been grateful for our assistance.

ICAO developed a training course to specifically provide guidance on the implementation of safety management standards. We generally deliver the courses in-house—with participation of up to 35 individuals—and since May 2006 we have delivered 35 courses in 28 States *(see "SMS Training Courses" sidebar, below).*

The courses are attended by State safety specialists and related officials, but it is obviously helpful if industry participants are also invited to attend—and generally this happens. Typically the 35 or so course participants are made up of 30 State officials and five or more industry representatives.

**What is industry's response? What are its primary concerns?**

Industry's primary concern is cost. This is a reasonable and logical concern. In the case of airlines, the allocation of resources for safety activities is already an operational and cultural reality, so for them this is not a serious issue. For other private sector operations it is more a question of relocation and reassignment of internal resources, as well as re-assessing how they are collecting and collating their safety-related information.

**With respect to reporting, how important is it that organizations and States respect the anonymity of the reporting individual and provide adequate professional/legal assurances that they will not be penalized for revealing a safety-related concern?**

If you want employees to be forthcoming about mistakes made, especially those which may provide valuable safety information for the aviation community, one must encourage and allow a degree of protection of reporting. It is as simple as that. We are talking here about errors, honest errors—not violations where an individual may have done something illegal. To provide for effective safety reporting, States and upper management must be willing to accept that people are going to make honest errors and that they should not be punished for revealing the

## SMS TRAINING COURSES

**In-house "train-the-trainer" SMS courses recently completed:**

- Argentina (2)
- Bolivia
- Brazil
- Chile (2)
- Colombia (2)
- Costa Rica (2)
- Cuba
- Denmark
- El Salvador
- France
- Hong Kong, China
- India (2)
- Italy
- Jordan (2)
- Mexico
- Netherlands (on behalf of ABIS States)
- Paraguay
- Panama (2)
- Peru
- Poland
- Republic of Korea
- Singapore
- Spain
- Sri Lanka
- Tunisia
- United Arab Emirates
- Uruguay
- COSCAP-South Asia (on behalf of India and Pakistan)

**In-house "train-the-trainer" SMS courses to be delivered before April 2008:**

- Aruba
- Dominican Republic
- Ecuador
- Gambia
- Greece
- Guyana
- Hong Kong, China
- Mexico
- Nepal
- Netherlands Antilles (Curaçao)
- Nigeria
- Portugal (2)
- Saudi Arabia
- Serbia
- South Africa
- Suriname
- United States
- COSCAP-BAG (on behalf of Banjul Accord Group)

**"To provide for effective safety reporting, States and upper management must be willing to accept that people are going to make honest errors and that they should not be punished for revealing the context and substance of these errors to assist with broader safety-related goals."**

*SMS Training Course, Amman, Jordan, 3-7 December 2006. Conducted by: Capt. Miguel Ramos, ICAO Technical Officer—SMS Programme, SMS OJT Trainer—Flight Safety Section; and; Mr. Drazen Gardilcic, ICAO Technical Officer—Air Traffic Management Section, SMS OJT Trainer.*

context and substance of these errors to assist with broader safety-related goals.

There exists in the aviation community a culture where errors by well-trained, well-paid professionals cannot be tolerated. But making mistakes is part of the human experience. Unfortunately, protecting sources of flight safety information is still a major obstacle to effective safety management, though I feel it is an artificial one. I strongly believe that it is a question of mindsets, because we are not talking here about moving the Rockies to Europe or draining the Pacific. Agreements are written by humans, and if reviewing those agreements could result in a potentially vast benefit for society, we should do so. Is there the political will to do that? That is the million dollar question. We can design and provide a safety-based solution, and buy-ins from safety officials for these solutions is basically 100% across the board, but political and corporate cultures must be willing to address legal and regulatory contexts that are now designed to penalize individuals for their occasional errors.

**Are States willing to take that step?**

Some legal systems would seem more flexible in this respect than others. Too often the mindset is that the individual is culpable and that the law or legal system is iron-clad and cannot be changed to remove this "alleged" culpability regardless of the net benefits of doing so. This is, of course, false. We know that laws are being constantly changed. If you have a situation where a community with a particular expertise is alerting society that there is a problem with a potential solution that will benefit the public, then collectively we need this trade-off. I am not convinced that society is as concerned as it should be.

**Do you see these less-flexible systems being a particular challenge to overall world flight safety success?**

Absolutely. Again—no data, no management. Individuals must know that they will not be culpable for reporting their honest errors. Only then will they be forthcoming with valuable and essential safety information. You may pretend that you have a safety management system that covers the safety gambit, but if you do not have data, you do not have anything. This, to me, is the real challenge.

**Is this inflexibility addressed in SMS courses?**

Yes, but in many respects we are preaching to the converted at this level of influence. ICAO has developed legal guidance for the protection of sources of safety information. That guidance has been incorporated into Annex 13, which deals with the investigation of aircraft accidents and incidents—so the basic tool is there. The most we can do at the working level is develop the tool and deliver a very concise and convincing case of why we need to protect sources of safety information. The ultimate burden arises when safety officials then try to sell this requirement to their countries' lawmakers. Without the necessary political will the process begins and ends in our classrooms.

To help make clear that we are not expecting the impossible here, in January 2000 the US President supported the implementation of a voluntary reporting system called the Aviation Safety Action Plan (ASAP), which featured all the elements of an effective set of aviation safety measures. Because a serious level of political will was generated from the top down, this program was passed into legislation. This has also been the case in additional countries, but the example serves to demonstrate that creating the context for effective aviation safety management systems is very possible.

As always, where there's the will, there's a way. ■

# Making an Impression

TRANSFORMING ITSELF FROM ITS EARLY ROOTS AS A SMALL-SCALE PRINTING OPERATION PRODUCING INTERNAL BLACK-AND-WHITE DOCUMENTS, THE ICAO PRINTING SECTION NOW OFFERS A MORE STREAMLINED AND PROFESSIONAL SERVICE WITH UNIQUE PUBLISHING CAPABILITIES FOR AN INTERNATIONAL READERSHIP. EMBARKING ON A PROCESS OF COMMERCIALIZATION THAT BEGAN IN EARLY 2006, THE SECTION NOW BOASTS AN IMPRESSIVE LIST OF EXTERNAL CLIENTS AND IS MAKING A CLEAR IMPRESSION ON ITS NICHE MARKET OF MONTREAL-BASED INTERNATIONAL AGENCIES.

> **"We're developing new commercial systems and adopting customer service and administrative tools that are a dramatic change from the culture that was previously in place, yet at the same time the new demands make every day a little different. These new responsibilities help us to become more resourceful, and for everyone involved, this continues to be a very exciting challenge."**


*Printing Section Chief Jacques Daoust (left) with ICAO Secretary General Dr. Taïeb Chérif (right), examining the inaugural copy of the new* ICAO Journal *just prior to the 36th Assembly.*

Transformation has been an important word for Jacques Daoust in recent months. At the beginning of 2006 the ICAO Printing Section Chief set his department on a new and more commercial approach, one taking advantage of his section's unique strengths.

It was a new stage in long journey for the Printing Section, one that began for Daoust three decades earlier during his period as a press operator for ICAO. He had arrived in 1976, when the Organization was located in the same building as IATA, and the printing operations for the two organizations were very much a cooperative venture.

"We were located on different floors but we shared our expertise, ideas and supplies..." began Daoust. "By the time the downsizing trend had arrived in the late '80s, most internal printing operations, including IATA's, were either shut down or significantly reduced. The ICAO Printing Section survived this period, continuing to adjust to the evolving needs of the Organization, and by the '80s and '90s virtually all of ICAO's printing was being done internally, except for the *ICAO Journal*."

The *Journal* required a 4-colour press for its production, something that was on the section's wish-list, but which it would wait until just recently to actually acquire. In the 1990s it used a 2-colour press to produce occasional 4-colour jobs, and it was also during this period that ICAO acquired its first analog copier to produce second-generation mass reproductions of single-colour documents.

"Although ICAO produces all its documents in the six official languages, the reality was that we were producing dramatically higher quantities at that time of the English and French versions", remarked Daoust. "Since the cost-effectiveness related to printing and publishing always diminishes when quantities are decreased, we were able to use the new copier technology to produce smaller runs of the remaining languages much more economically than had previously been the case."

It was this type of adaptation to the specific needs of ICAO that would eventually make the Printing Section a unique service provider for a number of UN and international agencies in the Montreal area, but at the time it was still several steps away from being able to supply this more mature and comprehensive service offering.

In 1998 ICAO acquired its first digital black-and-white copier, and in 1999 it made the move to digital colour reproductions. Today, the ICAO printing operation makes extensive use of three black-and-white and two colour digital copiers that allow it to respond much more quickly and flexibly to large-scale jobs, smaller reprints on demand, as well as any materials with tight deadlines. ICAO's acquisition of its new 4-colour press allows the Printing Section to offer a large variety of offset printing jobs—from smaller pamphlets up to large-format posters .

Appraising his section's now more complete service package, and with a good personal knowledge of the local market, Daoust began quietly to explore how ICAO would respond to the idea of seeking out more external clients to generate revenue and assist with the Printing Section's ongoing equipment needs.

"I was given the OK to proceed with some preliminary investigations at that time," remarked Daoust, "but you have to remember that this type of commercial activity was not something that ICAO as a whole had really begun to embrace. The early assessments we made actually brought up a number of questions with respect to whether ICAO should devote more resources to the Printing Section or again consider outsourcing this work altogether. In 2004 we engaged the consulting firm IKON to help us answer these questions, and their study results overwhelmingly indicated that continuing with an in-house solution would be best for ICAO."



The IKON study had confirmed that Daoust and his team had developed a unique and cost-effective publishing operation for an international readership. Hardware and software solutions that the Printing Section had in place, combined with an experienced staff that was sensitive to the needs of multi-lingual document typesetting and production, confirmed what Daoust had intuited when he first approached ICAO about potential external clients back in 1999.

"In the end the move to find external clients was driven as much by fundamental changes in ICAO as by our pre-press and production specializations", Daoust noted. "As technology led to more information being published on the web or on CDs, and as the secretariat streamlined its operations, we found that whereas just a few years ago we were producing more than 100 million impressions exclusively for ICAO, last year that number fell by 30 per cent.

I mentioned to the planners that I could take this unused capacity to generate revenue, and that's exactly what we've been doing ever since."

Since January, 2006, Daoust and his team have added a number of international organizations as clients and the network continues to grow *(see client list, below)*. During its first year of servicing external customers his section produced 22 million impressions, a number that will doubtless be climbing as word gets around about the quality and capabilities of the ICAO operation. Should business boom and additional capacity be required, Daoust still has an open night shift that could be staffed to fill almost any demand his section might encounter.

Daoust emphasized that the foremost mandate of his section is to provide the best printing and reproduction services to ICAO and its members, but on the whole he believes the shift to a more commercial profile has made his department more efficient and responsive at every level.

"This whole transformation has been a huge challenge for me and my staff, and I'm very proud of how everyone has responded," he commented. "We're developing new commercial systems and adopting customer service and administrative tools that are a dramatic change from the culture that was previously in place, yet at the same time the new demands make every day a little different. These new responsibilities help us to become more resourceful, and for everyone involved, this continues to be a very exciting challenge."

Another exciting possibility down the road for Daoust and his team is the likelihood that the ICAO Headquarters Building may soon be rewarded with the Leadership in Energy and Environmental Design (LEED) certification. This acknowledgement is awarded to eligible North American facilities by the United States Green Building Council (USGBC), as part of its Green Building Rating System™.

When its qualification is approved, the ICAO Building will become only the second building in Quebec to be awarded this new ecological standard based on sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality —all while housing a fully-operational printing facility.

Meeting these environmental criteria is just one more way that Daoust and his team are using innovation and adaptation to help forge a new future for their section and for ICAO. ■

**External Clients: ICAO Printing**

– International Air Transport Association (IATA)
– International Business Aviation Council (IBAC)
– UNESCO (statistical division)
– COSPAS-SARSAT (search and rescue satellite service)
– UN Secretariat on Biodiversity
– Commission for Environmental Cooperation (CEC)
– International Council of Societies of Industrial Design (ICSID)
– National Delegations and Consulates

## Deposit by Singapore on 17 September 2007

Singapore deposited its instrument of accession to the *Convention for the Unification of Certain Rules for International Carriage by Air*, done at Montreal on 28 May 1999 (Montreal Convention of 1999), during a brief ceremony at ICAO headquarters on 17 September 2007. This brought the number of parties to the Convention to 79. ■

*Shown on the occasion are Mr. Raymond Lim, Minister for Transport and Second Minister for Foreign Affairs of Singapore, and Dr. Taïeb Chérif, Secretary General.*

## China, ICAO Formalize Cooperative Relationship

Recognizing the importance of assistance and cooperation in the field of civil aviation, a Management Service Agreement and a Civil Aviation Purchasing Services Agreement were established between the General Administration of Civil Aviation of China (CAAC) and the International Civil Aviation Organization (ICAO) on 17 September 2007. The Agreements were signed by the Vice-Minister of Civil Aviation, Mr. Guoqing Yang (near left) and Dr. Taïeb Chérif, Secretary General of ICAO (far left), witnessed by Mr. Ricardo J. Heighes-Thiessen, Director, ICAO Technical Cooperation Bureau (TCB).

Through these agreements, ICAO TCB will be in a position to provide a variety of technical cooperation services such as advisory assistance, the development and delivery of training courses, equipment procurement, etc. ■

## Dominican Republic Deposit: Convention for Unification

The Dominican Republic deposited its instrument of ratification of the *Convention for the Unification of Certain Rules for International Carriage by Air*, done at Montreal on 28 May 1999 (Montreal Convention of 1999), during a brief ceremony at ICAO headquarters on 21 September 2007. This brought the number of parties to the Convention to 80. ■

*Shown on the occasion are (from left to right): Mr. José Valdez, Director, Legal, IDAC; Mr. Carlos Veras, Deputy Director, Civil Aviation; His Excellency Dr. Luis Arias, Ambassador of the Dominican Republic in Ottawa; Dr. Taïeb Chérif, Secretary General, ICAO; Mr. Luis P. Rodriguez Ariza, President, Civil Aviation Board; Mr. Luis Kalaff, Minister-Counsellor, Embassy; Mr. Briunny Garabito, Minister Counsellor, Embassy; and Mr. Denys Wibaux, Director, Legal Bureau, ICAO.*

## Dr. Silvio Finkelstein Presented with Edward R. Warner Award

The 38th Edward Warner Award, the highest honour in the world of civil aviation, was conferred upon Dr. Silvio Finkelstein (far left) by the ICAO Council and presented to him by ICAO Council President Mr. Roberto Kobeh González (near left) on 18 September 2007, in recognition of his leadership in the field of aviation medicine and his important contribution to safety in international civil aviation. Dr. Finkelstein was interviewed about his career and accomplishments in the last issue of the *ICAO Journal*. ■

## New ICAO Publications Make Impression at UN Day 2007

*Copies of the new* ICAO Journal *and* MRTD Report *magazines on display at the UN Day Exhibition 2007 in Bangkok, Thailand this past October. 22 UN agencies participated in the event which was well attended by the public.*


## Indonesia, ICAO Sign Management Services Agreement

Indonesia and ICAO formalized a new Management Service Agreement on 19 September 2007. Shown shortly after the signing ceremony is the Director General of Civil Aviation of Indonesia, Dr. Budhi Soeyitno (center left), and ICAO Secretary General Dr. Taïeb Chérif, (center right). The signing was witnessed by the Minister of Transport of Indonesia, Mr. Jusman Syafii Djamal (right) and Mr. Ricardo J. Heighes-Thiessen, Director, ICAO Technical Cooperation Bureau (left). ■

## Asia-Pacific Performance Based Navigation Seminars


*Attendees to the Performance Based Navigation (PBN) seminar held in New Delhi, India, in September 2007. The Delhi seminar was the second of nine that are to be held in the Asia Pacific region, highlighting the concept and application of PBN principles to local stakeholders.*

As part of the ICAO campaign, in cooperation with the FAA and EUROCONTROL, to create awareness and to familiarize various stakeholders in the aviation industry with the new concept of Performance Based Navigation (PBN), the first and second seminars in the series of nine were hosted in September 2007 in Bangkok, Thailand, by the ICAO Asia and Pacific Regional Office, and in New Delhi, India, by the Airports Authority of India (AAI).

Topics covered in the seminars included: Introduction to PBN; Airspace Concepts; PBN Planning & Implementation Processes; Development & Validation of Procedures; Overview of Oceanic, En-route Continental, Terminal and Approach PBN navigation specifications; and regional and industry implementation issues. Instant results from the interactive Question-Answer sessions provided by the FAA team kept the participants constantly engaged and interested.

The seminar in Bangkok was opened by Mr. Lalit Shah, Regional Director of the ICAO Regional Office in Bangkok, who set the tone by emphasizing the tremendous growth of aviation in the Asia-Pacific Region and the role that PBN can play in addressing this growth.

The seminar in New Delhi was inaugurated by a traditional lamp-lighting ceremony participated in by Mr. Raghumenon, Additional Secretary & Financial Controller, Ministry of Civil Aviation; Dr. K. Ramalingam, Chairman, AAI; and other dignitaries. Mr. Raghumenon acknowledged the efforts of ICAO and the AAI in popularizing the PBN concept in India, noting that the country's air traffic is growing at a very rapid pace and recognizing the need for implementing new concepts and procedures to cope with the challenges this growth presents. PBN will be implemented at Delhi and Mumbai Airports by June, 2008 and also at other airports in a phased manner.

Each seminar was attended by a diverse international audience of over 120 participants, representing various agencies in their States as well as international organizations. ■

## Deposit by the Russian Federation: Plastic Explosives Convention

The Russian Federation deposited its instrument of ratification of the *Convention on the Marking of Plastic Explosives for the Purpose of Detection*, done at Montreal on 1 March 1991, during a brief ceremony at ICAO headquarters on 19 September 2007. This brought the total number of parties to the Convention to 135. ■

*Shown on the occasion (from left to right) are: Mr. Evgeny Bachurin, Head of the Federal Civil Aviation Agency, Mr. Igor Lysenko, Representative on the Council; Mr. Valery Saleev, Adviser to the Minister of Transport; Mr. Sergey Aristov, Deputy Minister of Transport, State Secretary; Dr. Taïeb Chérif, Secretary General; Mr. Vladimir Chertok, Deputy Head of the Federal Service of Transport Oversight; and Mr. Denys Wibaux, Director, Legal Bureau, ICAO.*

## Kazakhstan, ICAO, Sign Purchasing Services Agreement

Kazakhstan and ICAO formalized a Civil Aviation Purchasing Services (CAPS) agreement regarding the future procurement of aircraft for the Azamat Airlines on 26 September 2007. The agreement was signed by Mr. Akhmukhanov, President of the Azamat Airlines (pictured at right with ICAO Secretary General Dr. Taïeb Chérif), and Mr. R. Gallego, Chief Field Procurement Section, ICAO Technical Cooperation Bureau. ■

# Noise and Local Air Quality: Getting Tough with Ourselves

**CLIMATE CHANGE IS A CHALLENGE CONFRONTING EVERYONE IN THE AIR TRANSPORT INDUSTRY, AND AIRPORTS MUST CONSIDER A RANGE OF ENVIRONMENTAL IMPACTS—NOT JUST $CO_2$ EMISSIONS. ISSUES OF NOISE AND LOCAL AIR QUALITY ARE MAJOR CONCERNS FOR THE POPULATIONS LIVING AROUND AIRPORTS, AND SO ALSO MUST FIGURE HIGHLY IN THE MINDS OF AIRPORT MANAGEMENT. ACI'S SCOPE OF ACTION, THEREFORE, TAKES ALL ENVIRONMENTAL IMPACT PARAMETERS INTO ACCOUNT AS WE PREPARE FOR THE FUTURE.**

ACI and its member airports are committed to implementing environmentally sound initiatives that are in harmony with economic development and our industry's healthy expansion. The organisation has been highly proactive in developing policy guidelines, sharing best practice information and organising specialised training programmes for airport staff, including a *Policy on Climate* Change published in May 2006 *(see Fig.1, page 33)*. As the 'voice of airports' ACI is responsible for representing these collective needs and positions, in particular at ICAO.

## Sustainable Development

Although only responsible for a very small percentage of the total aviation $CO_2$ emissions, airports are often the party faced with negative public opinion and media pressure against aviation's green house gas emissions. Community campaigns increasingly oppose the approval of airport applications for the construction of new airports, infrastructure expansion and building of new runways. This was once again seen in the UK at this summer's Climate Camp protests, where the focus was on the airport and was extended to opposition for the construction of a runway at Heathrow.

Even in regions where airport capacity expansion is clearly required to address congestion, the planning approval process can delay, cause cost blowouts or indeed, prevent a project from proceeding. Unless the aviation industry takes action to satisfactorily address its growing contribution to $CO_2$ emissions, the issue could further stifle many airport capacity plans, only adding to the problems of delays and ramp congestion at airports.

An important and positive outcome of the ICAO Assembly was the creation of a new group on International Aviation and Climate Change, composed of senior government officials with technical support of CAEP. Its task will be to develop an "aggressive Programme of Action" by 2009, including voluntary measures, technology, operational measures, ATM, positive economic incentives and market based measures.

ACI looks to this Programme of Action to produce decisive and effective actions; otherwise environmental pressures on airport capacity expansion could lead to the exacerbation of aviation infrastructure development and a crippling long term impact on employment and economic growth.

## Airports Reduce Their Environmental Footprint

Individual airports too are addressing a wide variety of environmental impacts, covering a broad spectrum of programme areas, such as emissions reduction, noise abatement programmes, use

of alternative energy supplies, energy-efficient terminals, mass transit options to and from the airport, improved waste management, wildlife preservation, employee transport incentives and energy savings for aircraft at the gate.

Notable examples can be found world-wide, as reflected in the following list. Additional airport-by-airport details can be found in *Fig. 2*, on page 34.

- Dallas Fort/Worth Airport has converted all of its light- and medium-weight ground vehicles and nearly three-quarters of its heavy vehicles to run on alternative fuels—with the aim of having the whole fleet completed in a couple of years. Phoenix, Los Angeles and many other airports are committed to the same programmes.

- Zurich International Airport has installed fixed electrical ground power on all its aircraft stands and made its use mandatory.

- The airport operator in Sweden has committed to become totally carbon neutral in the next few years—and is on target to meet that goal.

- BAA in the United Kingdom invested in public transport some time ago and now around five and a half million passengers use the Heathrow Express train service each year, cutting significantly the number of cars traveling to the airport.

- Many airports have invested in 'smart building' terminal control technology which dramatically cuts down on energy use by regulating the lighting and air conditioning to respond to passenger arrivals and departures, as well as replacing traditional sources of energy with alternative forms.

- Vancouver and San Francisco Airports have installed arrays of solar panels on their vast terminal roofs that will replace electricity from the national grid with the ultimate in renewable energy.

*Continued on page 44.*

**Fig.1: ACI Policy on Climate Change**

**a)** ACI believes that aviation should address its climate change impacts on a global level.

**b)** ACI believes that the best approach for addressing aviation's climate change emissions is a long-term strategy that identifies and phases in environmentally effective, economically efficient and politically viable measures for each category of emission. ACI suggests that ICAO establish a roadmap for long-term global action, with an Action Plan that identifies interim stages, specific measures and policy milestones for achieving aviation's emissions objectives by 2050.

**c)** Recognising the role of ICAO in setting standards, and calling upon this institution to devise more stringent emission standards for aircraft, ACI believes that the policy measure with the least negative impact on the aviation industry will be the integration of aviation's $CO_2$ emissions into a global emissions trading system. ACI does not believe that capacity constraints, taxation or charges that do not satisfy ICAO's criteria for legitimate aeronautical charges are viable solutions to address aviation's contribution to climate change.

**d)** ICAO's Action Plan should also identify the measures and timeframe for addressing $NO_x$ and contrails/cirrus once there is greater certainty over the scale and nature of those impacts. ACI emphasises that in the future, if the effects of $NO_x$ and other non-Kyoto gaseous emissions are addressed by aviation, it will be important that they also be addressed by other industrial and transport sectors.

**e)** ACI airports will continue to take action to minimise emissions within their control, and will support the development of technologies and design strategies in the aviation industry that will help to reduce aircraft emissions globally. On the topic of Emissions Trading Schemes (ETS), ACI calls for the integration of aviations $CO_2$ emissions into a global emissions trading system.

**Fig. 2: Sample Environmental Programmes at World Airports**

*(for a more complete list, please refer to the ACI Environmental Tracker File at www.aci.aero/environment)*

| | |
|---|---|
| **Airfield emissions reductions** | |
| Phoenix International Airport, USA | Alternative fuels programme (compressed natural gas for auto and bus fleets and required of taxis and shuttles) |
| BAA's airports, UK | $CO_2$ emissions reduction target of 15% by 2010 (renewable energy sources, public transportation alternatives, energy efficiencies) |
| Auckland International Airport, New Zealand | Air traffic management techniques (glide descent trial with airlines) and use of ground power units (GPUs) to reduce fuel consumption and noise) |
| **Noise mitigation** | |
| Oakland International Airport, USA | Residential sound insulation (aircraft noise and vibration) |
| Hamburg Airport | Continuous noise monitoring and reporting to stay within local noise limits |
| Vienna Airport, Austria | Mediation for new runway approval involving cooperation between airport, local gov't, local community (also agreed night time operation, flight tracks and land management) |
| **Recycling initiatives** | |
| Seattle-Tacoma International Airport, USA | Recycling for compost; recycling materials and motor oils = cost savings and revenue |
| Jersey Airport, United Kingdom | Recycling old runway concrete for footpaths and pavements |
| Canberra Airport, Australia | Water recycling system, a first for Australia |
| **Winter services** | |
| Munich Airport, Germany | Recycling de-icing fluid; the process generates heat for the terminal building |
| Detroit Metropolitan Airport, USA | Off-site company recycles de-icing fluid to produce 99% pure propylene glycol, which then is used in automotive products |
| Zurich Airport, Switzerland | Treatment of de-icing waste through new spray irrigation system for natural ground filtration |
| **Water pollution reduction** | |
| Auckland International Airport, New Zealand | Storm water treatment ponds filter water through wool to protect from fuel spillage |
| **"Smart" buildings and energy efficiency** | |
| Vancouver Airport, Canada | Solar hot water heating system, from 100 solar panels : reduced energy consumption and reduced costs |
| La Palma Airport, Spain | Wind power from wind generator turbines on airport property |
| Arlanda Airport, Stockholm, Sweden | Climate neutral carbon emissions reductions with audit carried out annually combined with a compensation scheme through purchase of emission reduction units or certificates |
| **Airport-wide education or communications programmes** | |
| Aéroports de Paris | Environment Partners Club for companies operating at the airports; resource centre, best practices; staff awareness |
| Auckland Airport, New Zealand | "Greening the airport" programme for staff; waste minimisation and energy conservation focus |
| Hong Kong International Airport | 4th Airport Environmental Best Practice Competition for airport business partners: air quality management was the theme this year |
| **Intermodality and surface access—getting to and from the airport** | |
| Heathrow Airport, UK | "Changing Direction" – the airport travel plan for the 70,000 employees |
| Boston Logan, USA | Preferred parking for environmentally friendly cars; advantages for taxi drivers of hybrid cars |
| Madrid Barajas Airport, Spain | Direct metro from city centre to the airport terminals |
| **Other environmental programmes** | |
| Hong Kong International Airport | Waste Reduction Framework: reusable shopping bags (no plastic bag campaign) |
| Southwest Florida International Airport, USA | Nature reserve establishment; establishment of the park has led to streamlined permitting of airport development |
| Munich and Frankfurt Airports, Germany | Economic incentives linked to $NO_x$ emissions: three-year test |

- Speaking of roofs... Melbourne Airport in Australia has coated the roof of its terminal in a revolutionary new paint. This reduces the internal temperature of the building by up to 15 degrees in summer, cutting air conditioning use by almost half.

- Narita Airport in Tokyo has successfully reduced its noise footprint by introducing an economic incentive in the form of differentiated landing fees for quieter aircraft based on the ACI Noise Index.

- Recently Frankfurt and Munich Airports announced a new initiative to charge more for older, more polluting aircraft—starting from January 2008—and ACI will be monitoring its progress to determine if this is a model that could be used at other airports.

## Managing Congestion

Optimum use of airport facilities can directly contribute to more efficient fuel consumption and noise management. Despite the best efforts of airport operators to expand their capacity to meet demand and remove artificial capacity restrictions, traffic peaking may reduce the effects of those efforts.

ACI advocates that the airport operator have a strong role in the efficient allocation of slots to airlines, balancing available capacities with the hourly movement rates for runways (aircraft movements), terminals (passenger movements) and aprons (number of aircraft parking stands)—and doing so in consultation with airlines, air traffic control and other appropriate authorities as necessary.

Given the increasing congestion at major airports, ACI supports adaptable, flexible charging structures for airlines and general aviation. Although many traditional carriers have resisted the concept to change the status quo for competitive reasons, we believe that the time has come to experiment with peak charging schemes to get relief at heavily congested airports.

## The Balanced Approach

Step-by-step progress undertaken by individual airports is very important, but at the same time environmental issues are global and therefore require a global response that is built on industry consensus. ICAO is the forum where we work together on such international commitments, where actions are proposed, debated and where consensus is sought amongst aviation partners. ACI has expanded its active participation at ICAO over the past few years, and fully supports the ICAO leadership role on this topic of universal concern.

ACI participates in ICAO's Committee on Aviation Environmental Protection (CAEP) which provides guidance through the 'Balanced Approach'—reduction of noise at source, land use planning, noise abatement operation procedures and operational restrictions. Working to achieve global stringency agreements represents an important step to convince the general public and our passengers that we are capable of being strict with ourselves in the interest of reducing noise nuisance.

Noise has the most clearly identifiable impact on neighbouring communities and is the environmental issue most likely to mobilise local residents against both existing operations and any development of future infrastructure or capacity expansion. This is a key concern for airports worldwide, as they strive to meet future capacity needs and ensure good customer service in a steadily growing aviation market.

ACI's members would like to see the ICAO stringency standards for aircraft noise updated on a regular basis and ACI has worked through CAEP to raise awareness of this issue. We believe that certification stringency can and should take the lead, and not simply follow technological advances.

## Future Work for ACI and its Members

ACI, whose airport members account for over 95 percent of the world's passenger traffic, intends to build on the considerable work and best practices being developed at airports all over the world. A carbon neutral airport is a goal to be considered.

ACI will also continue to participate actively in the CAEP Working groups on airports' behalf with special interest in:

- Global environment modelling which will be used to assess policy options including a possible new emissions stringency and ICAO environmental goals assessment.

- Further development of guidance material on local air quality, covering inventory, dispersion and modelling.

- A study on the relevance of current noise certification levels (potentially leading to a new noise stringency in CAEP/9).

ACI is also a funding member of the Air Transport Action Group (ATAG) and was co-sponsor of the Aviation and the Environment Summit in 2005 and 2006. Our airports are strongly supporting and participating in the industry wide "www.enviro.aero" initiative which aims to better communicate with the public on aviation efforts, our accomplishments and our future plans. At the next Summit which will be held in April 2008, ACI and CANSO will run a full day workshop on airport and ATM efforts to protect the environment, bringing together the people who are building practical and sustainable solutions to meet infrastructure needs.

There is an achievable balance between growth and environmental protection. The industry and the world economies do not have to sacrifice one for the other, but everyone has to be willing to invest, innovate, change old habits and accept new levels of stringency. The industry can either become the victim of a lack of cohesion, or work together on environmental challenges to achieve a brighter future. ■

FORUM

# Leadership and Action: A Winning Combination

Robert J. Aaronson, Director General ACI

Airports are a people business. In 2006, an estimated 4.5 million people worked at airports worldwide to serve over 4 billion passengers. Airports foresee that traffic will double in the next 20 years, which in practical terms means that we expect more than 9 billion departing and arriving passengers by 2025. The number of aircraft movements is expected to reach close to 120 million.

This is a true leadership challenge. Airports must manage this high growth business skilfully and efficiently while maintaining the highest levels of safety and security and pushing ourselves to attain increasingly stringent environmental commitments. A key resource in preparing airport staff worldwide is being provided by the joint ICAO-ACI training programmes, and in particular the Airport Management Professional Accreditation Program (AMPAP).

Despite new security measures that have required substantial investments and impacted duty free sales, the profitability of the airport sector has followed the buoyant traffic trend of the past two years. There have been benefits to airport service suppliers, as well, which is reflected in the increasing diversity of airport products and services and the overall growth of non-aeronautical revenue.

These healthy returns are vital because airport management teams see some major capacity challenges arising in the near future. Many airports in Europe, North America and Asia-Pacific will face a capacity crunch as demand continues to rise. For many emerging markets and developing nations, it will be equally critical to profit both economically and socially from this boom. In a competitive and globalized world, those who do not meet the challenges risk getting left behind.

The European Parliament's Transport Committee has warned that simple optimisation of existing capacity in Europe will be insufficient to meet demand and that capacity shortage is likely to open a market for construction of a number of new major- and medium-sized airports in the EU.

The Asia-Pacific region is growing faster than anywhere, with Chinese authorities committing to nearly 50 new airports in the coming decades.

North America is in dire need of greater capacity and better operating practices to minimise the negative impacts of current constraints. For the world's largest domestic aviation market to be suffering from massive avoidable delays because of industry and political infighting is inexcusable.

New development requires significant investment. Last year, the world's airports committed to spending a record $US 38 billion on capital expenditure. In light of current forecasts, the only direction for this trend is up.

On the path to congestion relief, however, we will also continue to face challenges in safety and security, the impact of external events, fluctuations of national economies and of course the environment. Climate change, and aviation's contribution to it, is an issue of great importance to all of us and one that has thrust our industry into the media spotlight. Noise, however, and local air quality are major concerns for the populations living around airports—and thus for airport management as well.

Our industry has been working hard to steadily address emissions and noise issues and to set new strategic targets. At our ACI annual assembly in November of this year, airport executives will consider a new resolution calling for commitment to environmental goals within their own control, integrating the best, cleanest, most efficient technologies into airport design, equipment and operations.

Our global scope of action must take all environmental impact parameters into account as we prepare for the future, and it will require determined leadership and cooperation with airline and air traffic management partners. Innovative mitigation techniques must be combined in an appropriate way with economic measures that encourage us to be strict with ourselves and to set a course that makes sense.

If we don't succeed, we will see others imposing constraints on our industry. Artificially restraining aviation's development is not the solution to reducing our environmental impact. Heavy-handed taxation, imposing unjustified ceilings on flight movements, refusing to expand capacity at airports: these are all short-sighted measures that would affect hundreds of thousands of jobs and entire national economies, with long-term impact worldwide. The situation calls for long-term solutions and not a series of counterproductive quick fixes.

Around the world, the customers airports serve and the people our industry employs want to envision a stable future. Strong leadership and vision can and will make the difference. The air transport community makes its greatest strides in developing sustainable solutions when all aviation partners work collectively. ICAO is the best forum for achieving international standards and harmonisation, and airports will give full support to its continuing leadership role. ■

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