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The Americas

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Special Joint Regional Report Issue:

Includes content and perspectives from ICAO's North and Central American and Caribbean (NACC) and South American (SAM) Regional Offices

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Americas Regional Report

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European and North Atlantic (EUR/NAT) Office, Paris

Middle East (MID) Office, Cairo

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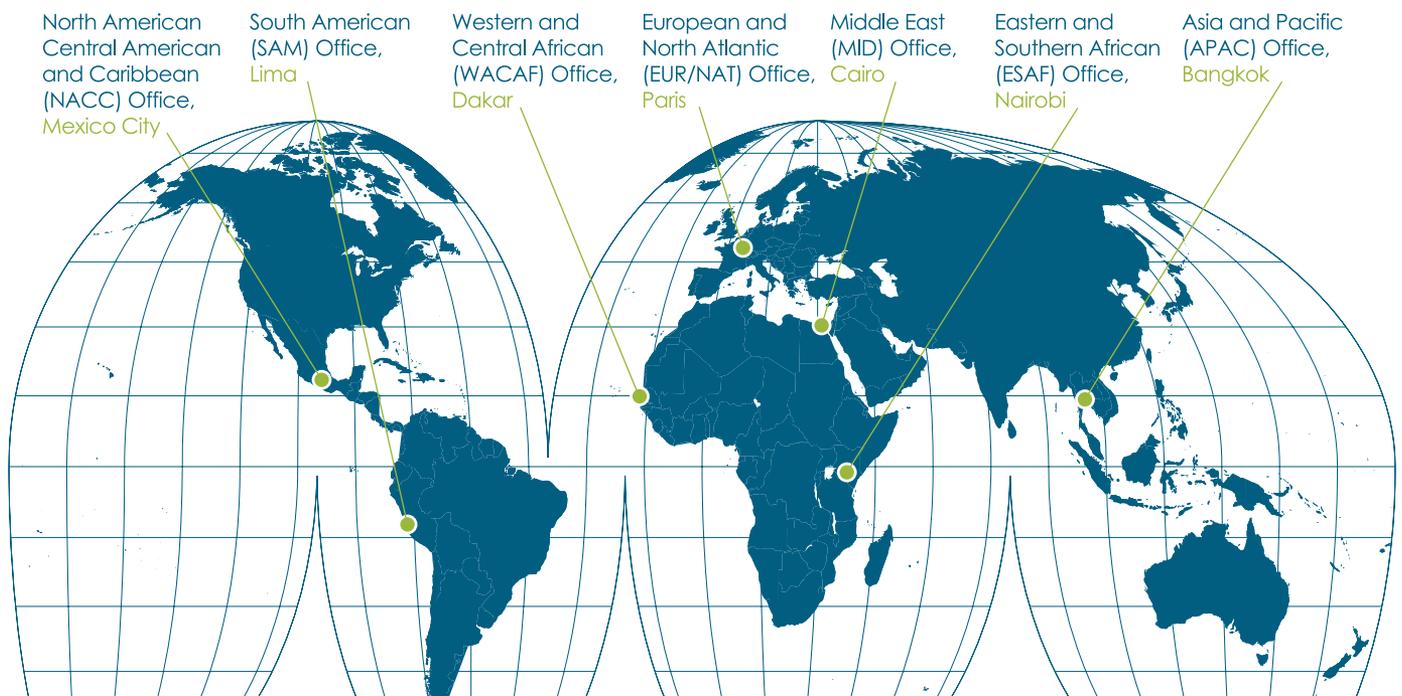
The role of the NACC Regional Office:
From planning to implementation and beyond

The North American, Central American and Caribbean (NACC) Office was established in Mexico City in 1957. It serves a group of 21 States and 11 territories representing a diverse mix of cultures and some very complex and challenging aeronautical issues—key among which are the current NAM/CAR/SAM priority areas of safety, security, and air navigation system function and performance.

In this special review for the ICAO *Americas Regional Report*, Loretta Martin, Regional Director, NACC Regional Office, highlights how Regional planning, coordination and implementation are helping stakeholders in the western hemisphere to develop more cooperative, manageable and efficient solutions to NAM/CAR/SAM challenges.

Prior to being appointed as ICAO's first female Regional Director (NACC, 2006), Loretta Martin spent 25 years with the Federal Aviation Administration (FAA) in various managerial and senior advisory positions related to international and technical initiatives. These postings included, inter alia: Senior Operations Advisor to the U.S. FAA Operational Evolution Plan (OEP); Chief of the New York Terminal Radar Approach Control; U.S. Eastern Region Deputy Air Traffic Division Manager; Eastern Region Air Traffic Division Chief of Staff; Eastern Region Air Traffic Airspace Branch Manager; and FAA Headquarters International Aviation Operations Specialist and International Aviation Planning Specialist.

Martin also served as the U.S. Delegate to the Informal Pacific ATC Coordinating Group and North Atlantic System Planning Group and as a U.S. policy advisor to the Informal South Pacific ATC Coordinating Group. Martin has additionally been a committee member for several aviation organizations, including: the U.S. RTCA; the Regional Airlines Association; the Air Transport Association; the National Air Carrier Association (NACA); and Airports Council International—North America (ACI-NA). She is also a member of Professional Women Controllers and the Federal Managers Association.

Martin worked as a commercial airline pilot for a U.S. carrier before her time with the FAA. She also holds licences as an airline transport pilot, flight Instructor, commercial/instrument Instructor and as a ground instructor. Martin has flown aircraft ranging from the Boeing 727 to the Cessna 150.

The primary responsibility of the NACC Regional Office is to assist States in achieving timely and harmonized implementations of ICAO policies, decisions, Standards and Recommended Practices (SARPs) as well as Regional air navigation plans. It also plays a critical role in technical cooperation-related activities by providing detailed information on State requirements from a close, first-hand perspective.

The NACC Regional work programme is challenging, varied and requires close cooperation with Regional civil aviation bodies such as the Latin American Civil Aviation Commission (LACAC), where related efforts must be well-coordinated in order to avoid duplication of effort and ensure a harmonized development of the international air transport system as a whole.

The NACC Office also works closely with international aviation organizations such as: Airports Council International (ACI); the International Air Transport Association (IATA); the International Federation of Air Line Pilots' Associations (IFALPA); the International Federation of Air Traffic Controllers' Associations (IFATCA); the Civil Air Navigation Services Organization (CANSO); and the Central American Corporation for Air Navigation Services (COCESNA), among others. Sister United Nations agencies and programmes also play an important role in many of the Office's activities, very notably with respect to assuring a coordinated and effective Regional response to the A(H1N1) virus outbreak recently experienced.

Work Programme

In order to address the issues related to the specific geographical areas of the Region, three sub-regional Directors of Civil Aviation groups have been established over the years.

Staff and leadership from the ICAO NACC Regional Office in Mexico City. The NACC work programme is challenging, varied and requires close cooperation with Regional civil aviation bodies such as the Latin American Civil Aviation Commission (LACAC).

Jamaica, Netherlands Antilles, the United Kingdom and the United States. Its 10th Meeting was held in the Cayman Islands in August 2009.

These three groups meet individually on an annual basis and hold a joint meeting every three years, the NACC/DCA, to discuss issues that touch all members of the NACC Regions equally, share experiences, and review and approve the results of the associated Work Groups. The last NACC/DCA Meeting was held in the Dominican Republic in September 2008.

Due to the mix of cultures in the NAM/CAR/SAM Regions, the NACC Office regularly conducts business in both Spanish and English. During 2009, it will conduct nine meetings and four seminars/workshops in English, 14 meetings and 12 seminars/workshops in Spanish, and 11 meetings and 11 seminars/workshops that will be bilingual. Eight of these events will be held at the NACC Office in Mexico City.

Every year, anywhere from two to three events are conducted by the NACC Office under the provisions of a Special Implementation Project (SIP). This year the Office is conducting four SIPs, including a workshop on the development of a national performance framework for air navigation systems to be held in July; a workshop on business case analyses for the implementation of Communications, navigation and Surveillance/Air Traffic Management (CNS/ATM) systems (part of the seamless global ATM system strategy) to be held in Antigua in October; a Performance-based Navigation (PBN) instrument flight procedure design course to be held in Cuba in June, and finally Missions to the Bahamas, the Dominican Republic, Haiti and Honduras to provide assistance to improve aeronautical meteorological services.

This year, the NACC Regional Office is also very pleased to host the First Meeting of the Steering Committee

The Central America and Panama Directors of Civil Aviation (DGAC/CAP) group, established in 1952, consists of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. Its 94th Meeting is currently planned for the third quarter of 2009.

The Eastern Caribbean Directors of Civil Aviation (E/CAR DCA) group, established in 1981, includes Barbados, French

Antilles, ECCAA (Antigua and Barbuda, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines), Trinidad and Tobago, the United States and the United Kingdom. Its 22nd Meeting is planned for December 2009.

The Central Caribbean Directors of Civil Aviation (C/CAR DCA), established in 1997, includes Aruba, the Bahamas, Cuba, the Dominican Republic, Haiti,

> **"The NACC Regional Office has witnessed first-hand the eagerness of all aviation stakeholders to make progress in Regional efforts in order to meet the challenges faced by aviation today. My personal impression is that we have all the skills, expertise and abilities at hand to be successful—we simply need to pool our capabilities and resources more effectively to ensure future success."**
>
> **– Loretta Martin**

of the Cooperative Arrangement for the Prevention of Spread of Communicable Disease through Air Travel (CAPSCA)—Americas Project here in Mexico City.

The ICAO CAPSCA Americas Project was officially launched in April 2009. It has as its main objective to assist States and their airports, airlines and public health authorities as these facilities and bodies develop, test and implement preparedness plans for the management of communicable disease posing a serious public health risk. The CAPSCA Project is achieving this objective through a combination of personnel education and on-site plan evaluations in its participating States.

It is important that all stakeholders pursue this CAPSCA effort with added emphasis, primarily in light of the recent A(H1N1) influenza outbreak. The main objective of the First Meeting of the Steering Committee of the ICAO CAPSCA Americas Project is to establish the Project Steering Committee and its Terms of Reference as well as to develop the Project Work Plan. The meeting includes a segment on reviewing the experience gained in responding to the A(H1N1) threats and lessons learned. It will benefit from the participation of many outside agencies, including the World Health Organization (WHO), IATA and ACI, along with the Pan American Health Organization (PAHO); the UN Office for the Coordination of Humanitarian Affairs (OCHA); the International Organization for Migration (IOM); the UN World Food Programme (WFP), UN World Tourism Organization (UNWTO) and the Centers for Disease Control (CDC) of United States.

New Regional frameworks and approaches: GREPECAS; RASG-PA; AVSEC/FAL/RG

As the focus of ICAO evolves—from primarily Standards and Recommended Practices and planning activities to roles involving more implementation and oversight—so does that of the Regional Offices. This evolution maintains the Organization's primary responsibility to assist States with compliance matters, but also moves it towards a more collaborative approach involving all aviation stakeholders, in order to better meet the future needs of global aviation.

From a Regional perspective, I personally see an intensive three-prong focus now underway, consisting of air navigation, flight safety and aviation security. The response to these focus areas will be met through three distinct efforts in the Pan American region, as described below.

The CAR/SAM Regional Planning and Implementation Group

The CAR/SAM Regional Planning and Implementation Group (GREPECAS) was set up by the ICAO Council in 1990 pursuant to a recommendation by the Second CAR/SAM Regional Air Navigation Meeting (held in 1989). The objectives in establishing GREPECAS were to ensure the continuous coherent development of the CAR and SAM Regional Air Navigation Plans, as well as their relationship to those of adjacent Regions, and to identify specific issues in the various air navigation fields and propose, in appropriate form, actions aimed at resolving these issues.

A significant accomplishment of the Group has been the creation of the GREPECAS Air Navigation Deficiencies Database (GANDD). This database provides a web-based tool to identify, classify, monitor and update the resolution status of outstanding Regional air navigation deficiencies. The GANDD is accessible to States on both the NACC and SAM Web sites.

GREPECAS is currently planning its 16th Meeting for April 2010 which will be held in an as-yet unspecified location in the NACC Region.

Regional Aviation Safety Group-Pan America

The Regional Aviation Safety Group-Pan America (RASG-PA) is the first initiative in civil aviation designed to address the gaps between air navigation and operational safety implementation activities. These activities involve States, international organizations, airlines, air navigation services providers, airports, manufacturers and Regional aviation safety organizations throughout the Americas.

The basis for the RASG-PA's work is the ICAO Global Aviation Safety Plan (GASP) and the associated Global Aviation Safety Roadmap (GASR) developed by the Industry Safety Strategy Group (ISSG), a group of major aviation industry stakeholders working with ICAO. The ICAO NACC Regional Office acts as the Secretariat for the Group.

RASG-PA will serve as a focal point to ensure harmonization and coordination of safety efforts aimed at reducing aviation hazards and risks in North America, Central America, the Caribbean and South America. Its second meeting and workshop will be held in Colombia in November 2009, and more detailed analysis of its structure and purpose can be found in this issue on page 12.

Aviation Security-Facilitation Regional Group

In March 2008, the ICAO Council agreed that aviation security issues should be removed from the GREPECAS mechanism, since security was not appropriate for review by air navigation experts. Aviation security requires specialized expertise and carries significant importance both regionally and globally. The result was that, during the last meeting of the GREPECAS AVSEC Committee (AVSEC/COMM) held in Mexico, a multi regional Aviation Security-Facilitation Regional Group (AVSEC/FAL/RG) was established for the NAM/CAR/SAM Regions to identify, assess and prioritize security issues as well as to follow-up and implement AVSEC/FAL measures in accordance with ICAO SARPs and other guidelines. The ICAO NACC Office will serve as the AVSEC/FAL/RG Secretariat, coordinating the Group's efforts based on priorities as established by its members.

In coordination with ICAO Headquarters, the AVSEC/FAL/RG will function as a multi regional forum to harmonize and efficiently unify the efforts of smaller AVSEC Regional entities, in order to avoid duplicating efforts and exhausting limited State resources. The first meeting of the AVSEC/FAL/RG will be held in early 2010 and will be hosted by a civil aviation authority from South America. We expect to have the first meeting conducted jointly with a security seminar/workshop on a topic related to ICAO Universal Security Audit Programme results and State responsibilities.

Each of the efforts described above requires keen focus and dedication by all participants. A determined and collaborative approach will be necessary on behalf of all stakeholders in order to achieve success, and it must be stressed that this is a new approach to meeting the demands now facing aviation.

The NACC Regional Office has witnessed first-hand the eagerness of all aviation stakeholders to make progress in Regional efforts in order to meet the challenges faced by aviation today. My personal impression is that we have all the skills, expertise and abilities at hand to be successful—we simply need to pool our capabilities and resources more effectively to ensure future success.

Loretta Martin
Director
ICAO NACC Regional Office ∎

Building trust through Regional cooperation

The area of responsibility of the ICAO SAM Regional Office encompasses 13 States and one territory—including 26 Flight Information Regions (FIRs)—covering more than 38,000,000 km². During its more than 60 years of service, coordination between ICAO's SAM Office and its Region's governments has resulted in an excellent environment of trust and cooperation, facilitating the creation of many civil aviation regulatory mechanisms that have helped further ICAO's globally-harmonized goals and objectives.

Franklin Hoyer joined ICAO SAM as Regional Director in September 2009. Prior to this appointment he served his government for almost 40 years, dedicating more than 24 years to civil aviation in the fields of flight inspection, CNS and air services negotiations. He was also head of CINDACTA 1, an important air navigation services provider in Brazil, as well as a Member in ICAO's Air Navigation Commission and the Aeronautical Mobile Communication Panel. Hoyer finished his public career as Superintendent of International Relations at ANAC, the new Brazilian CAA.

ICAO's South American Regional Office began its activities in October 1948, responding in part to an invitation extended by the Government of Peru at the SAM/SAT Regional Air Navigation Meeting held in Lima one year earlier. ICAO signed a headquarters agreement with Peru and has maintained close cooperation with the State in the ensuing decades—resulting in an excellent *modus vivendi* that has tremendously facilitated the Organization's efforts in the Region.

Having recently been appointed Regional Director of the SAM Regional Office, I cannot help but take note of the excellent work done by my predecessors in projecting the vision and mission of ICAO as an international aviation forum for the safe and sustainable development of civil aviation through cooperation among its Member States.

In order to achieve its vision, ICAO has established a number of strategic objectives aimed at addressing safety, security and sustainability concerns in a globally-effective and harmonized manner. All of these objectives are guided by the Organization's ongoing efforts with industry and State stakeholders to foster a culture of consistent improvement to the overall efficiency of all aspects of air operations.

In order to facilitate the implementation of ICAO's strategic priorities, the SAM Regional Office, in coordination with its States, has established several cooperative roles and mechanisms. In this capacity it serves as host to the SAM Regional Safety Cooperation System (SRVSOP); oversees the technical management of the South American Digital Network and the Regional coordination of the SAM Implementation Group (SAM/IG); and most recently is preparing to support the implementation of a new Regional Multinational Organization (RMO).

All of these mechanisms are established under multinational cooperation agreements and with the support of Regional technical cooperation projects.

The SAM Regional Office also hosts the Secretariat of the Caribbean/South American Regional Planning and Implementation Group (GREPECAS)—a responsibility shared with the North American, Central American and Caribbean (NACC) Regional Office. Current GREPECAS activities include planning for and strengthening the implementation of the CAR/SAM Air Navigation Plan as per the objectives reflected in ICAO's Global Air Navigation Plan (GANP) as well as coordinating the tasks of the emerging Regional Aviation Safety Group-Pan America (RASG-PA) with the implementation of ICAO's Global Aviation Safety Plan (GASP) and ISSG Safety Roadmap.

Emerging Regional strengths

The South American economy has been growing on a sustained basis for the last several years, primarily as a result of the abundant raw materials, agribusiness and manufactured product exports to other emerging economies of the world. This sustained economic growth, which is directly assisted and facilitated by ongoing air transport developments, is currently projected to continue for some time. Our Office's Regional challenge will therefore be to continue supporting air transport and economic development while ensuring safe, efficient, and environmentally sustainable aviation operations. This will need to be accomplished within a constantly changing environment at the technical, economic, commercial and political levels as South America continues to adapt to the new challenges of its ongoing economic and social progress.

ICAO SAM Regional Director Franklin Hoyer (centre) with his colleagues from the SAM Regional Office. In order to facilitate the implementation of ICAO's strategic priorities, the SAM Office, in coordination with its States, has established several cooperative roles and mechanisms.

Accordingly, and in keeping with GANP and GASP initiatives, Regional activities have been clearly defined within the ICAO Business Plan in order to introduce Strategic Operational Improvements to better meet the Strategic Objectives of the Organization. These activities are to be implemented within the 2011–2013 budget and our challenge will be to ensure that they are applied in a manner consistent with and effectively responding to the policies and directives of the Secretary General and the ICAO Council.

The primary goal of these initiatives will be to reduce the number of SAM accidents/incidents in the next few years, through the adoption, *inter alia*, of the following measures:

- The harmonization of national regulations in compliance with ICAO Standards and Recommended Practices (SARPs), and the Regional establishment of a fair and effective safety reporting culture.
- Broader implementation of State Safety Programmes (SSPs) and Safety Management Systems (SMS).
- Increasing capacity and establishing a more flexible use of airspace through the implementation of Performance-Based Navigation (PBN) and improved civil/military cooperation.
- Air Traffic Flow Management (ATFM).
- Applying CNS/ATM technologies in keeping with operational performance-based objectives.
- Supporting the Continuous Monitoring Approach (CMA) safety programme as a follow-up on completed ICAO Universal Safety Oversight Audit Programme (USOAP) inspections and results.

The ICAO South American Region currently hosts a large number of ICAO technical cooperation projects. These projects are used by the Regional Office as a tool for promoting and strengthening Regional cooperation and facilitating implementation of the Office's Regional programmes. This trend is expected to continue in the near- and medium-term and will clearly contribute to the sustained and safe development of civil aviation—both in the Region and throughout the world.

Franklin Hoyer
Director
ICAO SAM Regional Office ■

Welcome to the ICAO Americas Regional Report

In order to showcase our achievements to the global civil aviation community, ICAO NACC staffers have taken advantage of this unique publication to put together articles on important developments in our Region, including: bird hazard and wildlife prevention; aviation security (AVSEC) training; implementation of the seamless ATM system; the MEVA II Network; the new electronic format of the Aeronautical Information Publication (eAIP); the GANDD system; and the NACC Regional Office Web site, among others.

The collage presented below depicts historical meetings and many of the staff members who have contributed so diligently to this Office and its evolving objectives since its opening in 1957.

I sincerely hope that you will enjoy and be informed by the articles and images we have consolidated for this special publication. I am confident that they will provide interested readers with greater insight into the broader civil aviation issues in the NAM and CAR Regions, our host State, Mexico, and the current priorities of the NACC Regional Office and its staff.

Michiel Vreedenburgh
Deputy Regional Director, ICAO NACC Regional Office ◼

Michiel Vreedenburgh joined ICAO in 1999 and has served the Organization as Regional Officer Aerodromes and Ground Aids, Regional Officer Aviation Security, Project Coordinator Technical Cooperation, and, since 2009, as Deputy Regional Director of the ICAO NACC Regional Office in Mexico City serving the 21 States and 11 territories of the North American, Central American and Caribbean Regions.

A national of the Netherlands, Vreedenburgh is a qualified civil engineer and his professional experience prior to ICAO was as a specialist consultant and eventually corporate director of airport planning, design and operations for a private sector body. His career has spanned over 20 years of international aviation experience gained in more than 45 countries in the Americas, Asia, Middle East and Europe, serving governments, civil aviation authorities, airport operators, and international development and funding agencies.

Showcasing our unique cooperation

I am very pleased to help present to you the accomplishments and unique character of the SAM Regional Office. In the following pages you will find many submissions from our Regional Officers on the programmes and achievements that continue to highlight the cooperative spirit and desire to excel that has helped ICAO and the SAM States achieve so much in recent decades.

The collage below illustrates just a few of the meetings and assemblies that over the years have reflected this cooperative

spirit and allowed SAM stakeholders to work together under the unique leadership forum which ICAO provides in all matters relating to civil aviation developments and success. I hope that as you read through the following pages you will appreciate the hard work of the ICAO SAM staff and the special relationship we share with our NACC Office colleagues.

Together we have achieved much and I look forward to the future challenges we will help to resolve on behalf of our Regions and the States who comprise them.

Carlos Stehli
Deputy Regional Director, ICAO SAM Regional Office ■

The RASG-PA:
Moving forward on hemispheric safety initiatives

Following on the objectives set out in the ICAO Global Aviation Safety Plan (GASP) and the Industry Safety Strategy Group's (ISSG) Global Aviation Safety Roadmap (GASR), ICAO and Regional/industry stakeholders put into action the new Regional Aviation Safety Group-Pan America (RASG-PA) in late 2008.

As RASG-PA members gathered for a meeting in Colombia in November, 2009, participants expected to be moving forward on recommendations developed by the Group's Steering Committee during a meeting in Lima earlier in the year. Some of the key participants took a moment to discuss with the *Americas Regional Report* how this results-driven approach is beginning to move forward specific new planning and programmes designed to improve NAM/CAR/SAM safety levels across the full spectrum of the Region's operational and infrastructure-related activities.

In line with ICAO Global Aviation Safety Plan (GASP) and the Industry Safety Strategy Group's (ISSG) Global Aviation Safety Roadmap (GASR) objectives, the RASG-PA was developed as a focal point to ensure harmonization and coordination of safety efforts aimed at reducing aviation safety risks. Related planning focuses primarily on defining common safety priorities and implementing goals for NAM/CAR/SAM States and Regional aviation stakeholders. An added objective of the group is eliminating the duplication of efforts through the establishment of more cooperative Regional safety programmes.

This type of broad-based and coordinated approach significantly lessens the financial and human resource burden on all States in the affected Regions while delivering important and measurable improvements to benefit local aviation safety performance levels.

> **"We view the RASG-PA as an agent that can anticipate problems and opportunities that may aris as well as promote important cross-sharing of safety best practices and data."**
>
> **– Gerardo Hueto, Boeing**

The GASP and GASR require that all stakeholders follow a logical process to address 12 key focus areas attributable to States, Regions and industry respectively. The establishment of these focus areas helps to ensure that all safety stakeholders invest their energy and resources effectively and comprehensively *(for more background on these programmes and initiatives please see ICAO Journal, Vol. 64 No. 2, 2009)* and in a manner which is harmonized not only at the Regional but also the global level.

The Roadmap accomplishes this in part by providing metrics through explicit projects that enable managed improvement and which channel

States that would provide them with the necessary legal framework to ensure the protection of safety information and therefore the enhanced ability to assess aviation system safety. These efforts are in line with the best practices of the GASR and ICAO Annex 13. The latter proposal would be building on similar accomplishments related to the development of the Latin American Regulations *(LARs; for more information please see page 24).*

Essentially these tools provide a foundation for States as they develop their own legislation in related areas. The November meeting was also expected to identify solutions for the provision of more targeted training

"My main functions today include providing regular safety environment assessments to the RASG-PA and supporting the safety information working paper," Pellegrino commented. "This working paper is a living document designed to assist the RASG-PA in the development of future work programmes and to prioritize efforts based on data-driven risk identification. It will form the basis for a future RASG-PA annual safety report."

Pellegrino and the other RASG-PA members expect a lot from the creation of a new and more integrated safety environment. He noted that they are encouraging information exchange among civil aviation authorities and encouraging States to specifically make more effective use of the Web-based tool for ramp inspection data sharing that has been created by the South American Regional Safety Oversight System (SRVSOP).

Pellegrino also commented that his home State of Brazil is now working hard to implement its recently published State Safety Programme (SSP) and Safety Management System (SMS) provisions, and that these developments will positively impact RASG-PA and other initiatives since Brazil will be able to deliver more prompt information on air carrier and operator performance.

> **"CAST has found that strategic tools such as the ISSG GASR or ICAO's GASP can be excellent tools for identifying areas of risk, but that more specific measures such as those found in the CAST safety enhancements become essential to an effective solution to mitigate or eliminate those risks."**
>
> **– Glenn Michael, CAST**

efforts through existing mechanisms—not new bureaucracies. Industry participation is essential to all these efforts and has the full backing and support of airlines, airports, air navigation service providers (ANSPs), maintenance and repair organizations (MROs) and manufacturers.

At the time of this writing, the second meeting of the RASG-PA (November, 2009) was to have discussed, among other issues, investigating how to incorporate several Commercial Aviation Safety Team (CAST) initiatives and the development of tools for Pan-American

efforts as well as more extensive application of Safety Management Systems (SMS) and State Safety Programmes (SSPs).

Brazilian Carlos Eduardo Magalhães da Silveira Pellegrino, first Vice-Chairman of the RASG-PA supports the Chairman and the Executive Steering Committee in proposing the RASG-PA work programme and coordinating the activities of the RASG-PA and all GASP/GASR safety-related initiatives, adjusting the strategy as necessary. He's also responsible for providing regular safety environment assessments to the RASG-PA.

Operators' perspective

With respect to commercial carriers in the affected Regions, it was important from the onset that the RASG-PA's objectives were closely aligned with ISSG and IATA objectives and that the foundation arose from a global perspective but incorporated Regional needs.

"In our view the RASG-PA is off to a very good start," commented Günther Matschnigg, IATA Senior Vice-President, Safety, Operations & Infrastructure. "Clear objectives have now been developed and, in November, the Group will have to continue to deliver so that these objectives are successfully

implemented. In 2008, the Pan-American accident rate climbed to 2.55 accidents per million sectors flown, compared to 1.61 accidents in 2007. This is a serious concern and it demonstrates, in part, why the new RASG-PA initiatives and strategy need to begin to take effect quickly."

Matschnigg noted that priorities for the airlines included taking advantage of available, field-proven technologies to the fullest extent possible to enhance the Pan-American safety infrastructure. IATA is currently working with its members and

"However, success can be achieved if industry works as part of a harmonized plan and strategy."

Manufacturers' role

As an original CAST member, Boeing has been playing an active and important role in broader aviation safety initiatives for over a decade now. Gerardo Hueto, Boeing Program Manager for Regional Aviation Safety, noted that his company's participation in RASG-PA's Steering Committee affords it an

> # "RASG-PA in-kind support donors include Colombia, Costa Rica, Jamaica, United States (CAST), ACI/ LAC, ALTA, Boeing, COCESNA (ACSA), IATA, IFALPA, and FSF. This system needs to continue and grow, with more funding being secured in order for the RASG-PA to continue meeting its objectives."
>
> # – Loretta Martin, ICAO

several States to develop and implement RNAV/RNP approach procedures at selected airports. IATA feels these procedures will reduce the risk of Controlled Flight into Terrain/Approach and Landing (CFIT/ALA) accidents which have historically been a problem in the LATAM/CAR area.

Another area IATA is concerned with is runway excursions. Matschnigg drew attention to the fact that 31 percent of all accidents experienced in the NAM/CAR/SAM Regions last year were the result of an aircraft excursion from the runway. IATA rolled out a Runway Excursion Risk Reduction Toolkit earlier this year with the intent to provide a related training aid to airlines, Air Navigation Service Providers (ANSPs) and airports.

Lastly, he stressed that IATA would continue to engage regulators and airports to implement IATA Operational Safety Audit (IOSA) and IATA Safety Audit for Ground Operations (ISAGO) provisions into their safety oversight programmes.

"History has shown that one organization cannot, by itself, solve the safety problems in a Region," Matschnigg concluded.

opportunity to more effectively and specifically promote and support the implementation of GASR/GASP related projects in the NAM/CAR/SAM Regions.

"This joint industry-government approach fosters partnerships and also encourages further collaboration among States and industry," Hueto remarked. "While this is a relatively new initiative, the intention is to build on existing Regional organizations and truly integrate safety initiatives to reduce redundancy and duplication."

Hueto reinforced that the RASG-PA's project approach to safety initiatives has strong ties to ISSG GASR focus areas and best practices, keeps stakeholders engaged, and provides reassurance to his organization that Boeing's resources are being efficiently utilized.

"We view the RASG-PA as an agent that can anticipate problems and opportunities that may arise as well as promote important cross-sharing of safety best practices and data."

"In 2008, the Pan-American accident rate climbed to 2.55 accidents per million sectors flown, compared to 1.61 accidents in 2007. This is a serious concern and it demonstrates, in part, why the new RASG-PA initiatives and strategy need to begin to take effect quickly"

– Günther Matschnigg, IATA

Essential CAST contributions

A cooperative venture between the FAA and industry, the CAST initiative has been identifying safety hotspots since 1998 through the analysis of accident and incident data. CAST charters joint teams of experts to develop methods to fully understand the chain of events leading to accidents and identifies and implements high-leverage interventions or safety enhancements to reduce associated fatality rates, etc.

The Commercial Aviation Safety Team model has been extremely successful in the United States, where the fatality rate of commercial air travel has been reduced by 83 percent over the last ten years. In commenting on the intent of the RASG-PA to begin implementing specific CAST solutions to NAM/CAR/SAM areas of concern, Glenn Michael, CAST International Outreach Manager, drew attention to the tactical nature of many CAST solutions and to why it's crucial to support broader safety programmes with more focused initiatives.

"In the decade or so since it was formed," Michael began, "CAST has found that strategic tools such as the ISSG GASR or ICAO's GASP can be excellent tools for identifying areas of risk, but that more specific measures such as those found in the CAST safety enhancements become essential to an effective solution to mitigate or eliminate those risks."

CAST safety enhancements are developed by Joint Safety Analysis Teams, or JSATs. They have been looked to and locally tailored by a number of States in recent years as safety stakeholders have sought to replicate the degree of success that the U.S. has had in addressing specific risk areas.

"At the last RASG-PA Steering Committee meeting, Boeing, ICAO and CAST all brought accident data relevant to the CAR/SAM Region," Michael continued. "Runway excursions, controlled flight into terrain and loss of control in flight emerged as the three dominant areas of concern. We then broke out safety enhancements based on the Roadmap and provided the Executive Steering Committee with detailed implementation plans for each of those enhancements so that all its members could assess timelines, implementation requirements, associated costs that could be expected, and other specific details."

Michael also noted that an increased number of teleconferences in recent months, a simple communications tool yet one which can greatly facilitate and reduce the costs of Regional programmes and coordination of this kind, have also been essential in helping keep the entire RASG-PA process on-track and moving forward.

Mrs. Loretta Martin, ICAO Regional Director for the North American, Central American and Caribbean Regional Office in Mexico City, and Secretary of RASG-PA, concluded that the success of the RASG-PA is dependent on the commitment, participation and contributions of its members from States and industry alike, with financial and in-kind support. Results to date have been achieved to a large extent on in-kind support from RASG-PA members serving as event hosts, providing subject matter experts and input to projects, sharing of proprietary safety information and tools, and delivering training. In-kind support donors include Colombia, Costa Rica, Jamaica, United States (CAST), ACI/LAC, ALTA, Boeing, COCESNA (ACSA), IATA, IFALPA and FSF. This system needs to continue and grow, with more funding being secured in order for the RASG-PA to continue meeting its objectives. ◼

Regional cooperation and the implementation of multinational air navigation facilities

The SAM Region has been developing new and important multinational frameworks in recent years to provide the foundation required for contemporary advances in the design and implementation of Regional civil aviation systems.

Carlos Stehli, ICAO SAM Deputy Regional Director, provides here for the *Americas Regional Report* an overview of the history and current activities, including the Regional bodies and ICAO Technical Co-operation project initiatives which have established and continue to provide the important channels to allow for more effective multinational cooperation as Regional and harmonized programmes become an increasingly essential component of SAM State air transport solutions.

Carlos Stehli is a telecommunications engineer. Prior to his ICAO appointment, Stehli served the Bolivian Government assisting with the planning, implementation and maintenance of Communications, Navigation and Surveillance (CNS) installations. He joined the ICAO SAM Regional Office in 1985 as Communications Technical Officer, fostering and promoting the implementation of CNS Regional Air Navigation Plan systems and international multilateral Regional cooperation. Since 2007, Stehli has served as the Regional Deputy Director of the SAM Regional Office.

With the Tenth Air Navigation Conference's endorsement (September 1991) of the Future Air Navigation System—designated the ICAO CNS/ATM system by said conference—ICAO ushered in a new era of possibility with respect to coordinating Regional cooperation in the provision of air navigation services based on a new and multinational approach to planning and implementation. This new approach was designed to respond to the technical, operational, legal and institutional challenges posed by the advent of the global CNS/ATM system.

At that time, the solution being put forward to address existing and systemic problems involved the implementation of a Global Navigation Satellite System (GNSS) for all flight phases, the extensive use of data link for commu-nications between aircraft and ground facilities, and automatic dependent surveillance to support the implementation of a new air traffic management concept. This solution has been significantly advanced and updated, evolving into the ATM Operational Concept that was endorsed by the Eleventh Air Navigation Conference (2003). It was projected that this more advanced and performance-based solution would be gradually implemented through a transition process by 2025.

Multinational approach

Immediately after the Tenth Air Navigation Conference and following the recommendations of said Conference, the CAR/SAM Regions began a review of the planning process being carried out by the Regional Planning and Implementation Group, GREPECAS. This review triggered the implementation of various Regional Technical Co-operation projects which served as the basis for the design of the initial multinational administrative agreements—the predecessors of current multinational approaches. These projects included

- **ICAO/UNDP RLA/98/019**
  Implementation of the South American Digital Network (REDDIG) (turnkey implementation and management of the REDDIG).
- **ICAO/UNDP RLA/00/009**
  Regional GNSS Augmentation Trials (SBAS augmentation trials and training courses provided to SAM States).
- **ICAO/UNDP RLA/98/003**
  Transition to the CNS/ATM systems in the CAR and SAM Regions (originated current studies for the improvement of the route network, supported Reduced Vertical Separation Minima (RVSM) implementation in the CAR/SAM Regions, and began studies on institutional aspects for the identification and implementation of multinational systems).

Upon approving the recommendations of the CAR/SAM/3 Regional Air Navigation Meeting (Buenos Aires, November 1999), the Council permitted the Secretariat to reformulate the *CAR/SAM Air Navigation Plan* (Doc. 8733) and to include in the *Facilities and Services Implementation Document* (FASID; Volume II) the guidance material for the implementation of multinational facilities—which was used as the basis for subsequent studies.

The Regional cooperation/collaboration process

The 35th Session of the Assembly, in its support for the ATM Operational Concept (Res. A35-15) and the related implementation of Global ATM, strengthened the need for SAM States to engage members of the aviation community so as to address key technical and operational issues.

This process helped to engender an unprecedented environment of collaboration and cooperation that has helped to make multinational ATM efforts such a resounding success to this point. In addition to technical and operational aspects, the legal, financial and economic requirements of implementing the Global ATM system

within the framework of the appropriate institutional instruments also had to be agreed upon to support these efforts.

GREPECAS therefore decided to intensify its studies on institutional aspects by redirecting its efforts, with the support of the Regional Technical Co-operation Project RLA/98/003, in order to provide study material to the Institutional Aspects Task Force. This allowed the CAR/SAM States to consider the multinational systems that could be implemented and the technical/operational, legal and institutional aspects that had to be taken into account based on given operational scenarios. The systems identified for possible multinational arrangements under this process were, *inter alia*:

- Digital networks for aeronautical communications.
- GNSS augmentation systems.
- Air Traffic Flow Management (ATFM) services and systems.
- An integrated aeronautical information system.
- A Regional Monitoring Agency (RMA).

Parallel to the studies being undertaken by GREPECAS, SAM Regional Civil Aviation Authorities (RAAC) meetings closely followed these developments and responded with a High-Level Group on Institutional Aspects (EANAI), in order to analyze the GREPECAS findings once they had been submitted.

The GREPECAS results were clear (Conclusions 14/5 and 14/6) and recommended a model agreement for the establishment of a Multinational Regional Organization (MRO) with its own administrative procedures similar to other United Nations organizations. The purpose of this body would be to manage, consolidate and implement multinational systems among its Member States.

GREPECAS/14 also recommended that the ICAO Technical Co-operation system be used to establish a Regional project to facilitate the implementation

of the MRO. The ICAO Air Navigation Commission endorsed these initiatives.

EANAI examined the Model Agreement and made interesting amendments to it. It also developed the terms of reference for the establishment of MRO headquarters and agreed to submit its results to the RAAC/11 Meeting. RAAC/11 endorsed these initiatives, taking note that the implementation of the MRO would provide the following benefits:

a. Regional strength and presence for the planning, consolidation, implementation and management of the multinational systems required in the Region for the development of global ATM.
b. Regional strength and presence to coordinate, at the global level, the implementation and development of the ATM operational concept with a view to global ATM.
c. The capacity to plan/implement services with common technical/operational objectives in a consistent and integrated manner.
d. Funding would be facilitated and the cost of implementing, operating, and maintaining multinational and other services and systems would be reduced.
e. Immediate benefits would be provided to users of the entire Regional airspace in a harmonized manner.
f. Centralized management of the main multinational facilities in the Region and more efficient and reliable management and control by Member States of the MRO.

With this in mind, the RAAC/11 Meeting asked ICAO to organize, in coordination with the States, a Diplomatic Conference in order to finalize the text of the Constituent Agreement. Brazil agreed to host the meeting which is expected to be held in December 2009. Furthermore, the Regional Technical Co-operation Project was examined by the RAAC/11 Meeting, and the results of the Conference will determine how it gets implemented.

Some of the expected initial tasks of the MRO concern the management of the South American Digital Network (REDDIG) and the development of studies for the establishment of the CAR/SAM Regional Monitoring Agency (CARSAMMA). These requirements will be achieved with the support of the aforementioned Regional Technical Co-operation project.

Once the MRO becomes operational, the necessary studies for the implementation of new multinational facilities will be conducted, and it is expected that the scope of the Constituent Agreement will be extended so that the MRO may offer air navigation services in the medium- and long-term. Documents concerning the establishment and implementation of the MRO are available in the report of the RAAC/11 Meeting on the Web page of ICAO's South American Regional Office (www.lima.icao.int).

States have high expectations for the MRO. Its implementation now really depends on firming-up the Regional political will that will allow it to move forward. The environment necessary for its creation has already been established through the extensive cooperative work of the States and ICAO, as previously described, and the challenge is now to get it up and running.

Other multinational initiatives

Under the same principle and spirit of cooperation achieved for the implementation of multinational aeronautical services and systems in the Region, other interesting initiatives have been developed with the support of additional Regional Technical Co-operation projects as indicated below.

One such initiative is the gradual planning/implementation of Global ATM based on the operational initiatives of the Global Air Navigation Plan (GANP). In this regard, Regional Project RLA/06/901 provides a framework so that the States participating in said project, as well as all of the parties interested in Regional coordination and cooperation, will have a forum for the required discussion, dissemination, and training through seminars and courses that will allow this initiative to meaningfully mature.

This work will be of tremendous assistance in enabling the implementation of PBN, ATFM, and the interconnection of Air Traffic Control (ATC) automated systems in order to allow for interoperable flight surveillance and coordination applications. The SAM/IG Implementation Group supported by this project periodically reviews the work of the experts on the project and provides the forum through which the participating States finalize their decisions.

Likewise, in 1998, through a Memorandum of Understanding (MOU) between ICAO and LACAC, the Regional Safety Oversight Co-operation System (SRVSOP) was established with the support of Regional Technical Co-operation Project RLA/99/09. This system is a mechanism that provides assistance to States for the harmonization of their national regulations in order to comply with ICAO Annexes 1, 6, and 8. The SRVSOP develops Latin American Regulations (LARs) which several States that participate in the Regional system are already adopting as their national regulations or else are harmonizing with existing regulations. The SRVSOP now plans to extend the LARs to cover Annexes 11 and 14, and to institutionalize the multinational mechanism in the medium-term.

Once Regional Project RLA/98/019 was completed, ICAO and the States activated a new Regional project, RLA/03/901, through which ICAO's Technical Co-operation Bureau, on behalf of the Member States of the project, manages the operation and maintenance of the REDDIG—which has been operating since September 2002. With the implementation of the MRO, this project is expected to complete and transfer its functions to the MRO. ∎

Improving SAM AIS/MAP services in support of PBN implementation

The SAM Region is committed to the implementation of several air navigation applications based on the Performance-based Navigation (PBN) concept. As part of ongoing activities to support the implementation of early navigation applications, such as RNAV-5 as well RNAV/RNP approach, it was considered of paramount importance for States to implement, in the corresponding AIS units, the Quality Management System (QMS) and its certification as prescribed in Annex 15.

Alberto A. Orero is the ICAO SAM Regional Officer (RO) Air Traffic Management/ Search and Rescue/AIS Information Service. Orero joined ICAO in December 2000, as RO/ATM/SAR. Prior to joining ICAO he served in Argentina's Civil Aviation Authority for 30 years as Senior Air Traffic Controller, Operations Officer, Adviser on ATM/SAR issues and Professor on ATM/SAR/AIS.

The main objective of the Aeronautical Information Service (AIS) is to ensure the necessary information flow for safety, regularity and efficiency of international civil aviation. In this regard, the CAR/SAM Regional Planning and Implementation Group (GREPECAS) has encouraged CAR/SAM States, as a matter of high priority, to implement the SARPs contained in Annexes 4 and 15. The main role of the Regional Office is to highlight this priority further as SAM States harmonize their AIS/MAP activities.

The implementation of the Quality Management System (QMS), in line with the Global Air Navigation Plan Initiative GPI-18, assures that timely aeronautical information will be provided to users with the resolution, integrity and precision required. It should be noted that most of the SAM States are committed to implementing QMS. To help support them in these efforts and

reinforce the importance of these developments, ICAO executed a Special Implementation Project (SIP) in July 2009, supported by the Regional Technical Co-operation Project RLA/06/901. Key objectives were:

a) Identification and application of specific procedures for AIS activities within the framework of quality management (QM). The workshop produced a verification list with questions related to each procedure of the AIS activity harmonized with ISO 9001—where value criteria are defined to validate the process and where results may be measurable.

b) Present participants of the seminar/ workshop on AIS QM the development of work of AIS/MAP QM harmonized with ISO 9001 Standard.

Participants were given the opportunity to practice a pre-defined strategy for applying the QM programme effectively (achievable) and efficiently (lowest possible cost) and were familiarized with the ingredients required for successful implementation of the programme. It is expected that, with the instruction provided through the July SIP, SAM States are now in a better position to initiate and finalize an effective QMS programme.

The implementation of Global ATM will require high quality and accessible digital aeronautical information. This should be provided online through database applications, specifically with respect to AIS/MAP services on cartography, ATFM affectation warnings,

AIRAC updating and preparation of AIC/NOTAM models. e-AIP and required AIP Supplements shall contribute to meeting this need. The availability of aeronautical information in digital form and with the corresponding quality standards will facilitate greatly the use of computer-based avionics and improve pilot situational awareness to perform modern RNAV/RNP procedures in accordance with PBN guidelines.

Additional assistance to the States in the AIS/MAP field will be provided through the RLA/06/901 Regional Project. This will support Phase I development of the ICAO Roadmap for the transition from AIS to the Aeronautical Information Management (AIM) which comprises in the short- and medium-term the development/ harmonization by States of national regulations in correspondence to Annexes 4 and 15, including the QMS programme implementation.

In consideration of the collaboration and cooperative spirit that characterizes the SAM Region, future AIS/ MAP services improvements, harmonized with the Global/Regional ICAO plans in support of PBN implementation, represent very achievable objectives for all stakeholders. ■

Aerodrome safety: A proactive approach

CAR/SAM Committees address bird strike and aerodrome pavement maintenance

Collisions with birds and other wildlife cost the airline industry, and ultimately the flying public, billions of dollars annually. In addition to the economic losses, some collisions have also resulted in loss of human life and aircraft damage. While some of the collisions have been with smaller aircraft, large commercial aircraft have also been damaged and the potential for a catastrophic crash of a large commercial airliner remains possible.

In addition, aerodrome safety in the CAR/SAM Region is also significantly affected by regular maintenance schedules and especially those issues arising from pavement maintenance.

In this submission to the *Americas Regional Report*, Jaime Calderón, NACC Regional Officer, Aerodromes and Ground Aids (RO/AGA), reports on how several States and territories in the Caribbean and South American (CAR/SAM) Regions have been coordinating efforts on bird hazard control and wildlife prevention, and in addition outlines ongoing ICAO Training and outreach activities to address aerodrome pavement concerns.

Jaime Calderón is a civil engineer with a Master's Degree in Airport Planning and Management from Loughborough University of Technology. He has over 24 years of experience in the planning and design of airport infra-structure and spent 11 years as Chief of the Aerodromes Department in the Civil Aviation Authority in Bolivia. Prior to joining ICAO, Calderón was involved as a consultant in the design and development of several airports and participated in the construction of the New International Airport Jórge Wilstermann in Cochabamba, Bolivia, in 1989. In August 2007, he took up the position of ICAO Regional Officer, Aerodromes and Ground Aids, at the NACC Mexico Office.

Bird/Wildlife Hazard Prevention Committee (CARSAMPAF)

The main objective of the ICAO Regional Committee on Bird Strike and Wildlife Prevention (CARSAMPAF) is to coordinate joint actions aimed at reducing, to a minimum, the number of incidents/accidents in the CAR/SAM Regions as a result of bird strikes and other wildlife interventions.

Collisions will occur wherever birds and aircraft use the same airspace, and bird strikes have been reported from all over the world. A serious strike will likely cause significant damage to an aircraft, but additionally any wildlife strike may startle the pilot, impair his judgment, or otherwise distract his attention. An accident which is caused by the combined or successive effects of several factors is usually referred to as a 'multiple causation accident.'

Comparisons of strike data specifics for different countries or different airports have little value due to varying procedures for reporting, recording and publishing strike statistics. More general comparisons within a Region may, however, help to indicate those areas in which strikes are most likely to occur.

The main task of the Regional Committee is to focus on the identification, analysis, development and investigation of problems dealing with bird strikes. It also focuses its efforts on the publication of informative material in order to assist in the prevention and reduction of bird and wildlife hazards to pilots, airline operators and aerodrome operators.

Depending on the extent of the bird strike and/or wildlife problems within a State/territory, CARSAMPAF addresses the importance of organizing a national

committee serving as a focal point to deal with analysis of the problems, as well as airport inspections, airport and aircraft operator interfaces, and research and development. Actually, this is a popular method to gain information and solicit the participation of airports and the aviation community in many States. This national committee should include all the agencies associated with or interested in these problems and should act as an information source and exchange for those in the aviation community.

It is recognized that a good organizational structure can make dealing with bird strike and wildlife hazards much simpler. Related policy implementation is also much easier when it comes directly from the national authority responsible for regulating airport operations.

Modifications to the airport environment and the implementation of environment and land use management are issues strongly promoted by the Regional Committee. Such efforts can remove or limit the attractiveness of an airport to birds and other wildlife, thus eliminating these hazards and ultimately, providing effective, long-term measures for reducing the numbers of birds and wildlife that will come to an airport.

Since its first meeting, held in Santiago, Chile in 2003, CARSAMPAF has organized six annual meetings and conferences, with presentations and participants from States and organizations from the CAR/SAM Regions and visiting experts from the NAM and EUR Regions.

Latin American and Caribbean Association of Airfield Pavements (ALACPA)

The majority of deficiencies observed at aerodromes in the CAR/SAM Regions are a result of inadequate airport infrastructure maintenance which is directly related to aircraft safety at airports.

The CAR/SAM Regional Planning and Implementation Group (GREPECAS),

Attendees from the Sixth International Conference on Bird and Wildlife Hazard Prevention (CARSAMPAF) and Fourth International Seminar on Bird and Wildlife Hazard Prevention—CENIPA and CCPAB, Brasilia, Brazil, November 2008

through its Aerodromes and Ground Aids/Aerodrome Operational Planning Subgroup (AGA/AOP/SG), has provided a series of annual seminars/short courses on specific airport pavement issues since 2002 in order to provide training for the States and territories of the CAR/SAM Regions.

The topics covered by the events have included Airfield Pavement Maintenance; Aircraft/Pavement Interaction; Pavement Management Systems; Pavement Condition Index (PCI) Method; Airfield Pavement Design; New FAA Design Software for Airport Pavement Thickness; Airport Pavement Evaluation, Rehabilitation and Repavement Projects; New FAA Software for Airport Repavement Design; Maintenance of Air Navigation Visual Aids; and FAARFIELD Pavement Design.

The main objective of these events was to provide participants with the required tools to resolve deficiencies related to aerodrome pavement maintenance. Furthermore, an important objective was to train participants from States/territories on the collection of quality pavement data; provide a general view on pavement preservation and repair techniques; provide a general view on Pavement Management Systems and provide new technologies for airport pavement design, such as the software tool noted above which has been developed by the FAA.

Important aspects to be considered with respect to sound airfield pavement maintenance includes the evaluation of pavement structures for aircraft loads— requiring precise information on the thickness of layers within the structure

and the physical properties of the materials employed. Improved knowledge of current repair techniques will allow for the establishment of a maintenance programme that meets particular aerodrome needs and, later on in the process, incorporation of a Pavement Management System.

The ALACPA has also forged a partnership with the Operations, Technical and Safety Committee of ACI-LAC. The collaborative activities being undertaken by ICAO and ACI currently include a survey of pavement conditions at major airports in the Regions, including roughness and structural capacity; survey of runway end safety area (RESA) status at major airports in the Regions; the creation of a friction testing information centre; and preparation of a comparative study of safety programmes for airside construction at major airports.

Currently, ALACPA has 122 active members from 20 States in the CAR/SAM Regions and another three from other ICAO Regions. In addition, several organizations and companies are now in the process of becoming ALACPA members.

It is envisioned that, in the near future, the exchange of particular information and techniques between personnel involved in airports will head to the implementation of appropriate pavement maintenance methods. The creation of an Airport Maintenance Centre with specialized personnel and equipment is now also under consideration, in order to provide strategic assistance to States and territories on pavement friction measurements and runway rehabilitation. ■

Continuing on course

All activities in the ICAO NACC Regional Office regarding Aviation Security (AVSEC) issues are focused on the mandate of ICAO's Strategic Objective B: *Enhance global civil aviation security*. Based on previous evaluations and more recent results from the ICAO Universal Security Audit Programme (USAP), one of the main objectives of the NACC Regional Office is to increase levels of implementation of existing ICAO security Standards and Recommended Practices (SARPs).

Ricardo G. Delgado, NACC Regional Officer, Aviation Security (RO/AVSEC), discusses recent and ongoing training programmes and courses that have been pursued in the Region to address these concerns and help advance NAM/CAR and SAM hemispheric harmonization of aviation security effectiveness.

Ricardo G. Delgado was assigned to the ICAO NACC Regional Office in February 2007. He is responsible for coordinating and assisting aviation security and facilitation issues and for conducting the USAP Audit follow-up visits in the NAM/CAR/SAM Regions. Delgado is a certified ICAO security auditor and instructor and joined the Organization in 2004 as one of the USAP Team Leaders. He conducted many of the first cycle USAP Audits in South and Central America, participated in the Egypt USAP Audit Team and oversaw the Audit of Kyrgyzstan. Mr. Delgado has also conducted many AVSEC workshops and courses as Lead Instructor and was the Secretary both of the former Aviation Security Committee (AVSEC/COMM) of the GREPECAS mechanism as well as for the new Aviation Security and Facilitation Regional Group (AVSEC/FAL/RG).

One of the most important recent steps taken to address AVSEC concerns in the NAM/CAR and SAM Regions was the establishment of the ICAO *Aviation Security Awareness Training Programme in Latin America and the Caribbean* in conjunction with Foreign Affairs and International Trade of Canada (DFAIT).

Phase I of this programme took place during 2004–2005 and resulted in 14 sub-Regional Aviation Security Implementation workshops being organized in: Jamaica; Ecuador; Costa Rica; El Salvador; Netherlands Antilles; Venezuela; Argentina; Guatemala; Barbados; and Trinidad and Tobago. Four additional Workshops took place in Mexico during the same period and were attended by 23 States and one international organization. Additionally, two *Regional Aviation Security Audit*

Seminars were held in Kingston, Jamaica, and Lima, Peru, during the same period. The latter events each involved 21 States and four international organizations.

Phase I provided all participants with a clearer understanding and awareness of their obligations under ICAO Annex 17— *Aviation Security*, the ICAO USAP and other aviation security issues in general. The majority of the participants came from State Civil Aviation Authorities (CAAs) and held positions of responsibility for the oversight of the implementation of Annex 17. Airport Authorities also sent individuals who in most cases were similarly responsible for the implementation and operational aspects of AVSEC measures.

Phase II was renamed the *Security Awareness Training Programme* and commenced in 2006. This second stage continues to this day and has consisted thus far of 44 separate workshops and seminars. It has trained over 700 AVSEC personnel from NACC States on issues relating to the improving of general education levels concerning the application of ICAO AVSEC SARPs to strengthen State security systems, and more specifically has aided states in completing suitable AVSEC Corrective Action Plans based on their specific State needs. The programme has also provided more financially needful States with the ability to participate irrespective of their payment of the associated registration fees.

As of this writing the following States have hosted Phase II training events: Anguilla; Argentina; Aruba; Barbados; Belize; Bolivia, Brazil; Colombia; Costa Rica; Cuba; Dominican Republic; El Salvador; Grenada; Guatemala; Guyana; Honduras; Jamaica; Mexico; Netherlands Antilles; Nicaragua; Panama; Paraguay; Peru; Suriname; Trinidad and Tobago; Uruguay and Venezuela.

ICAO has also developed Aviation Security Training Packages (ASTPs) in English and Spanish which have been used by ICAO Short Term Experts (STEs) borrowed from NAM/CAR and SAM States to conduct the programme's training activities. Through *Phase I* (2004–2005) and *Phase II* (2006–present), the following events were conducted:

- Eleven ICAO *AVSEC Implementation Workshops* were conducted in: Argentina; Barbados; Costa Rica; Ecuador; El Salvador; Guatemala; Jamaica; Mexico; Netherlands Antilles; Trinidad and Tobago; and Venezuela. Together these benefited 316 participants from 24 States in the NACC Region.

- *Airport Security Programme (ASP) Workshops* were also scheduled and conducted through ICAO Aviation Security Training Centres to train and provide guidelines to States and airport operators for developing an airport security programme (Standard 3.2.1, Annex 17) in accordance with national security provisions and based on the *ICAO Security Manual* (Doc 8973).

- Between 2007 and 2008, eight *National Civil Aviation Security Programme Workshops* were held to train and provide guidelines, with detailed information and familiarization on the requirements for States to ensure the development of a proper National Civil Aviation Security Programme (Standard 3.1.1, Annex 17). All security requirements were based on ICAO Standards and Recommended Practices (SARPs) and *Security Manual* provisions— customized to local State security environments and resources. Ninety-three participants from 12 States benefited from these workshops.

- Eight *National Civil Aviation Security Quality Control Programme Workshops*, with the objectives of assisting States in remedying Annex 17 deficiencies and enabling aviation security management personnel to develop a proper and effective National Civil Aviation Security Programme (Standard 3.1.1, Annex 17), were also held. The resulting national programmes include aviation security quality control measures in order to implement ICAO SARPs, security-related elements of other Annexes and any additional security measures that were required by the State. These workshops also assisted in the development of documentation and implementation methodology as well as maintenance of appropriate oversight and internal quality assurance procedures. Ninety-five participants from 12 States received this training.

- Ten *Screener Certification Workshops* were held with the objective of providing participant States with detailed information and familiarization on the requirements for screener certification processes in order to better enable them to either draft a process for certifying screeners or review their State/territory existing national requirements, as per Annex 17, Standard 3.4.3, and based on their national civil aviation security programme requirements. One-hundred and forty-nine participants from 23 States benefited from this training.

- A *Passenger Screening Seminar* was held for sharing information on procedures, experiences and new technology for passenger and cabin baggage screening in compliance with international requirements. This event was conducted in Montego Bay, Jamaica, in January 2008, and was hosted by the Jamaican Civil Aviation Authority. Eighty-five participants from 19 States, four international organizations and eight AVSEC industry companies attended this seminar.

- By the end of 2008 and until March 2009, a new wave of courses was launched and eight *Aviation Security Instructors Courses* were conducted. These were designed to equip instructors with the skills necessary to present ICAO AVSEC courses using the Aviation Security Training Packages (ASTPs). Ninety-six participants from 14 States benefited from this training.

- Additionally, ICAO solidified a Fellowship Agreement with the Inter-American Committee Against Terrorism (CICTE) from the Organization of American States (OAS). The CICTE has graciously provided subsidies for participant travel costs for many States in the NACC Region.

The strength of the *Security Awareness Training Programme* has been based on the quality of the instructors, the materials provided and the support of the host States. This important programme has benefited hundreds of aviation security personnel and stakeholders from many different States in the NAM/CAR and SAM Regions, and participants have expressed positive comments on the workshops/seminars by way of confirming that the training has been beneficial to their ongoing AVSEC programmes and activities. ■

Tools for Regional integration

The Regional System on Safety Oversight in Latin America and the Latin American Aviation Regulations (LARs)

After many years of hard work, ICAO's Latin American States have now accomplished the first milestone of having a set of harmonized regulations and procedures that are paving the way for stakeholders to begin enjoying the full benefits promised by a Regional Safety Oversight Organization (RSOO): mutual recognition of certificates; multinational certification and surveillance; data sharing of safety information; 100 percent compliance with ICAO SARPs; homogeneous training programmes; the sharing of human resources; etc.

In this report for the *Americas Regional Report*, Oscar Quesada-Carboni, ICAO SAM Regional Flight Safety Officer, describes how States and industry are beginning to mutually perceive the benefits of a more harmonized regulatory regime and why a stronger, more closely integrated industry makes for safer, more efficient skies for all.

Oscar Quesada-Carboni joined ICAO in 1992, and after two years returned to the airline industry. He rejoined ICAO in 1999 as International Co-ordinator of a Technical Cooperation Project aimed at strengthening a local State's safety oversight system. In 2001 he joined ICAO's SAM Office staff as Regional Technical Co-operation Coordinator. Since 2006 he has been as ICAO's SAM Regional Flight Safety Officer.

Since the early 1990s, ICAO has been promoting the creation of Regional and Sub-Regional Safety Oversight Organization (RSOO) as a solution to the common problems confronted by States in complying with their international safety oversight obligations as per the Chicago Convention on International Civil Aviation.

ICAO Assembly Resolution A 36-2 recognized that the establishment of RSOOs holds tremendous potential to assist States in complying with their international obligations through economies of scale and harmonization. It encourages States to foster the creation of Regional partnerships to collaborate in the development of solutions to common problems in order to strengthen State safety oversight capabilities, as well as to participate in, or provide tangible support for, the furtherance of Regional safety oversight systems. RSOOs also form a key component in the ICAO/ISSG global aviation safety initiative *(see Regional Aviation Safety Group-Pan America (RASG-PA) article on page 12 for more details on ICAO's global safety programme in conjunction with the industry).*

There are a number of challenges for States that need to be addressed before they can enjoy the full benefits of an RSOO. One of the most important and difficult tasks involves the harmonization of aviation regulations and procedures among Member States seeking to establish an effective Regional safety oversight programme.

The newly-harmonized Latin American Aviation Regulations (LARs) have been developed based on the following guiding principles:

1. To guarantee compliance with ICAO SARPs.
2. To encourage the use of plain language.
3. To avoid the literal translation of models from different operational environments.

4. To avoid re-inventing the wheel.
5. To achieve an effective balance between proper safety oversight for regulators and adequate flexibility for operators.

The majority of Member States contained within the Regional System on Safety Oversight in Latin America (SRVSOP) have acknowledged the importance of progressing towards the implementation of a harmonized regulatory environment. At present 27 LARs have been developed, covering Annexes 1, 2, 6, 7 and 8. States have now also decided to begin examining additional Air Navigation related Annexes.

Despite the fact that the Latin America RSOO commenced operations in 2002, its origins go back to the Fifth Meeting of the Directors General of Civil Aviation (DGCAs) of South America (Cuzco, Peru, 1996). Participants to the Cuzco DGCA event reviewed the possibility of setting up a Regional safety oversight mechanism and noted that it should operate under direct ICAO coordination through the Organization's SAM Regional Office. For this purpose, the SAM DGCAs requested that ICAO first study the feasibility of creating a multinational body of this nature.

A group of institutional experts was convened the same year and came to the conclusion that a cooperation agreement among the Civil Aviation Authorities needed to be implemented, signed by the DGCAs themselves in order to avoid any additional delays that might have arisen from local governance requirements. It was also recommended that, to broaden the scope of the agreement such that non-SAM States could also participate, the Latin American Civil Aviation Conference should be utilized as a forum whereby non-SAM States could deposit their adhesion agreements.

The standard adhesion agreement contains provisions ensuring the commitment of the new State to

MEMBER STATES PARTICIPATING IN THE LATIN AMERICA REGIONAL SAFETY OVERSIGHT ORGANIZATION	
■ Argentina	■ Uruguay
■ Brazil	■ Venezuela
■ Bolivia	■ ACSA (Central
■ Chile	American Agency
■ Cuba	for Aviation Safety)
■ Ecuador	■ DGCA of Spain
■ Paraguay	(Observer)
■ Peru	■ AIRBUS (Observer)

harmonize its regulations and procedures with existing RSOO States, to provide expert resources at its disposal to assist with the effective operation of the Regional Systems, and to accept safety inspection and audit visits specified under the Agreement and its recommendations.

The RSOO is headquartered at the ICAO SAM Regional Office in Lima and its functions are performed by a General Board, a General Coordinator (SAM ICAORD), a Technical Committee and various resource focal points in the participating States. The RSOO has a minimum number of staff as the majority of the work programme is carried out by local experts from member States—ICAO primarily provides the infrastructure and higher-level management of the programme.

The RSOO strategy is strongly linked to the premise that Regions need to develop their own capacity for drafting regulations and procedures. In the SAM Region the harmonization strategy was developed based on a simplified procedure similar to the one ICAO uses for developing its own Standards and Recommended Practices (SARPs).

The harmonization programme is complemented by the following programmes:

■ Multinational certification and surveillance activities using LARs.
■ Training programmes on LARs and Guidance Materials.
■ Meeting Programme (comprising management meetings and technical meetings to agree on LARs).
■ Assistance to States.

Photo courtesy TAPME, Brazil.

Under the multinational certification and surveillance initiative, a successful programme for Aircraft Maintenance Organization (AMO) was launched in 2004. Under this programme an AMO is subject to a multinational process for certification which is recognized by participating Member States. This creates common standards and avoids duplication of efforts while promoting mutual trust and recognition. To be part of a multi national team, Safety Inspectors from the Region are required to sign-on to the LAR Auditor Register. A similar programme is to be launched in 2010 as regards the certification of training centres.

Another successful programme addresses Ramp Inspection Results Data Sharing or IDISR as per the initiative's Spanish-based acronym. Under this programme, implemented as per ICAO Assembly Resolution A36-2 (previously A35-7), a ramp inspections results database was developed incorporating existing data fields from the Ramp Inspection form of ICAO Doc 8335. Safety inspectors received standardized training on how to perform ramp inspections and, once trained, are provided with a username and password to be able to upload the results of their ramp inspections (performed for foreign operators as per Article 16 of the Convention).

The IDISR programme was launched at the end of 2008 and is expected to contribute very positively to ongoing Regional efforts to identify additional trends and hazards affecting aviation safety.

The implementation of ICAO SARPs has been facilitated using these new Regionally-harmonized tools. A good recent example of this improved efficiency has been demonstrated through the establishment and operation of a new pilot programme related to the implementation of Safety Management Systems (SMS) in AMOs—made possible in part by the support of Transport Canada.

Seven AMOs from the Region offered to participate in the programme. It provides the means by which these AMOs can share experiences and solutions related to the difficulties in implementing effective SMS programmes. Participating AMOs also use the programme to exchange information on the drafting of new guidance material, the incorporation of amendments to existing regulations, the training of safety inspectors who can evaluate the effectiveness of a given SMS, etc.

As States continue to adopt and/or harmonize their national civil aviation regulations with new Regional LARs, it has become increasingly straightforward to exchange human resources in order to support needful States with specific certification or surveillance activities. Additionally, when a new amendment proposal is circulated by ICAO, respective Regional Panels (AIR, OPS or PEL) have streamlined their review and ratification processes so that the incorporation of the amendment into the LAR framework can occur almost immediately after it has been approved by Council.

Another example of the possibilities that are now being enabled by the LARs is the support that the SRVSOP is providing on the implementation of Performance-Based Navigation (PBN). In this instance the Technical Committee of the Regional System is assisting Regional Project RLA/06/901 (Global ATM Concept implementation) with the development of Advisory Circulars to enable the approval of various PBN operations, notably: RNP AR APCH, RNAV 1, RNAV 2, RNAV 5, RNAV 10, APV/Baro-VNAV, etc. These advisory circulars are to be implemented by States under the framework of the newly-harmonized regulations and they are expected to have broader distribution to all stakeholders that might benefit from these improvements.

Though integration efforts of any kind invariably engender difficulties and growing pains, SAM States are slowing beginning to realize some of the more bottom-line benefits of the new Regional system. A cost/benefit study developed during the first quarter of 2009 concluded that, conservatively, over $13 million in aggregated savings would be realized over the Regional initiative's first five years of operation, compared to what would have been required if the participating States had to develop their own related capacities and activities individually.

The future challenge for the Regional System on Safety Oversight concerns its institutionalization, but the road which has now been paved on the path towards creation of the new Multinational Regional Organization (MRO) for SAM air navigation services could likely be used as a Roadmap for the required evolution of the SAM RSSO. ∎

GREPECAS Air Navigation Deficiencies Database (GANDD) for the CAR/SAM Regions

The ICAO NACC and SAM Regional Offices are responsible for managing the resolution of deficiencies in air navigation. They are also in charge of presenting information during CAR/SAM Regional Planning and Implementation Group (GREPECAS) and air navigation meetings regarding the status of registered CAR/SAM air navigation deficiencies.

Gabriel Meneses, ICAO NACC Office Automation Assistant, reports here on the proprietary web application, developed through an ICAO Council Special Implementation Project (SIP), which now provides Regional users with access to the English/Spanish GREPECAS Air Navigation Deficiencies Database (GANDD) in order to effectively monitor specific deficiencies and provide for administrative Focal Points so that Regional stakeholders can implement appropriate and timely solutions.

Since October 2004, the procedures and systems to allow web access and use of the GREPECAS Air Navigation Deficiencies Database (GANDD) for the CAR/SAM Regions have been available to local States/territories. The GANDD application has evolved since its implementation into a user-friendly tool which allows local States/territories to continuously review and report amendments in an effective manner.

The current GANDD application is based on the requirements specified by the ICAO Council-approved 'Uniform Methodology for the Identification, Assessment and Reporting of Air Navigation Deficiencies'. The GANDD consists of a desktop application which serves as the Regional management tool and a Web application which functions as the interface for States/territories to report amendments. Administrative Focal Points designated by the States/territories are able to report changes in the status of deficiencies in a timely manner to be validated and updated as required.

Through the internet, CAR/SAM States/territories and other organizations may view information at any time and request an amendment and/or update. Therefore, a capture format has been designed that can be displayed for each deficiency by pressing a specific button that corresponds to its identification. Only those Focal Points whose username and password correspond to the State/territory owning the deficiency to be edited can be authorized to report the respective change.

The information modified for each registry is sent by e-mail to the NACC or SAM Regional Office as appropriate, with a copy to the ICAO Regional Officer responsible for the respective field of the modified deficiency.

Once the e-mail with the proposed amendment is received, the corresponding Regional Officer will review the updated information and, if necessary, will coordinate with the Focal Point to complete the changes in the GANDD, in both of its official languages.

According to the username used, the first display of information is that of the corresponding State or organization. It is also possible to view global information through the use of specific filters, such as Region; Air Navigation Field; State; Priority; and Status (Outstanding/Corrected).

Bearing in mind the importance of using the GANDD as a tool for the effective and timely reporting of air navigation deficiencies, and considering that Focal Points appointed by States have guidelines and information for adequate use, the following documents are available in the GANDD's Welcome Page:

- Uniform Methodology for the Identification, Assessment and Reporting of the Air Navigation Deficiencies.
- Procedure for classifying and addressing 'U' Deficiencies in the Air Navigation Field.
- GANDD User Guide.

The GANDD Web application can be found at the following address: www.mexico.icao.int/gandd2.html

The GANDD application is currently serving as a unique and effective tool for the efficient monitoring, updating and reporting of air navigation deficiencies for ICAO and CAR/SAM States/territories. ■

EDAPS Consortium
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EDAPS

CONSORTIUM
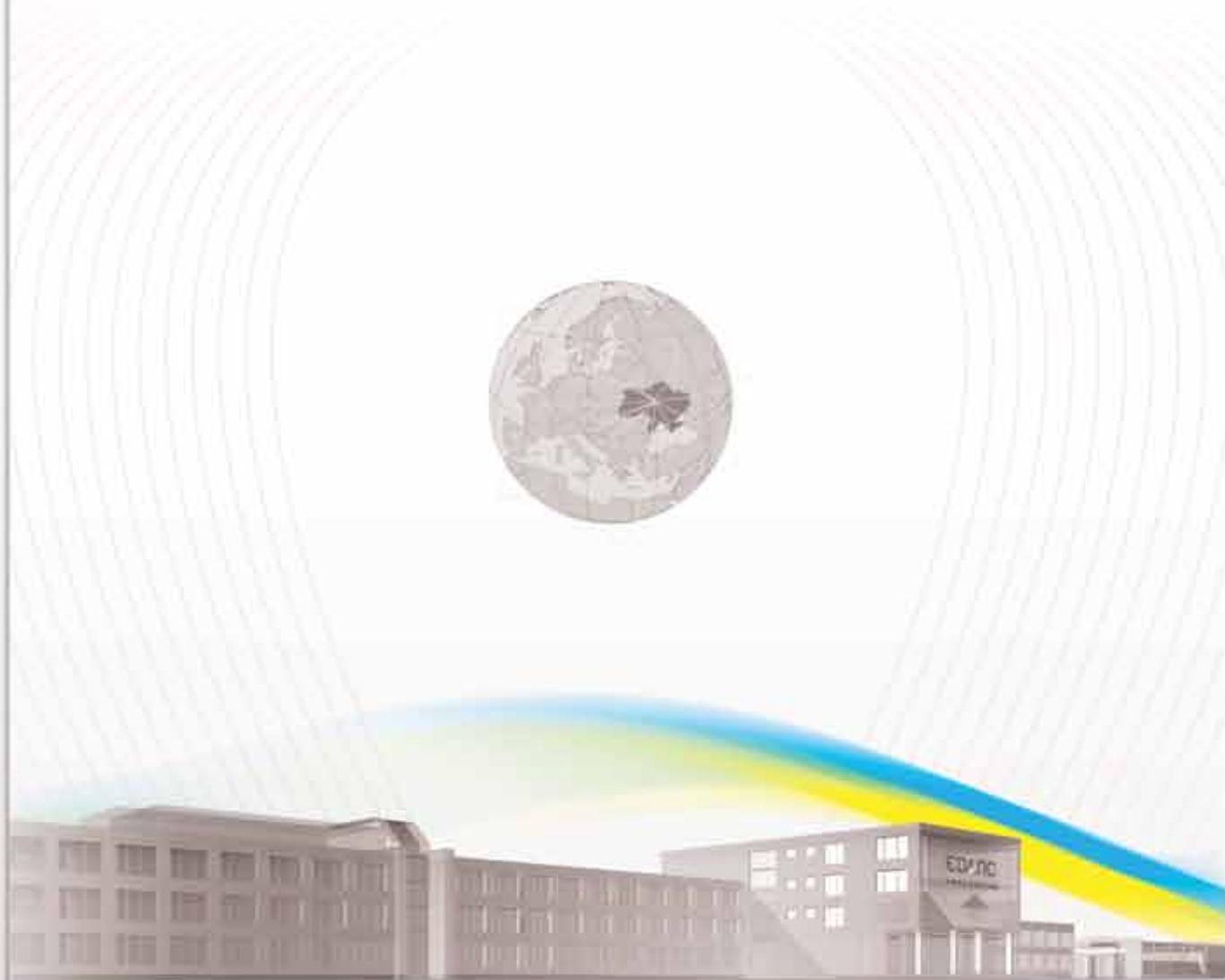
Water - flows, wind - blows, fire - burns, EDAPS delivers results

EDAPS Consortium - ID Solutions

EDAPS Consortium is successfully introducing its advanced technology in secure printing, informational, biometric and holographic technologies in Ukrainian & International markets.

OUR PRODUCTS:

- e-Passports
- Passports
- National Registry Systems
- National ID Cards
- Driving licences
- Vehicle registration certificates
- Tax stamps & control stamps

OUR SERVICES:

- System integration
- Turn-key Global infrastructure solutions
- Data enrollment & management
- Security design
- Document production & personalization
- Consultancy & project management
- Customer training

SECURITY ELEMENTS:

- Optical security features
- Security inks
- Microtext
- Laser engraving
- Laser perforating
- Holographic secure elements

EDAPS

CONSORTIUM

SAM aviation safety and security audits

An analysis of the results of ICAO safety oversight and security audits conducted in South America has revealed that the Region compares favourably with the global average in complying with applicable international standards.

Armando Quiroz, ICAO SAM Acting Chief of the Aviation Security Audit Section in the Safety and Security Audits Branch, describes the Region's successful record, while noting that some Regional issues of concern remain.

Armando Quiroz is Acting Chief of the Aviation Security Audit Section in the Safety and Security Audits Branch of ICAO. A native of Mexico, Mr. Quiroz has over 30 years of experience in the aviation industry and has spent the last 13 years at ICAO—fulfilling various managerial and training roles with both the safety oversight and the aviation security audit programmes.

The ICAO Safety and Security Audits Branch was established in 2006 under the Office of the Secretary General of ICAO. It is responsible for the activities of the Safety Oversight Audit Section (SOA) and the Aviation Security Audit Section (ASA). These Sections are supported by the Audit Coordination and Reporting Section which provides services to both. SOA and ASA are responsible for managing the Universal Safety Oversight Audit Programme (USOAP) and the Universal Security Audit Programme (USAP), respectively. The objective of these programmes is to enhance global aviation safety and security through the conduct of universal, mandatory and regular audits of the aviation safety and security oversight systems in all Member States.

Both safety oversight and aviation security audits are carried out in compliance with established programme principles and standardized methodologies and tools. The audits are governed by a Memorandum of Understanding signed between ICAO and each Member State and focus on the effective implementation by States of the eight critical elements of a safety or security oversight system.

In carrying out their activities, both the USOAP and USAP respectively rely on the secondment of experts by States to supplement ICAO's audit teams. In recent years, both programmes have benefited from the support received from States in the South America Region. Currently, there are nine auditors from three South American States on the USOAP roster, and eight auditors from three South American States on the USAP roster.

The USOAP was established in 1999 with a mandate to conduct audits of all ICAO Member States on ICAO Standards contained in three of the 18 Annexes to the Chicago Convention, namely: Annex 1—*Personnel Licensing*; Annex 6—*Operation of Aircraft;* and Annex 8—*Airworthiness of Aircraft*. An initial three-year audit cycle was followed by a separate programme of follow-up visits between 2001 and 2004. These follow-ups were designed to validate the progress made by States in the implementation of their

corrective action plans submitted to ICAO following the initial audits. All States in the South America Region received both an initial USOAP audit and a follow-up visit.

After the first cycle of audits and follow-ups was completed, a new, six-year cycle of USOAP audits was launched in 2005 based on the Comprehensive Systems Approach (CSA). Under this methodology, the scope of USOAP audits was expanded to cover the safety-related provisions in all safety-related Annexes. The CSA cycle is due to be completed by the end of 2010 and only one State in the South America Region has not yet been audited. This final audit in the Region is scheduled for December of 2009.

The USOAP CSA audit results for the 12 South American States audited to date compare favourably with the global average of results, based on the audits of 134 Member States completed thus far. The South American average with respect to a lack of implementation of the critical elements of a safety oversight system stands at 32.6 percent, while the global average is 42.3 percent.

Although the results of the South American audits indicate a lower percentage of non-implementation for each of the eight critical elements compared to the global average, the audits have revealed that additional efforts are needed in some areas. These include Technical Staff Qualifications and Training, Surveillance Obligations and the Resolution of Safety Concerns. These areas show the highest levels of non-implementation in the Region.

As a result of a new ICAO requirement for transparency that took effect in March 2008, summaries of the results of the safety oversight audits of all Member States are now posted on a public Web site at www.icao.int/fsix. To promote the sharing of safety information, final safety oversight audit reports are posted in their entirety on a secure Web site which is accessible to all Member States.

The 36th Session of the ICAO Assembly directed the Council to examine different options for the continuation of USOAP beyond 2010, including the feasibility of applying a new approach based on the concept of continuous monitoring. In June 2009, the Council considered various options and approved the transition of USOAP to a continuous monitoring approach (CMA) after 2010, while directing the Secretariat to develop the necessary methodology and tools.

The CMA will involve the establishment of a system to monitor the safety oversight capabilities of Member States on an ongoing basis. It will also allow for a harmonized and consistent approach towards assessing the safety level of aviation activities and evaluating safety management capabilities. In preparation for the CMA, the Council has directed the Secretariat to establish a transition period during which ICAO Coordinated Validation Missions (ICVMs) to States will be conducted. ICVMs will replace follow-up visits as a means of determining the level of implementation of Member States' corrective action plans.

The USAP was established in 2002 following the recommendations of a High-Level Ministerial Conference on Aviation Security. An initial five-year audit cycle was begun in 2002 and completed in 2007. This was complemented by a cycle of follow-up visits designed to validate the implementation of corrective action plans. The USAP cycle of follow-up visits will be completed by the end of 2009. All States in the South America Region have received both an initial audit and a follow-up visit.

The results of these first-cycle audits reveal that overall compliance with Annex 17 Standards in the Region was at par with the global average. The area with the lowest level of compliance was found to be Access Control. While considering the results of the first cycle of security audits, the 36th Session of the Assembly requested that future aviation security audits focus, wherever possible, on a State's ability to provide appropriate national oversight of its aviation security

activities. The Assembly also requested that the scope of audits be expanded to include relevant security-related provisions of Annex 9—*Facilitation*. Accordingly, a second cycle of USAP audits was launched in January 2008, currently scheduled to last six years.

Four second-cycle USAP audits have been carried out in the South America Region to date. One State in the Region is scheduled to be audited in 2009 and four others are scheduled for 2010. The results of the first four audits indicate that the Region remains at par with the global average, with an average lack of effective implementation of the critical elements of a security oversight system standing at 44.6 percent. Of particular concern is that the States audited in the Region have an average of over 50 percent lack of effective implementation of critical elements in the areas of quality control obligations, the resolution of security concerns, certification and approval obligations and the provision of technical guidance, tools and security-critical information.

The 36th Session of the Assembly requested that the ICAO Council consider the introduction of a limited level of transparency with respect to aviation security audit results, balancing the need for States to be aware of unresolved security concerns with the need to keep sensitive security information out of the public domain. In June 2008, the Council approved a proposal to introduce such transparency through the release of a chart for each audited State, depicting the level of implementation of the critical elements of an aviation security oversight system. These charts are only available to Member States through the USAP secure Web site.

ICAO audits conducted under the USOAP and USAP programmes have proven effective in the identification of safety and security deficiencies and in the provision of recommendations for their resolution. Comprehensive reports on the results of both USOAP and USAP audits at the global and Regional levels will be published in 2010. ■

Understanding AMHS Extended Service

In concordance with the proven benefits of ATS Message Handling System (AMHS) Extended Service over the AFTN communication systems, ICAO has assisted NACC Civil Aviation Administrations (CAAs) by setting clear guidelines regarding what these systems should be capable of, as set out in ICAO Docs 9705/9880.

AMHS Extended Service is a fully-integrated aeronautical communications solution based on the X.400 and X.500 protocol families. It can be deployed over OSI compliant technology or the widely adopted TCP/IP suite. AMHS design parameters offer improved availability and reduced maintenance costs due to its centralized and non-proprietary enterprise/military technology foundations.

The core architecture of AMHS also considers future communications requirements. It enables high availability, scalability as well as seamless client and server expansion without common failure points or specific transmission media. This allows it to additionally be deployed on HF, VHF or satellite networks.

AMHS Extended Service widely enhances basic system capabilities. It provides binary data exchange between clients as message attachments, a centralized X.500 address directory for all terminals, P3 and P7 protocol security improvements, statistical tuning and visual monitoring tools.

X.400 and X.500 (the base open standards series for AMHS Extended Service) are set by the ITU (International Telecommunications Union) and ISO (International Organization for Standardization) documents. They specify a

Figure 1: Integrated gateway for message exchange with aeronautical administrations still using AFTN legacy systems.
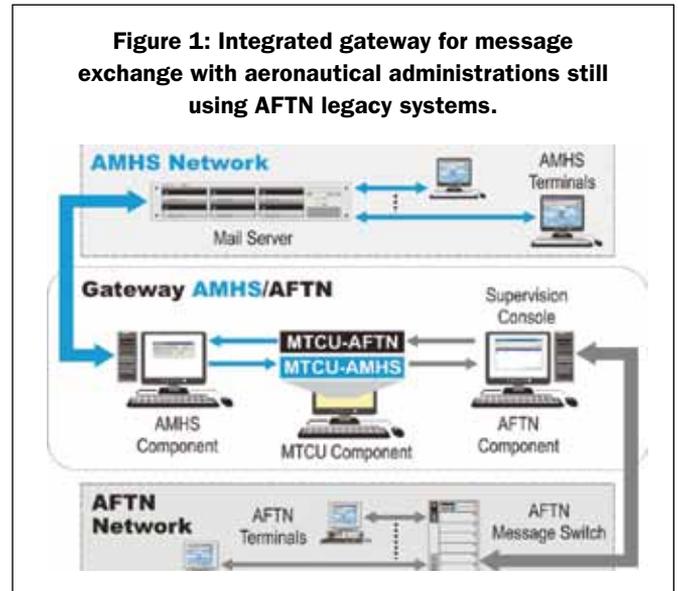
number of components, including MTA (Message Transfer Agent), Message Store (server-side) and User Agent (client-side). The X.400 standard also defines the data exchange protocols between P1 components (for transfer to another MTA), P3 components (for connection to Message Stores and

Figure 2: ATC graphic consoles retrieve and publish flight data directly connected to AMHS
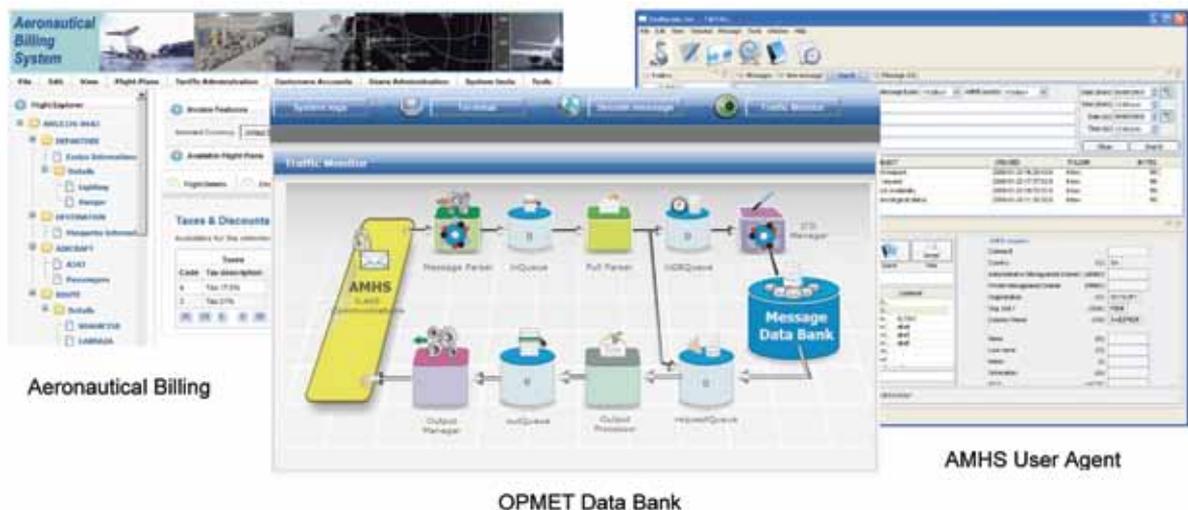
User Agents) and P7 components as a redundant message delivery protocol.

The X.500 Directory is based on a hierarchical electronic directory service and distributed data storage which provide address information about AMHS message accounts. DAP (Directory Access Protocol) enables User Agents to retrieve world-wide registered X.400 address data. Directory servers automatically synchronize their data via DSP (Directory Service Protocol) or replicate it with DISP (Directory Information Shadowing Protocol).

Minimizing the Transition Impact

The AMHS messaging solution also provides an integrated gateway for message exchange with aeronautical administrations still using AFTN legacy systems. It utilizes high availability message translation software that automatically converts between AFTN and AMHS in a transparent manner for all users. This gateway is a transition interconnectivity module compliant with ICAO Doc. 9705-AN956, sub volume III, 3rd Edition, for ATS message service *(Fig 1)*.

Additionally, a complete AMHS Extended Service solution usually includes a variety of aeronautical software modules such as NOTAM, Billing System, OPMET and other specific integrated data banks. A native AMHS Data Bank stores and delivers data bundled as X.400 messages which transitively upgrades reliability and improves data service performance.

An Aeronautical Billing System could be integrated in the AMHS system configuration, useful for automatic invoicing of airport and navigation services; the information needed is received from Flight Plans and associated messages transmitted across the network. ATC graphic consoles retrieve and publish flight data directly connected to AMHS *(Fig. 2)*.

Another key feature of the software modules connected to AMHS is the machine-to-machine AIXM data exchange wrapped in X.400 messages. When considered in light of this and its additional attributes, AMHS Extended Service can be seen to allow end users to manage their growth rates via a cost-effective, modular and seamless communications solution *(Fig. 3)*. ■

Figure 3: Modular and seamless AMHS Extended Service solution.
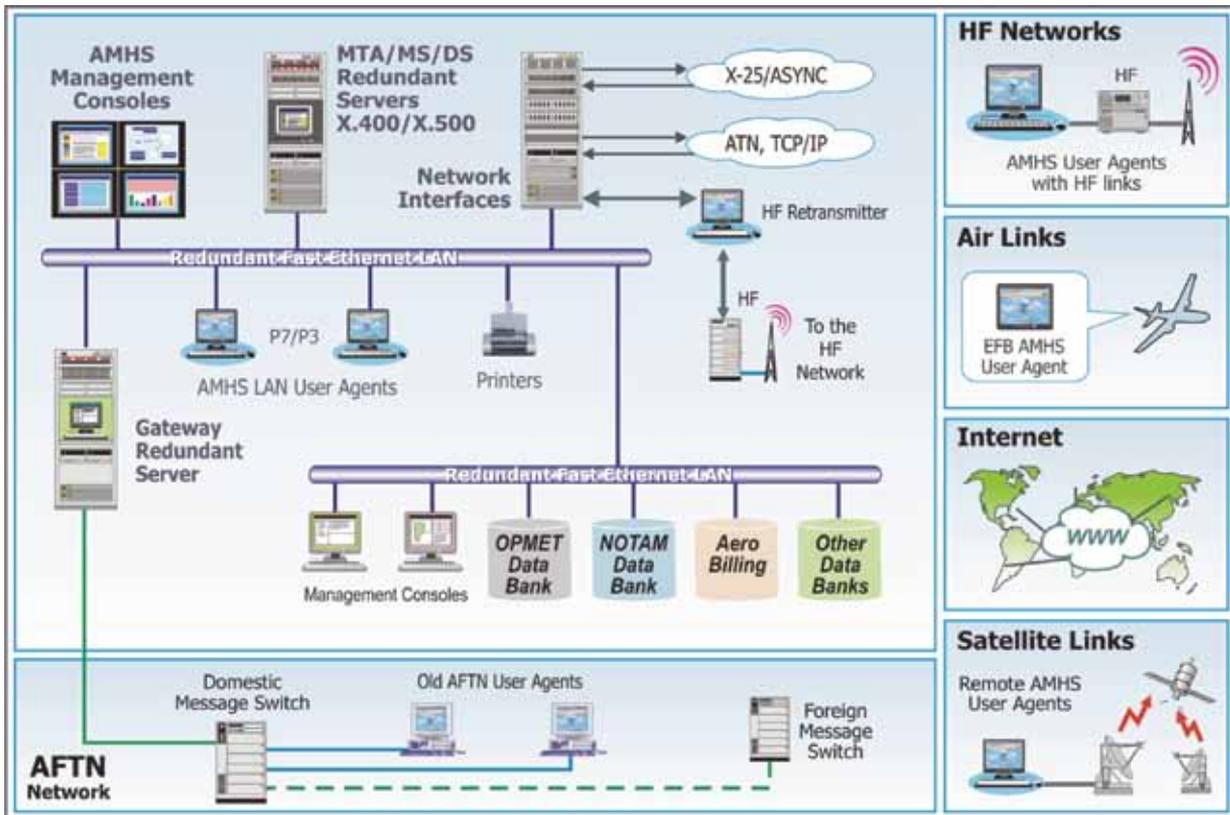
Seeing results:
SAM ten-year plan leads to safer aircraft operations at Regional airports

The ICAO South American (SAM) Regional Office has been working intensively alongside local Civil Aviation Authorities (CAAs) during the last ten years to improve aircraft and airport safety in the Region. The first step in the airports-related process was the elaboration of a detailed work plan, one which has guided the comprehensive approach that has been taken to address safety and efficiency deficiencies.

As ICAO TCB Expert Consultant Dr. Samuel Hautequest Cardoso reports, the results of the implementation of this ten-year Plan have now paved the way for safer aircraft operations in airports of the SAM Region as well as to provide for enhanced Regional cooperation and knowledge so as to prepare the SAM States as effectively as possible for future challenges.

Samuel Hautequest Cardoso is a former Brazilian Air Force Officer. He is a Senior Airport/Pavement Engineer, Safety Management Systems (SMS) Senior & SMS OJT Instructor, and served as AGA Regional Officer for ICAO in South America until 2008. Currently, he is an International Consultant and expert for the ICAO Technical Co-operation Bureau.

The underlying approach of ICAO's ten-year airport safety work plan was to carefully identify airport deficiencies and provide the necessary technical support to eliminate/mitigate them.

Due to the complexity of this endeavor, existing Regional relationships were leveraged and some preliminary assessments and actions were required to help guarantee the long-term success of the plan, notably:

- More detailed identification of aerodrome deficiencies.
- The effective partnerships between ICAO's NACC/SAM Offices and State CAAs.
- The creation of two new safety-related international organizations (CARSAMPAF and ALACPA).
- The identification of primary factors affecting aircraft/airport safety.
- A large-scale training programme.
- Application of Deming Control Circle guidelines *(plan-do-check-act)*.

Identification and correction of aerodrome deficiencies

The identification of aerodrome deficiencies was carried out during regular missions and meetings. The missions were prioritized according to the gravity of the deficiencies presented by each State.

In the early stages of the identification initiative, only a few deficiencies had been documented and maintained in the Caribbean and South American (CAR/SAM) Regional Planning and Implementation Group (GREPECAS) Air Navigation Database (GANDD). Action in the first few years then led to 500 additional deficiencies being identified, prioritized and added to the database according to ICAO's methodology.

Action plans for each specific case were then elaborated and discussed with the applicable CAAs. It was suggested to the States that they correct the more urgent safety-related deficiencies first, followed by those affecting the efficiency and regularity of air operations. This strategy served to produce a significant reduction in overall deficiencies in the Region.

Leveraging the strong ICAO partnerships with State CAAs

The effective working relationships between the SAM/NACC Regional Offices and their State CAAs, most notably the creation and the work of the Aerodromes and Ground Aids/Aerodrome Operational Planning Subgroup (AGA/AOP/SG), as part of the GREPECAS mechanism, tremendously facilitated the development of programmes and solutions to repair existing deficiencies.

The first meeting of the AGA/AOP/SG took place in 2001 in the Bahamas. From this point forward the subgroup became the main platform from which a number of initiatives aimed at improving aircraft/airport safety were launched in the CAR/SAM Regions. In an overall sense the AGA/AOP/SG played a key role in the success of the broader work plan.

The creation of CARSAMPAF and ALACPA

The AGA/AOP/SG provided the necessary support to allow for the creation of two new international organizations to help aircraft/airport safety improvement in the Region. The first of these, the CAR/SAM Regional Bird/Wildlife Hazards Prevention Committee (CARSAMPAF) was established in 2001 during the AGA/AOP/SG/1 Meeting. Shortly afterward, the Latin American and Caribbean Association of Airfield Pavements (ALACPA) was created in July 2002.

As of this writing, the CARSAMPAF has organized six international conferences, while the ALACPA has carried out six international seminars, several workshops in cooperation with the Federal Aviation Administration (FAA) as well as several short courses on

themes specifically oriented to airfield pavement deficiencies common to several local States. Some of these events drew over three hundred CAR/SAM participants. In addition, both bodies collaborate extensively with experts and organizations in related fields from Europe and the United States.

As a result of these initiatives, all the SAM States now operate National Committees for Bird/Wildlife Hazards Prevention and, currently, over 50 international CAR/SAM airports have Airport Bird/Wildlife Coordinating Committees.

The identification of primary factors affecting aircraft/airport safety

It was identified that many airports did not have updated airport master plans. It was also ascertained that any construction initiatives that had not or were not comprehensively studied as part of a broader facility master plan would likely constitute sources of hazard and risk for civil aviation.

Another critical area for concern which was identified in the Region was the lack of, or non-updated, aerodrome

emergency plans and emergency operation centres.

Large-scale training programme

Training was soon understood to be the underlying enabler required to effectively move forward all the phases and initiatives of the work plan. Table 1 *(bottom left)* summarizes the training provided to the Region.

In addition to the events reflected in Table 1, a further 11 courses and workshops on Safety Management Systems/State Safety Programmes (SMS/SSP) were carried out by ICAO in the Region. The SMS/SSP initiatives, as well as activities provided for on a worldwide basis by ICAO under the auspices of its Universal Safety Oversight Audit Programme (USOAP), thus serve to very effectively compliment Regional programmes.

Application of Deming Control Circle guidelines *(plan-do-check-act)*

All the events or activities described as forming part of this initiative were organized between one and two years in advance **(plan)**.

Several enquiries were carried out to aid with the planning process. Events and programmes were monitored during their realizations **(do)** and enquiries were also conducted six months, one year and one and a half year after the events **(check)**.

The elements evaluated in these enquiries were related to the learning process, the application of new technologies, the elimination of deficiencies based on what was learned during the events, how many people were trained in the organizations by those employees who participated in the events, etc. All this information was analyzed, summarized and presented during the AGA/AOP/SG meetings and new actions were planned based on these results **(act)**. ■

EVENT	TYPE	DAYS	PARTICIPANTS
Certification of Aerodromes	Workshop	4	85
Aerodromes Maintenance	Seminar	4	63
Aircraft/Pavement Interaction	Short Course	1	63
Aerodrome Inspector	Workshop	4	56
Pavement Management Systems	Seminar	5	116
Pavement Condition Index	Short Course	2	116
Aerodrome Inspection	Short Course	5	26
Aerodrome Inspector	Workshop	5	103
Pavement Design	Seminar	4	196
New FAA Pavement Design Methods	Workshop	1	196
Annex 14 and Related Documents	Short Course	1	196
Aerodrome Inspectors	Workshop	5	53
Safety Management Systems	Workshop	5	103
Emergency Plans/Emergency Operation Centres	Workshop	5	88
Pavement Evaluation/Rehabilitation/Overlay	Seminar	4	123
Maintenance of Visual Aids	Short Course	2	123
SMS/SSP Implementation	Workshop	5	84

MEVA II: An important step towards the Aeronautical Telecommunications Network

In 1996, several CAR States and territories agreed to implement new technology to help increase the safety and regularity of operations through the implementation of a common telecommunication network. These improvements were put in place to improve the Regional reliability of the Aeronautical Fixed Services (AFS) telecommunications service.

Julio César Siu Sem, NACC Regional Officer, Communications, Navigation and Surveillance (RO/CNS), reports on how the new MEVA and MEVA II networks represent excellent examples of Regional collaboration by NAM/CAR States and territories as they seek to further advance their air navigation services and planning activities in conjunction with new performance objectives.

Julio César Siu Sem is a telecommunications engineer who joined ICAO in 2008 as Regional Officer, Communications, Navigation and Surveillance (CNS). Prior to joining ICAO, Siu worked for the Central American Air Navigation Service Provider, (Corporación Centroamericana de Servicios de Navegación Aeréa, or COCESNA) for more than 13 years as Regional Manager for Honduras and as Project Engineer. His experience covers telecommunications networks, mono-pulse secondary surveillance radar (MSSR) and ATM control centres implementation, radio NAVAIDs maintenance and system automation.

Approved and implemented in 1996, the *Mejoras al Enlace de Voz del ATS* (MEVA—Spanish equivalent of *Improvements to ATS Voice Link*) Regional Very Small Aperture Terminal (VSAT) telecommunication network began providing Air Facility System (AFS) voice and data communications between the 15 existing VSAT nodes located in the Central Caribbean and neighbouring zones.

The original MEVA network operated in the 4–6 GHz C-band on satellite PAS-1R, with SCPC (Single Channel per Carrier) and DAMA (Demand Assigned Multiple Access) technologies to allow a voice or data circuit user, anywhere in the network, to communicate with any other user via a single satellite hop.

The system was capable of providing full-mesh connectivity, dynamic reconfigurability and service on demand through the use of a distributed network control architecture. The MEVA network also employed a Network Management and Control Facility (NM&C) that allowed the monitoring of real-time operational status, end-to-end circuit performance, and

improved security regarding all ground and space elements of the system on a 24/7 basis.

The MEVA equipment was composed of tropicalized, Commercial Off-the-Shelf (COTS) hardware, software and related supplies, with a guaranteed replacement availability of ten years. All system voice and data circuits provided a high percentage of availability. The MEVA Network made the implementation and improvement of the Aeronautical Fixed Telecommunication Network (AFTN) and voice circuits established in the CAR/SAM Regional Air Navigation Plan possible. It also solved the aeronautical telecommunications service (COM) deficiencies that had been previously identified in the Central Caribbean area.

The MEVA network and all operations-related matters are managed by the MEVA Technical Management Group (TMG), composed of experts chosen from among the participating MEVA members and the MEVA service provider. The MEVA TMG usually meets on an annual basis, assisted by ICAO.

Transition to MEVA II and eventual evolution to the Aeronautical Telecommunications Network (ATN)

In 2000, the TMG recognized that, although MEVA performed its intended mission adequately, the system was not technically responsive enough to support ICAO's new and evolving digital communications requirements in the Region in an operationally efficient and cost effective manner. Because of the growth of the satellite communications industry, the quantities and types of voice and data circuits used by each MEVA end-user resulted in monthly recurring charges that were no longer cost competitive with other types of satellite services that had been put into worldwide use. Newer technologies, such as the Internet Protocol and improved Frame Relay capabilities opened the door for improved services at a better value.

In consideration of the Global Air Navigation Plan Initiatives, (specifically GPI-22—*Communication Infrastructure*), ICAO SARPs, related Guidance, and the need to support CNS/ATM systems with the introduction of the Aeronautical Telecommunications Network (ATN), the MEVA Member States, territories and a participating international organization recognized the necessity to update the MEVA network. The update was required in order to facilitate the adoption of services, systems and protocols with a common equipment interface based on the Open System Interconnection reference Model (OSI) of the International Organization for Standardization (ISO). The upgrades also benefitted the interconnection/ interoperability of the MEVA network with other Regional and sub-Regional digital networks, and as progress continued the initiative eventually became referred to as the MEVA II Network Project.

MEVA II MEMBER STATES:

- Aruba
- Bahamas
- Belize (COCESNA)
- Cayman Islands
- Costa Rica (COCESNA)
- Cuba
- Dominican Republic
- El Salvador (COCESNA)
- Guatemala (COCESNA)
- Haiti
- Honduras (COCESNA)
- Jamaica
- Netherlands Antilles
- Nicaragua (COCESNA)
- Panama
- Puerto Rico
- United States

MEVA II was handled by the MEVA TMG, again assisted by ICAO. The major activities involved included studies of the updates required (a three-year business case project), formulation of the formal Request for Information (RFI) document in 2003, the Request for Proposals (RFP), and eventually the evaluation and selection of the best solution.

By December 2004, the Service Provider for the MEVA II project and its corresponding Agreement Document had been approved by the MEVA States' Civil Aviation Directors. In 2005, MEVA TMG finalized the technical document that

describes the network and the transition plan towards MEVA II. Based on those documents, as well as conformity requirements with their respective State laws, the MEVA members arranged their contracts with the selected service provider and implementation of the MEVA II nodes was completed in November 2006.

MEVA II attributes

MEVA II is a time division multiple-access (TDMA) satellite-based frame relay network, connecting air traffic control facilities and civilian airports throughout the Central Caribbean and adjacent Flight Information Regions (FIRs). The network uses satellite IS 1R's directed beam to the United States and Latin America, with operational frequencies in the C-band and utilizing vertical linear polarization. MEVA II provides voice and data communications between ATS control units in Aruba, Bahamas (Freeport and Nassau), the Cayman Islands (Grand Cayman), Cuba, the Dominican Republic, Haiti, Honduras (COCESNA), Jamaica, Netherlands Antilles (Curaçao and St. Maarten), Panama and the United States (Miami, Puerto Rico). In coordination with the MEVA II members and MEVA TMG, the service provider manages network operations, performs preventive and corrective maintenance functions, and conducts advanced training sessions for interested MEVA II Member States.

The MEVA II Network Project has permitted several improvements to overall network/system capacity and performance, including:

- Improved satellite bandwidth capacity/ availability for future services and network expansion to continue satisfying AFS communications and facilitating the implementation of ATN sub-networks. This contributes significantly to the implementation of new CNS/ATM systems and applications.
- Support and compliance with new and future ICAO requirements with respect to digital communications in the air

traffic control Regions of the Caribbean and South America during the next decade, via operationally- and cost-efficient means.
- The use of Multiple Access by Division in Time (TDMA), with satellite bandwidth on demand (BoD) and the implantation of Frame Relay, IP solution or IP over Frame Relay. These have proven beneficial in reducing monthly service costs as well as allocating more efficient bandwidth usage.
- COTS equipment, architecture design and real-time monitoring of network status permits more flexibility, a higher level of services and increased availability of the aeronautical services.
- South American Regional VSAT Network (REDDIG) compatibility with designated MEVA II VSAT Nodes for the interconnection of the two networks.

The implementation of MEVA II resulted in optimum bandwidth usage, increased network reliability and better monitoring capability. At each VSAT node site, all electronic and RF components were replaced with the latest COTS versions. Each site's reliability is now ensured via annual preventative maintenance checks. The MEVA II network utilizes a proprietary Web site for dissemination of public information, as well as a means for MEVA II members to share information and performance status monitoring (www.mevaii.net).

The overall system performance of the MEVA II network over its first years of operation has been satisfactory, according to the conclusions of the MEVA TMG/19 Meeting. MEVA II has thus far maintained a 99.9% availability requirement, factoring-in annual preventive maintenance allotments and outages caused by force majeure and on-site hurricane preparedness (i.e. a temporary shut down and storage of an antenna). This operational performance is supported and assisted by appropriate training activities and the development of a Contingency Plan, among other activities.
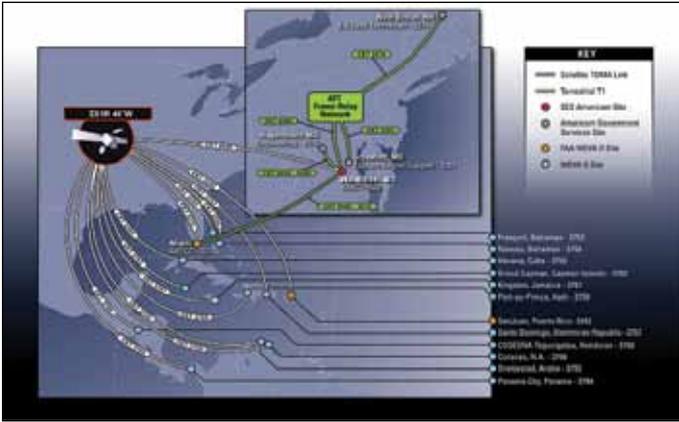
MEVA II inter-connection with additional Regional networks

Due to their technical similarities with respect to satellite architecture, and in order to solve current and future communications requirements in the NAM, CAR and SAM Regions, it was agreed to interconnect the MEVA II and REDDIG networks. This integration/interconnection is expected to provide low-cost, high-level performance by avoiding the use of multiple VSAT networks. This complies with the mandate made by ALLPIRG (All Chairmen of the Planning and Implementation Regional Groups) Conclusion 5/16—*Implementation of VSATs* which deals with the expansion of existing VSAT networks.

For the MEVA II and REDDIG networks' interconnection, a Coordination Group was formed with the participation of members from both networks. The group has thus far completed an action plan, a satellite contingency plan, Memoranda of Understanding (MOU) between each partici-pating party, agreements related to technical-operational and administrative issues, acquisition of necessary equipment and finally a list of preliminary considerations for a future integration phase. The interconnection of MEVA II and REDDIG is scheduled to be completed in the last quarter of 2009.

This Coordination Group also agreed on an integration phase for the MEVA II and REDDIG networks, however, due to differences in the two VSAT networks' current administrative and operational schemes, the integration phase is currently projected to begin sometime in 2014 or shortly afterward. The preparation and study of the new integration phase is an ongoing task of the Coordination Group.

ATN application implementation via MEVA II

As part of its main objectives, MEVA II provides flexibility and a capability for the MEVA II members to implement their planned ATN applications and required automation data exchange to achieve seamless interoperability of local and Regional data networks. Additionally, MEVA II provides the enabling infrastructure for the automated exchange of radar data, ATS Message Handling System (AMHS) connectivity, flight information, and other important operational data across borders. These functions reduce operational errors, improve safety, and increase the efficiency of operations across the participating Regions.

In addition, as the main telecommunications data exchange means, MEVA II provides for ongoing radar and surveillance data exchange agreements among CAR States, territories and one international organization. With the modernization of AFTN systems, several AMHS systems have been implemented in the CAR Region and an ATN router connectivity assessment is planned.

Several CAR Region States/territories and international organizations now enjoy a high level of progress in their ATM system automation. Considerable processing capacity and several automated functionalities—together with the surveillance data exchange—would allow additional operational benefits regarding safety and efficiency, improved airspace utilization and mutual backup between adjacent ATS units, thereby significantly improving airspace harmonization.

Under these considerations, the MEVA II network is envisaged to expand to include new members and allocate more services as States implement their Air Navigation Plan systems and applications to better meet or surpass Regional/national performance requirements. ∎
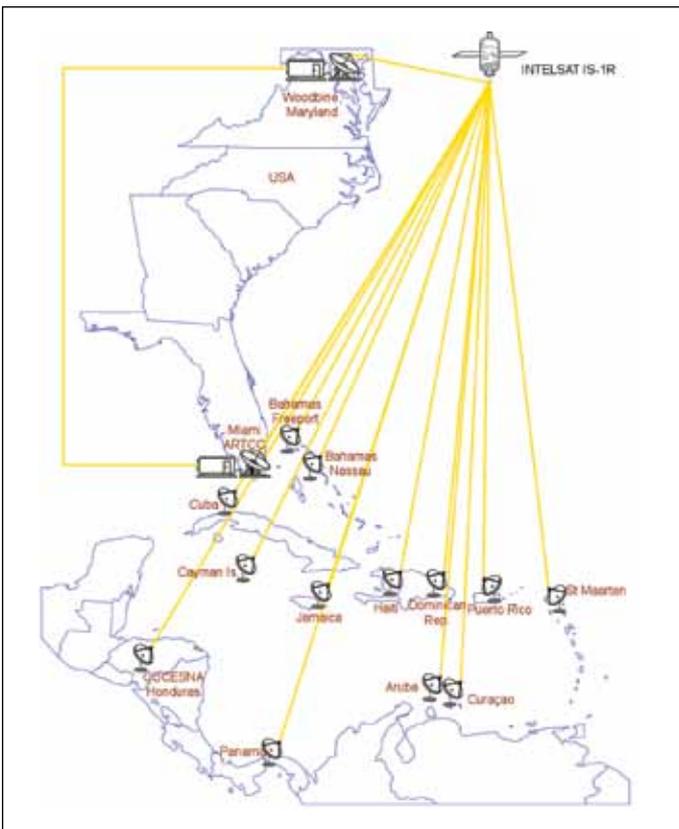
Airspace optimization in the South American Region

Responding to ICAO's challenge to evolve their airspace into the safer and more efficient operating environment in line with the Organization's Air Traffic Management ATM and Performance-Based Navigation (PBN) initiatives as reflected in its Global Air Navigation Plan, SAM States have been working hard in recent years to establish the programmes and implementations that will make these goals a reality over the near- and medium-term.

As Jorge Fernández Demarco, ICAO SAM Regional Officer ATM/SAR explains, his Region's unique spirit of cooperation and teamwork, engendered in no small part by ICAO's ongoing Technical Co-operation projects with SAM States, remains the single most important enabler of the progress and achievements now being experienced with respect to SAM airspace safety and efficiency objectives.

Jorge Fernández Demarco is an Air Traffic Controller. Born in Uruguay, he has been the ICAO SAM ATM/SAR Regional Officer since 1993, also performing duties as ISO Auditor Leader, USOAP Auditor and SMS Instructor. Fernandez has acted as Secretary of the GREPECAS ATM Committee, CAR/SAM APATM Group, SAMIG Group and SAT Group. He has extensive experience in aviation, having served at the Uruguayan Aeronautical Administration and having worked as an ATS Instructor at the Uruguayan Training Centre. He was also an Advisor to the Carrasco International Airport Directorate in Uruguay.
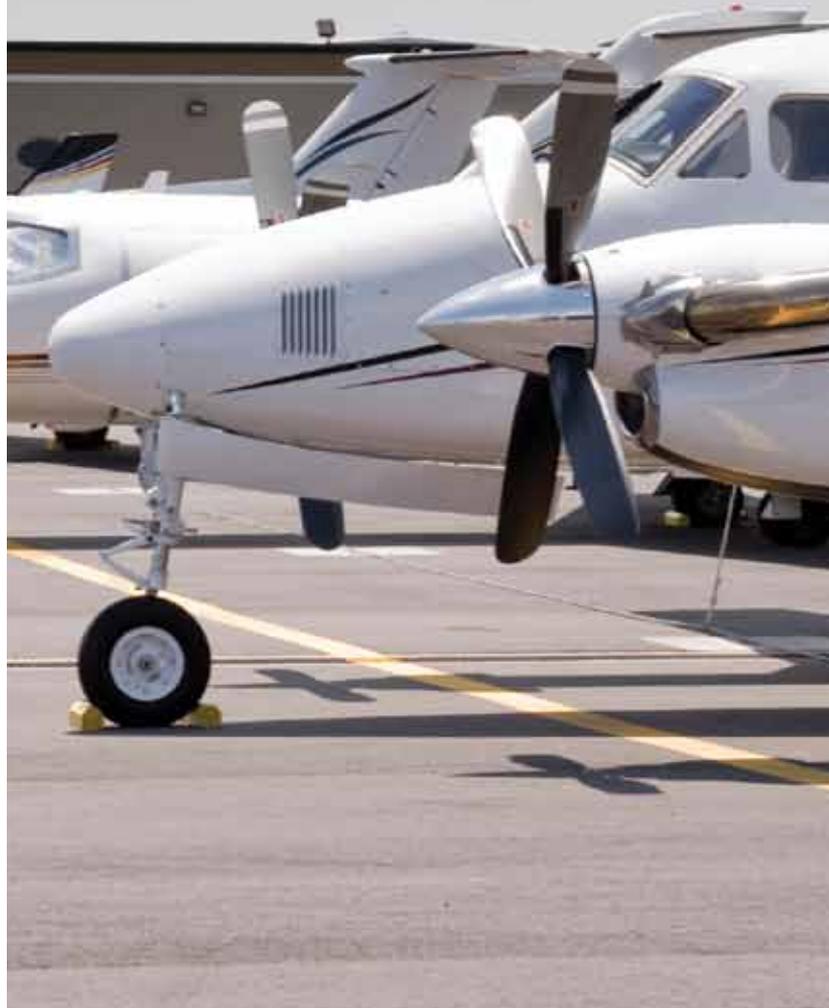
The International Civil Aviation Organization (ICAO) has focused its attention, through two of its Strategic Objectives, in improving safety and efficiency in international civil aviation. In this connection, States of the South American Region (SAM) have committed themselves to these objectives and, with the support and assistance of the ICAO South American Regional Office, are executing a project for the optimization of the Region's airspace through the implementation of Performance-Based Navigation (PBN) in air routes, terminal areas and approach landings at primary SAM airport facilities.

States are similarly pursuing the implementation of Air Traffic Flow Management (ATFM) to optimize air traffic circulation and avoid overloading the air traffic system.

Attendees to a recent gathering in Lima of the CAR/SAM Regional Planning and Implementation Group (GREPECAS).

PBN advances

SAM States developed a Regional PBN Roadmap through the CAR/SAM Regional Planning and Implementation Group (GREPECAS). This is a fundamental document for the harmonization of SAM PBN implementation and which provides a strategy for the evolution of applicable technologies and systems in the short- (2008–2011) and mid-term (2011–2015). This strategy includes aircraft operations in all flight phases, namely: routes (continental and oceanic); terminal areas; and approaches.

The SAM PBN Roadmap has also provided the necessary guidelines to allow for the development of a PBN Implementation Project for RNAV-5 en-route operations in SAM continental airspace as of November 2010. Keeping in mind that current ground-based infrastructure will not support RNAV applications with adequate precision to ensure the effective and harmonized evolution of air navigation in the Region to PBN capabilities, the RNP-2 application is expected to commence in the mid-term in selected continental airspaces with the exclusive application of GNSS.

For oceanic and/or remote areas, no significant changes are expected in the short-term, due to existing low air traffic densities. In the mid-term, however, RNP-4 with ADS/CPDLC utilization is

expected in the European/South American (EUR/SAM) corridor and in the Santiago de Chile/Lima route segment.

During the same periods, RNAV-1 will be implemented for operations in specific terminal areas as selected by States, assuming RNP-1 implementation in non-radar environments and/or areas without adequate DME coverage. The application of RNP APCH, Baro/VNAV o RNP AR APCH is also expected with respect to instrument approach procedures in most of the international airports of the Region.

In order to facilitate implementation and provide guidance to the SAM States on this matter, corresponding action plans have been developed by ICAO and a document was prepared detailing implementation activities, specifying the results expected and formulating the vision of the Region with regard to the new airspace concept.

This concept features a Regional approach to flight operations within the airspace and was developed to meet specific strategic objectives, such as safety improvement, adjustment of the services provided in reply to air traffic increases, environmental impact mitigation capacities, etc. The airspace concept includes details on the practical organization of the airspace based on users' characteristics, Communications,

Navigation and Surveillance (CNS) infrastructure and the concept of Air Traffic Management (ATM).

SAM ATFM

Upon analyzing current and future demand, GREPECAS encouraged the implementation of ATFM to optimize air traffic circulation and reduce ground and in-flight delays—thus avoiding an overloading of the air traffic system. Taking into consideration the above, GREPECAS approved the CAR/SAM ATFM Concept of Operations (CAR/SAM ATFM CONOPS), which reflects the order of events expected and which should also assist in guiding planners in the gradual design and implementation of an effective ATFM system.

As a follow-up to the guidelines issued by GREPECAS, the States and the ICAO SAM Regional Office agreed to include within their regular work programme the progressive implementation of the associated ATFM air navigation Global Plan Initiatives (GPIs) and related operational concepts.

With views to harmonize ATFM planning, ICAO SAM States, together with interested airspace users and international organizations such as IATA, IFALPA and IFATCA, deemed it pertinent to develop an ATFM Roadmap to provide guidance to air navigation services providers, aircraft operators and airspace users, international organizations and others, with regard to the applications which should be implemented in the short term (2008–2010) and at mid-term (2010–2014). The SAM ATFM Roadmap will provide guidance material on ATFM implementation as well as guidance for the execution of national implementation plans.

SAM States are aware that ATFM may not be restricted to the area under responsibility of one State, due to its transnational effects on air traffic circulation in other areas. It was therefore agreed that ATFM implementation be carried out in the Region

in an orderly and harmonized fashion, beginning with the application of simple ATFM procedures in airports and then gradually progressing to more complex stages.

Additionally, the Region has developed guidance material to apply a common terminology and phraseology for the exchange of ATFM messages between the units that provide ATFM services as well as a common methodology for the calculation of capacity at airports and applicable ATC sectors.
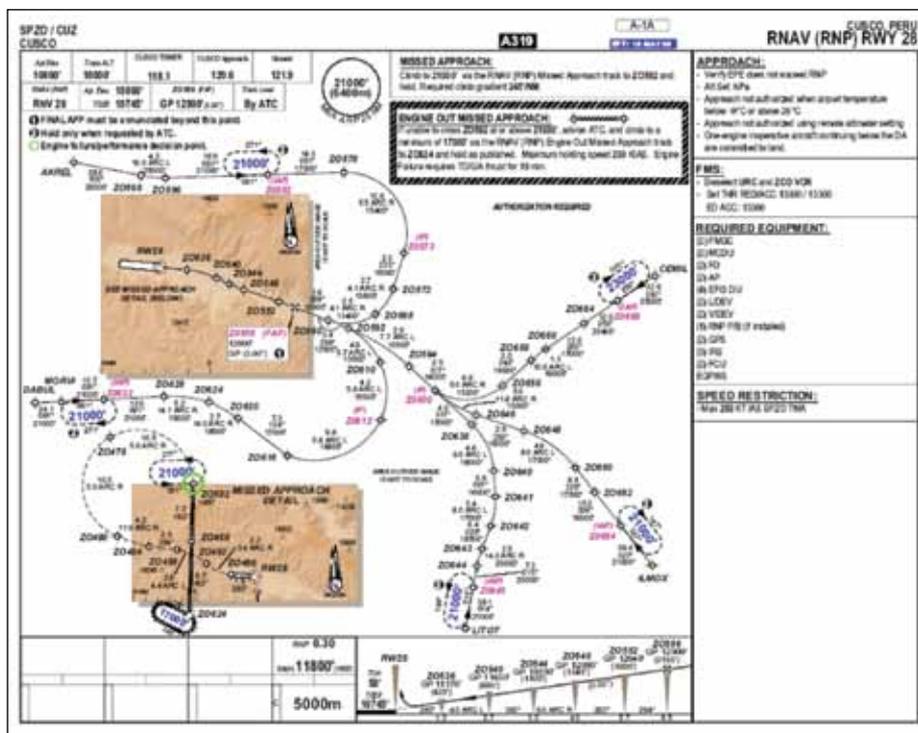
The RNP Approach Authorization Required Procedure used by LAN at the Cuzco International Airport, Peru.

Implementation pillars

RVSM implementation in the SAM Region has met with unqualified success, primarily due to State commitments to the project, cooperation with other projects complying with related operational requirements and to the team spirit of the State experts involved. These pillars are the foundation of the response to the challenges that must be met as global aviation evolves towards worldwide ATM implementation.

Pillar One: Commitment

One of the main pillars of the SAM Region for the execution of the ICAO regular air navigation work programme and, particularly, of the PBN and ATFM implementation programmes, has been the commitment of States upon subscribing to Regional Project RLA/06/901—*Assistance in the implementation of an ATM Regional system according to the ATM*

operational concept and the corresponding technological support for Communications, Navigation and Surveillance (CNS).

This project serves as the coordinating mechanism for all meetings and workshops of the SAM Implementation Group (SAM/IG) and, when necessary, the hiring of experts for specific tasks. Other activities are carried out within the framework of informal meetings, coordination meetings, bilateral or multi-lateral meetings, courses, seminars and workshops which all similarly contribute to the improvement of the SAM Region experts' training.

Pillar Two: Regional cooperation

The second pillar, complementary to the aforementioned cooperation mechanism, is the Regional Safety Oversight Cooperation System Project (SRVSOP)—RLA/99/901 which provides essential support with respect to the implementation of related operational requirements. This project's activities have been oriented to meet PBN implementation requirements through the development of Advisory Circulars (ACs) which provide Acceptable Compliance Methods (ACMs), regarding RNAV-5 aircraft approvals for operations, RNP Approaches (RNP APCH), RNP Approaches with Authorization Required (RNP AR APCH) and Barometric Vertical Navigation Approach (APV/baro-VNAV). By the end of 2009 the RNAV-10, RNAV-1 and RNP-1 circulars for operations, which will enable PBN implementation in a harmonized manner in the Region, are expected to have been completed.

Pillar Three: Team spirit

The SAM States have concurred that teamwork is essential to execute the projects in which they are currently involved. The SAM Implementation Group has built on this successful camaraderie among its Member States in implementing RNAV routes and RVSM.

The Region has learned to work in a harmonious and collaborative manner and this has been recognized in several forums, most notably ICAO's Technical Co-operation projects. Once these projects are finalized SAM States will have attained full implementation of the objectives set forth in the Organization's Global Air Navigation Plan and will have realized an optimized airspace structure as well as a safe, integrated, interoperable and cost-efficient Regional ATM system. ■

CASSOS INFORMATION PAPER FOR AIR NAVIGATION COMMISSIONERS
JULY 28, 2009, RUNAWAY BAY, JAMAICA

The Civil Aviation Authorities of Barbados, Belize, Guyana, Haiti, Jamaica, OECS (Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines), Suriname, and Trinidad and Tobago, Member States of the Caribbean Community, signed an agreement in late 2001, formalizing their participation in and support for a cooperative approach to aviation safety oversight. The Agreement provided for the establishment of an 'Association of Civil Aviation Authorities of the Caribbean' (ACAAC) under the umbrella of the Caribbean Community (CARICOM) Secretariat and to form its operating arm, the Regional Aviation Safety Oversight System (RASOS). Each RASOS member authorities was mandated to implement the provisions of all ICAO Annexes. It was the RASOS mandate to assist them with specific regard to Annexes 1, 6, and 8 of the Chicago Convention and involved aiding, facilitating, harmonizing and sharing resources for the provision of aviation safety oversight services in 13 small nations in the Caribbean region. Although all participating authorities belong to States that are members of CARICOM, membership in the CARICOM was never a prerequisite for membership in the ACAAC.

RASOS members' States developed a formal agreement signed by Heads of State in 2008 to widen the regional organization's mandate to include all ICAO Annexes. This marked a major step forward in elevating the RASOS status by establishing it as a new entity, and renaming RASOS as the Caribbean Aviation Safety and Security Oversight System (CASSOS) and having it designated as an Institution of the Community by the Conference of Heads of Government pursuant to Article 21 of the *Revised Treaty of Chaguaramas Establishing the Caribbean Community Including the CARICOM Single Market and Economy*. The agreement subsumed RASOS into CASSOS and the ACAAC no longer exists. CASSOS has full juridical personality, and its Board of Directors report to the Ministers who constitute the CARICOM Council for Trade and Economic Development (COTED).

Originally, the Members of ACAAC implemented the Regional Aviation Safety Oversight System (RASOS), to share resources and reduce the cost of providing the required airworthiness and flight operations oversight services to individual Member States. The RASOS concentrated on the optimization of the use of the region's technical resources. Its focus was to strengthen the civil aviation authorities, promote the upgrading and harmonization of regulations, standards, procedural guidance material, inspector training and to enhance the ability of the individual states to fully discharge their safety oversight responsibilities. The sub-regional approach chosen is consistent with the global strategy promoted by ICAO to address safety oversight problems of contracting states. RASOS office core operations were funded by equal annual member CAA contributions and it was self sufficient during its existence, and by its frugality was able to commence CASSOS with no additional expenditures.

Assistance from the FAA between the years 2003–2008 provided numerous training courses for RASOS Member CAA's inspectors and other technical staff, ICAO courses were delivered in the region with regard to aerodrome certification and dangerous goods and PEL. Transport Canada assisted with some compliance/enforcement training, and medical examiner training. The FAA provided extensive in-country assistance by providing technical experts in an effort that was aimed at advising and assisting Members to achieve IASA category one and compliance with Annexes 1, 6 & 8. This assistance included mentoring of inspectors and technical advice provided during re-certification of air operators. Other ongoing FAA technical assistance pursuant to Technical Assistance Agreements was aimed at full implementation in the first half of 2008 of a common and ICAO compliant computer based written knowledge testing system. A regionally developed, harmonized, common licence format and production system has been installed in all member authorities and could be made be available commercially to any other authorities that are interested in such a system. Transport Canada continues to assist with training of civil aviation medical examiners and cabin safety inspectors and is offering ongoing training support in SMS and aviation compliance and enforcement. Common qualifications and training standards for inspectors have been enunciated to facilitate resource sharing, that is, the trans-national use of inspectors, and procedures for designation and delegation of authority and for requesting, tasking and deploying trans-national inspectors have been developed and approved. A Policy and Procedures Manual was developed to guide the management and operation of RASOS and in its latest version will now be used to guide and direct CASSOS activities. Inspector guidance material is shared freely between Members and is well harmonized already. It is anticipated that development of unitary common guidance material will follow the development of common 'regional' civil aviation regulations while at present, all regulations are based on adaptations of the ICAO MCAR and are virtually identical. Other initiatives include harmonized enforcement procedures and inspection procedures.

In 2009, four of the original seven RASOS Member CAAs continue to meet the IASA Category One standards. CASSOS, in a manner similar to that used by the European Aviation Safety Agency (EASA), performs reviews of its Members using experienced inspectors from the region and checklists derived from IASA and ICAO USOAP checklists. Reports developed for the Member authorities are reviewed and the results are used to determine, prioritize and respond to region-wide needs. The reviews assist with harmonization activities and have also assisted members to prepare for IASA and ICAO audits. Some Members find them useful to develop compliance action plans. There remains an ongoing need for on-site mentoring and training of technical personnel and for technical assistance in all Member CAAs, particularly as the CASSOS mandate has been significantly widened and new expectations arise resulting from changes to the Annexes and technology.

Using needs assessment methodology the regional body has identified the need for professional training and recurrent qualification training of airport operators' personnel. It has from its own resources and assisted by a member of the FAA airport standards staff, delivered a three day seminar on aerodrome manual preparation to some 33 aerodrome specialists from the region.

The RASOS web site contains public information and members' only sections. The inspectors' section contains downloadable inspection forms, some common guidance material, flight test forms and other data required by the region's technical staff. The site also hosts a safety newsletter, links to Member CAA sites, links contact to RASOS and provides a secure 128 bit encrypted e-mail service for the Directors, RASOS staff and all technical safety inspectors in the RASOS group and other selected officials who have been working with RASOS. It is a very strong tool for communication, information and data sharing and for providing a public identity for the organization as well as serving as a virtual office for RASOS personnel. The Web site is being updated and changed to reflect CASSOS operations and that should have been completed by October, 2009.

CASSOS has adopted the European Coordination Centre for Accident and Incident Reporting Systems. (ECCAIRS) for incident and accident reporting and, in a regional project, CASSOS Members use a common, harmonized regional inspection planning, tracking and reporting system. While this system respects national security, confidentiality and sovereignty as required, it provides a valuable tool for analysis and tracking of trends and allow development of appropriate safety and regulatory interventions. CASSOS will share inspection data as in the European Safety Audit of Foreign Aircraft (SAFA) system. Seminars in ALAR CFIT accident reduction have been delivered and this will continue under CASSOS with a much widened safety promotion mandate. The regional organization has assisted members with accident and incident investigation and it is envisaged that this will grow into a truly regional service as the benefits of a centralized investigating office are beyond question. The foregoing summarizes the major efforts of the past seven years toward safety oversight harmonization within the CARICOM CSME framework.

All of the above initiatives have been aimed at building a strong regional regulatory and Safety Management System to enhance civil aviation safety in Member States and throughout the region and are continuing under CASSOS. Funding at this moment in time is limited to provision of two technical experts and one administration person. Future development and strengthening of the regional safety oversight capability may require increasing member contributions or new sources of funding or assistance.

The direct beneficiaries of the regional CASSOS institution activities are the participating States of CARICOM and will include any other States or Territories in the region that might become part of the regional aviation safety oversight mechanism during the next few years. Other direct beneficiaries of CASSOS activities are the owners and operators of aircraft and all who use the aviation industry infrastructure and services in the CASSOS States. One must not overlook the indirect beneficiaries of the air transport, aviation services and infrastructure that includes the tourism and business sectors of the economies. External benefits flow to the States from the improved aviation safety environment resulting from the upgraded aviation infrastructure and the increased surveillance and enforcement of the safety standards established by ICAO.

CASSOS has matured from its fairly humble beginnings during seven years of hard work by all persons involved and now has seven years of successful operating experience in coordinated, cooperative, harmonized, self-sufficient group efforts aimed at providing safety oversight services to the high economic value air transportation system in all participating States as well as to other States whose airlines operate into the region. This high level of achievement will continue as CASSOS continues its growth into a truly regional institution.

The immediate benefits of regional cooperation are evident from the constantly improving track record of results of the ICAO and FAA safety oversight audits of member CAAs. Benefits are also accruing to members from the mutual technical cooperation, mutual technical assistance, attainment of greater numbers of trained and qualified technical inspectors, and the valuable technical expertise contributions made by all Members in their efforts to achieve and sustain compliance with international aviation safety oversight standards at affordable costs. A strong regional safety oversight partnership has been forged. Future activities are aimed at establishing a permanent Headquarters, undertaking new regional projects such as a single upper airspace control system, introduction of new ATM surveillance technology and air navigation technology, and managing safety initiatives and interventions to keep the aviation system loss rates as low as possible.

Commissioners are invited to:

a) note the information contained in this information paper and in particular to recognize the CASSOS as a regional organization aimed at enhancing the level of aviation safety of civil aviation in the region as well as facilitating other mutually accepted initiatives for the good of the Caribbean region and the Caribbean Community.

b) note the substantial progress already achieved by the CASSOS in improving safety oversight in its Member States.

c) note the step forward for CASSOS being designated as a formal institution of the Caribbean Community.

d) extend all possible support to the CASSOS in cooperating in and building wider technical support and resource partnerships to further its work.

e) consider that CASSOS associate membership is not limited to CARICOM Members.

f) consider that as a CARICOM Institution the CASSOS will be much more effective than RASOS as it will have the political and diplomatic status to deal with regional and external agencies on all aviation issues on its own.

g) consider that under the Revised Treaty of Chaguaramas, CASSOS will be a primary source of expertise for all matters dealing with technical aspects of aviation within the Community.

h) recognize and support CASSOS as it actively enhances and expands its aviation safety activities and programs and its goals of assisting in the development of the highest and most modern standards and services supporting air transport operations and safety in the region and facilitating aviation growth in the region.

Achieving seamless ATM in the NAM/CAR Regions

Over the years, the ICAO NACC Regional Office has put in place a series of initiatives related to the planning and development of air navigation systems (ANS). These have been intended to eventually evolve into a component of a broader Global Air Traffic Management (ATM) system and were implemented in close coordination with ICAO's South American Regional Office (Lima), the ICAO European and North Atlantic Regional Office (Paris) and the ICAO Asia-Pacific Regional Office (Bangkok).

Víctor Hernández, NACC Regional Officer, Air Traffic Management/Search and Rescue (RO/ATM/SAR), reports on the status of this ongoing inter-Regional ANS harmonization being achieved by ICAO and industry stakeholders, resulting in greater ATM seamlessness across all Regions.

Víctor M. Hernández Sandoval joined ICAO as the ATM/SAR Regional Officer in January 2003. With more than 35 years of combined aviation experience, he has met challenges throughout the years in different positions relating to air traffic control (ATCO), human resources planning and training, architecture development for ATS airspace and route networks, development of aviation standards and procedures—including airport requirements, certification of radar automated systems, development of ATS safety programmes, and the auditing of air navigation services in Mexico and additional Caribbean States. Mr. Hernández served as acting Deputy Regional Director for the ICAO NACC Regional Office during 2008.

The North American and Caribbean (NAM/CAR) Regions, located strategically at the confluence of Air Traffic Service (ATS) routes connecting major destinations, have become a vital link in the smooth flow of air traffic between major blocks of airspace in adjacent Regions. This is made evident by the heavy air traffic now being experienced between these Regions specifically as well as the additional operations which are becoming more commonplace between the NAM and SAM Regions via Caribbean airspace.

Performance approach

Performance-based air navigation planning, which is now being used to guide Regional efforts and the key activities in the NAM/CAR airspaces, will eventually establish ICAO's objective for a Global ATM system. To facilitate the realization of this goal, the ICAO NACC Regional Office has made

significant progress in the development of relevant guidance materials based on:

a. *The Global Air Traffic Management Operational Concept* (Doc 9854).
b. *Air Traffic Management System Requirements* (Doc 9882).
c. *The Manual on Global Performance of the Air Navigation System* (Doc 9883).
d. *The ICAO Global Air Navigation Plan* (Doc 9750).

Regional approach

Aircraft capabilities have significantly increased in recent years. New aircraft are capable of extremely accurate navigation during all phases of flight and many are now equipped with satellite-based communication. Rapid aircraft fleet growth has resulted in a relatively young airline fleet, most equipped with some or all of the available enhanced avionics capabilities. Both of these developments have required ICAO to take early and efficient ATM implementation steps to facilitate the potential they represent in the context of a harmonized air navigation system.

Consistent with global guidance, the Regional approach being pursued in the NACC will build on the work already completed by States and consists primarily of:

- Developing an interoperable and harmonized air navigation system that will meet the continuous growth projections for Regional air traffic.
- Bringing near- and medium-term benefits to the ATM community by taking advantage of currently available aircraft capabilities, ATC infrastructures and related technologies.
- Ensuring that all activities must be based on clearly-established operational improvements and performance objectives that support ICAO's key Strategic Objectives.

The goal in this regard is to now focus attention on the particular and required implementation activities and to ensure

that resources are efficiently utilized to avoid duplication. The new work processes and methods also ensure that performance objectives can be measured against timelines and key performance indicators, in order to facilitate the reporting to ICAO of any progress being achieved.

Currently, Regional ATM initiatives are primarily related to the implementation of:

- Performance Based Navigation (PBN-RNAV/RNP).
- Demand and capacity balancing or Air Traffic Flow Management (ATFM).
- Interfacing of ATM Automation systems including ATS Inter-Facility Data Communications (AIDC) and radar-data sharing.
- Improving civil/military coordination regarding special-use airspace.
- ATS contingency planning.
- Aligning upper-airspace classification.

PBN and other capacity-enhancing developments

Since PBN implementation affects areas such as the Gulf of Mexico, local traffic operating domestically may have different requirements for its RNAV or RNP routes based on respective flight trajectories. This has been Regionally addressed such that, as the routes are re-aligned or new routes are added, air navigation providers are developing new RNAV or RNP routes connecting to appropriate airports *(editor's note: for a more detailed analysis of PBN activities globally please see ICAO Journal 04, 2009).*

Implementation of RNP 10 as well the redesign of the ATS route network in the West Atlantic Route System (WATRS) resulted in 40 percent increased airspace capacity as well as shorter route tracking with commensurate fuel savings benefits for airlines and reduced engine emissions. Other cost-benefit reports highlight savings of approximately $8.00 per nautical mile by reducing the distance along airways in the Caribbean.

It has been recognized recently that there are periods during which demand for access to airspace and/or airports exceeds the capacity therein. To address these shortfalls, NACC stakeholders have been working together to deal with traffic demand and airspace capacity issues affecting the western hemisphere and to share best practices. The development of harmonized flow management initiatives and operational procedures across States, territories and Regions, as well as the implementation of additional demand and capacity balancing, have worked to enhance NACC aviation safety and efficiency.

To more effectively integrate current and future systems, measures taken thus far have included the development of a Common Coordination Interface Control Document (ICD) for North American States as well as a similar tool approved by the South American and Caribbean Regional Implementation and Planning Group (GREPECAS). Both instruments allow ATS Providers to exchange flight plan data and radar handovers using harmonized protocols where possible.

Upgrades are also in progress to allow for Automatic Dependent Surveillance (ADS) handovers, and to implement full NACC demand- and capacity-balancing initiatives incorporating collaborative decision making tools with all ATM stakeholders. The updated interface between NAM/CAR States will result in a reduction in controller workload and an increase in flight data accuracy.

NACC airspace has been recognized as a joint resource with demands placed on it by both military and civil users. Based on a Regional strategy, several agreements have now been achieved between ATC providers and military organizations to improve coordination of, and access through, Special Use Airspace.

RVSM accomplishments

Via an extensive cooperation process pursued in the western hemisphere, along with a correspondingly high level

of support from participating stakeholder organizations, Reduced Vertical Separation Minima (RVSM) was successfully implemented in the NACC Region in 2005, with all States concerned aligning their system of cruising levels for IFR/VFR flights to ICAO Annex 11 requirements.

As a result of RVSM implementation, expected savings in the CAR and SAM Regions will be approximately $400 million over a 15-year period, for international flights alone. In the NAM Region, fuel savings benefits are projected to be $5.3 billion over the same period. RVSM implementation has provided six additional cruising altitudes which have dramatically-increased upper airspace capacity.

Regional contingency planning

In 1999, the Y2K event provided a great opportunity to focus on NACC ATM contingency planning. Whether a natural disaster or human event is the cause of a crisis, the NACC Regional Office maintains a Regional catalogue of contingency plans developed on a bilateral basis between States, territories and international organizations, including related points of contact to facilitate Regional coordination. The goal is to provide accurate assistance for a safe and orderly operation during a particular crisis in air navigation services.

As the NAM and CAR Regions also encompass several areas with potential hurricane and volcanic activity, suitable contingency initiatives have been developed addressing standardized guidelines for alerting aircraft when hurricane or volcanic eruptions are possible or have occurred, and for identifying coordination procedures to be followed by the affected Area Control Centres (ACCs).

Regarding other natural events or disasters, States have committed resources for Search and Rescue (SAR) services for these purposes through bilateral agreements. The goal here is to provide accurate humanitarian assistance and the related and ongoing Regional activities in this respect include periodical exercises in cooperation between State SAR organizations.

States' planning

In terms of ongoing upgrades infrastructure to their air navigation systems, States, in cooperation with the ATM community, have been developing their national plans in harmony with the Regional plan by using relevant ICAO guidance material. These plans include detailed action items to successfully achieve national performance objectives and identify the individual parties responsible for these objectives as well as the means for monitoring their progress. The responsibilities and timeframes are clearly defined so that the involved parties are aware of their commitments throughout the planning process, and these responsibilities include the
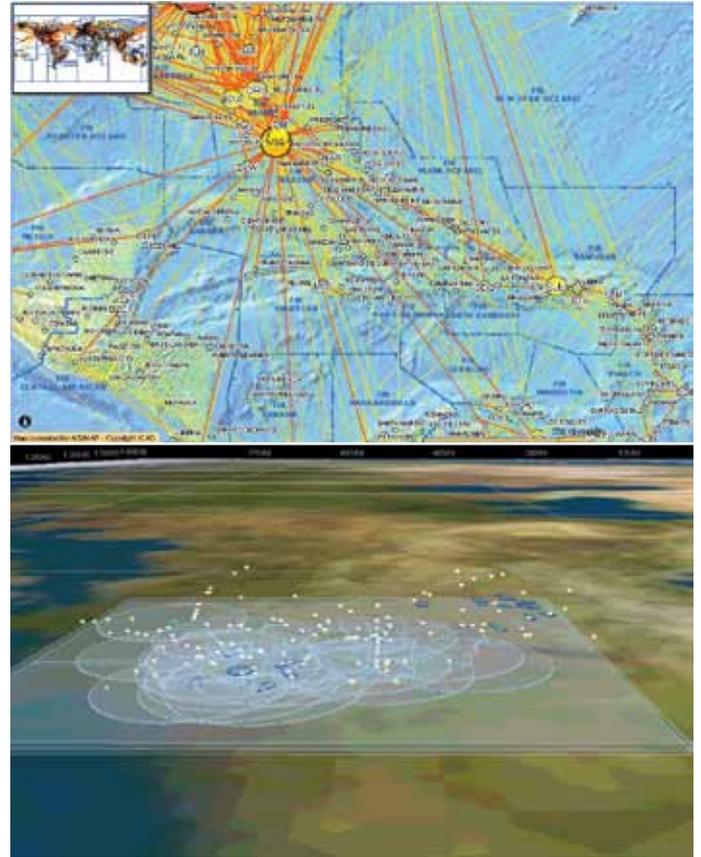
requirement for periodic reports to relevant Regional Planning and Implementation Groups (PIRGs).

Significant implementation work has also been developed to harmonize Regional ATS Safety Management Systems (SMS), ATS regulations from State-to-State as well the planning and training of human resources for ATS duties. ATS Quality Assurance programmes developed Regionally at the beginning of this century are part of these achievements.

Atmospheric and environmental programmes remain additional challenges with respect to improving existing NACC Regional harmonization activities in the ATM area.

Conclusion

All of the Regional activities mentioned here contribute to enhance aggregate NACC aviation system performance, meeting ATM community expectations and developing new metrics to help stakeholders track their progress across a variety of harmonized criteria. All these efforts help ICAO to proactively maintain and guide a more efficient Regional ATS airspace. It is felt that through this progressive, cooperative and cost effective approach, the challenge of achieving a seamless NACC airspace will be realized in the near future. ■
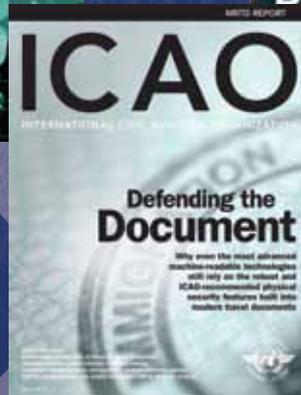
Bridging aeronautical information's digital divide

Air navigation safety is one of ICAO's highest priorities. Major emphasis is placed by the Organization on the availability of quality aeronautical data/information, including significant flight safety improvements that could be achieved by in-flight and electronic ground-based applications.

Raúl Martínez, NACC Regional Officer, Aeronautical Information Management (RO/AIM), discusses the objectives, accomplishments and ongoing transition challenges as States in the NAM/CAR Region evolve their Aeronautical Information Publications (AIPs) into the more digitally-flexible formats that are already helping to improve the efficiency of NAM/CAR air navigation.

Raúl A. Martínez Díaz first joined the ICAO NACC Regional Office from June 1999 to July 2003, when he returned to the Mexican Directorate of Civil Aviation (DGAC). He later rejoined ICAO in June 2006. Prior to his work with ICAO, Mr. Martínez worked at Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM) as Chief of Design of Terminal Procedures and En-route Flight Procedures (PANS-OPS, 1981 to 1993). From 1993 until 1999 he was SENEAM Chief of AIS/MAP. Under his leadership, SENEAM introduced aeronautical information digital processing and the use of the geo-indexed CAD system for the production of aeronautical charts and the Mexico Aeronautical Information Publication (AIP). Between 2003 and 2006, Martínez was Aeronautical Inspector at the Mexican DGAC in the area of Airports and Security. Martínez has also been a consultant for diverse projects in the aeronautical industry. He has a university degree in Social Psychology, is a technical specialist in microelectronics and robotics, and is a technician in analysis and system programming.

An Aeronautical Information Publication (AIP) is defined by ICAO in Annex 15—*Aeronautical Information Services*, as a publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

An AIP is designed to act as a manual containing thorough details of regulations, procedures and aeronautical charts for all public international and national aerodromes. It also contains information pertinent to aircraft operating in the particular State to which it relates. AIPs are usually issued by, or on behalf of, a State's Civil Aviation Authority (CAA) as part of the Integrated Aeronautical Information Package (IAIP) which includes:

■ The AIP.
■ Amendments to the AIP.

- Supplements.
- Aeronautical Information Circulars (AICs).
- Notices to Airmen (NOTAMs).
- Pre-flight Information Bulletin (PIB).
- Related verification lists.

The structure and contents of an AIP are formatted into three categories: GEN (General), ENR (En Route) and AD (Aerodromes). AIPs are kept up-to-date by a regular revision on a fixed cycle and, for operationally-significant changes in information, the AIRAC (Aeronautical Information Regulation and Control) cycle is currently used. This cycle operates on the basis of revisions which are issued by States every 56 days (the double AIRAC cycle) or every 28 days (the single AIRAC cycle). Any changes are received well in advance so that users of the aeronautical databases can update their flight management systems (FMS) on their aircraft.

Electronic AIP (eAIP)

Integrated aeronautical information packages (IAIPs) are currently being adapted on a State-by-State basis so that they may include the new data products needed to continue the transition to what has become known as Aeronautical Information Management, or AIM. Some States in the NAM/CAR Regions have now published versions of an electronic AIP (eAIP) as an initial step towards their transition to AIM.

A good example in the Region is COCESNA *(Corporación Centroamericana de Servicios de Navegación Aérea)* which has already implemented GIS, Quality Management and additional digital product formats for its six Central American Member States (Belize, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua).

The electronic version of the AIP, or eAIP, can be made available to end-users as a printable document or in a form suitable for viewing by electronic media, such as web browsers. Guidance material is currently being developed by ICAO in this respect as it will help avoid the possibility of the proliferation of multiple and possibly confusing presentations of AIP information via web-based tools.

Many States/territories accredited to the NACC Regional Office provide digital eAIPs either through a CD-based subscription or through a Web site. By doing so, the respective Aeronautical Information Service (AIS) is improved, as it is developed within a coordinated framework delivering quality assured information for all phases of an aircraft's flight.

Full eAIP effectiveness will eventually be achieved through increased data convergence (including the integration of geospatial-relational databases), the inclusion of electronic obstacle and terrain data (eTOD), complete WGS-84 reference coordinates, full implementation of a quality management system and the evolution of aeronautical information provision to meet the ATM interoperability requirements for system-wide information management.

The aim of the eAIP specification is to increase and to standardize the use of digital tools and formats and to introduce highly structured relational databases, such as Geographic Information Systems (GIS) that complement the current paper-based components of the IAIP. The production of an eAIP represents a very important step in the transition to AIM primarily because it already relies so heavily on digital processes and formats.

The next stage in the ongoing transition to AIM will focus on the wider establishment of data-driven processes for the production of current products in all States and Regions. An Aeronautical Information Exchange Model (AIXM) will provide guidance to States wanting to implement digital interchange from aeronautical databases. ICAO guidance material will include advice on a minimum data set to initiate and guide a phased development of the more mature relational database structure.

Many States are already providing eAIPs, either on CD or through the Web, as is the case with the Eastern Caribbean States under the PIARCO FIR. ICAO guidance material will be based on existing best practices and will be provided to States to ensure that new types of media will be harmonized for all stakeholders.

Additional CAR States have delegated eAIP production to an external contractor and few States continue to publish their AIPs solely in a paper-based format for the international aeronautical community, as detailed below.

ICAO Annex 15 specifies that each State must take all necessary measures to introduce a properly organized quality assurance system and implement quality management for air navigation data—especially with respect to the implementation of the Performance-Based Navigation (PBN) concept which has increased the dependence on airborne computer-based navigation systems. Nevertheless, the possibility remains that corrupt or erroneous data may yet pose serious threats to air navigation safety.

ICAO is currently developing new SARPs that will facilitate the provision and exchange of aeronautical data and define the requirements to support the delivery of that data through eAIPs. These will be oriented to all users and in particular the ATM community, in order to facilitate more timely and collaborative responses to ATM challenges. ■

The SAM Digital Network (REDDIG) An integral solution for current and future fixed aeronautical communications

Before the advent of digital communications, analogue technologies servicing CAR/SAM civil aviation stakeholders were limited in transmission capacity and availability, required continuous corrective maintenance actions and suffered from repair times that often exceeded acceptable limits.

As Onofrio Smarelli, ICAO SAM Regional Officer, Communications, Navigation and Surveillance (CNS) describes in this exclusive overview for the *Americas Regional Report*, these situations were significantly remedied by the implementation of the CAR/SAM Digital Network (REDDIG)—a solution currently managed under the auspices of the RLA/03/901 ICAO Technical Co-operation Project and which should be more comprehensively integrated with the NAM/CAR MEVA II Network by the end of 2009.

Onofrio Smarelli Mascitti is a Electrical Engineer who joined ICAO in 1998 as a CNS Technical Officer. Prior to his ICAO appointment he had worked in the Venezuela Civil Aviation Administration for 19 years, coordinating the planning, implementation and maintenance of CNS installations.

The CAR/SAM Air Navigation Plan (Doc. 8733) contains the aeronautical fixed communications requirements that must be implemented by Regional States in support of their air navigation services. States in the past had generally implemented the Plan requirements based on bilateral agreements, leasing voice and data (AFTN) circuits to local communications providers.

Earlier analogue communications solutions for CAR/SAM aviation were plagued by downtime and other technical shortcomings. Although there were back-up procedures to address any disruptions in communications, these often suffered from the similar reliability limitations. Over and above these serious technical shortcomings, the leased services were also expensive and the communications system to support the aeronautical fixed service (AFS) suffered from a less-than-systematic implementation and inadequate system management.

As ICAO and its States began researching a more integral aeronautical communications solution to aviation's analogue issues, the formulation of the satellite-based Future Air Navigation System (FANS) concept and its subsequent endorsement by ICAO's Tenth Air Navigation Conference as a direction to be pursued by new Communications, Navigation and Surveillance (CNS) systems, provided the digitally-based answer to South America's air navigation challenges.

Studies in this regard were first initiated within the CAR/SAM Regional Planning and Implementation Group (GREPECAS) mechanism. The former GREPECAS Communication Subgroup (COM/SG) was tasked to consider plans for the deployment of digital telecommunications networks. These networks would need to embrace requirements to implement the Aeronautical Telecommunication Network (ATN) and its supporting applications as well as any other voice and data transmission requirements. GREPECAS Conclusion 6/27 suggested that the ICAO SAM Regional Office should coordinate these efforts closely with its States so that a solution best benefitting all Regional stakeholders could be arrived at.

South American Digital Network (REDDIG)

A series of informal meetings and consultations with the tele-communications industry were later carried out. These meetings, in reply to the GREPECAS Con. 6/27, recommended that SAM States implement a hub-less Very Small Aperture Terminal (VSAT) network, taking advantage of the expertise available to them through ICAO's Technical Co-operation Bureau. SAM States sub-sequently approved Regional Technical Co-operation Project RLA/98/019—*Implementation of the SAM Digital Network (REDDIG)*.

RLA/98/019 elaborated detailed specifications for the new network, put the deliverables to international tender and oversaw the required implementations. REDDIG commenced operations in September 2003, with all SAM States participating with the exception of Panama. In 2006, Trinidad & Tobago also completed a REDDIG-affiliated implementation.

The RLA/98/019 project also served as the basis for an administrative agreement between participating SAM States to operate and maintain the new multinational aeronautical communications facility. REDDIG was initiated amidst great expectation and the underlying objectives of providing more efficient and reliable aeronautical communications along with reduced maintenance and operational expenditures.

REDDIG specifications address the current and future communications requirements specified in the CAR/SAM Air Navigation Plan. The RLA/98/019 project later evolved into RLA/03/901—*REDDIG System Management and Satellite Segment Administration* in November 2003, which continues today to provide the basis for the effective management of REDDIG operational and maintenance needs.

REDDIG Administrator Mr. Luis Alejos in the NCC at Manaus, Brazil.

REDDIG technical characteristics

REDDIG is an open architecture digital communications network owned by its State members and with an estimated ten-year lifespan. It has a totally meshed topology, TDMA/Frame Relay satellite access and employs VSAT technology using 3.7 m C-Band antennas operating over the IS 1R satellite. REDDIG also has a multi-service platform established at each node (voice and data) and is multi-protocol (switching and multiplexed system).

Flexible and scalable to facilitate network changes and growth, REDDIG features high availability (redundancy in each VSAT node and ground back-up circuits implemented between VSAT nodes) with distributed intelligence and no common failure points. It also allows for traffic prioritization with dynamic administration and on-demand bandwidth; automatic alternate traffic routing in the event of failure; counts with a common, integrated and global network management system (NMS); migration to other network technologies; and lastly continuous and uninterrupted use with unattended operation.

REDDIG user services

REDDIG provides voice and data services, with user voice services currently comprised of three separate networks overlaid on the same satellite carriers. These are comprised of the two Air Traffic Services (ATS) networks, namely the ATSd (hotline circuits) and ATSa (switched circuits) specified in the CAR/SAM Air Navigation Plan (FASID) and the administrative (switched) voice network. Voice services are interfaced in an analogue (E&M, FXS, FXO) or digital (E1 CAS & CCS) form, according to local requirements at each node.

The user data services are comprised of four networks, also overlaid on the same satellite carriers. The initial service is

A REDDIG Station in Guyana.

provided by 27 point-to-point a-synchronous data links for the Aeronautical Fixed Telecommunications Network (AFTN), as specified in CAR/SAM FASID Table CNS 1A—*AFTN Plan*. There are also point-to-point radar links implemented using various synchronous protocols. The Aeronautical Telecommunication Network (ATN) is supported through a switched X.25 protocol and IP interfaces.

The Remote Control and Monitoring (RC&M) network service is comprised of distributed elements (the local control and monitoring system) and of centralized elements (Network Control Centres (NCC)). The main NCC is located in Manaus, Brazil, and the alternate in Ezeiza (Buenos Aires), Argentina. Both the local and centralized elements may be accessed by remote control from any site. The RC&M network which interconnects these elements operates over-the-satellite and is a Bandwidth on Demand (BOD) IP network accessed through an Ethernet hub at every site. To facilitate automatic Master Reference Terminal (MRT) redundancy, there is additionally a direct, bridged connection between the Ethernet hubs of Manaus and Ezeiza which is enabled by a ground link provided by Brazil and Argentina.

Current REDDIG operation

ICAO's Technical Co-operation mechanisms, as previously mentioned,

have provided the basis for REDDIG administrative needs on behalf of the SAM States. Network operational costs are being paid by States via annual contributions to ICAO. These are used mainly to pay for satellite bandwidth, maintain the stock of spare parts, train technical personnel on an ongoing basis, upgrade software/hardware as necessary, and to hold annual coordination meetings to revise and plan the future REDDIG requirements.

A Network Administrator oversees operations from the main NCC in Manaus. States also maintain their own technical staffs to operate REDDIG nodes and participate in Administrator-supervised maintenance actions conducted by the NCC. States additionally are responsible to maintain their local REDDIG stations.

The aeronautical administration of Brazil supports REDDIG with the provision of the necessary facilities for the operation of the Manaus NCC, including a round the clock availability of a group of technicians. Similar support is provided by Argentina for the Ezeiza NCC.

The implementation of REDDIG as a multinational aeronautical communications facility has been a complete success for ICAO and SAM States. Regional communications issues were effectively addressed and States now have a robust platform from which to

implement future ATM solutions. One of the most important elements aiding in this success was the high degree of collaboration and cooperation that exists between States in the Region. Ideas are now being discussed regarding a new Multinational Regional Organization (MRO) to more effectively leverage this cooperative SAM spirit, with the REDDIG network likely to be the first system to be overseen by the new body.

REDDIG perspectives

REDDIG is not only a network. It is also a new Regional concept operating via multinational organization and cooperation. It is analyzed on a continuous basis to accommodate its needs to the satellite segment market and to evolving digital telecommunications technologies. It is expected that, in the short term, implementation of new services such as radar and flight data information exchange, AMHS connectivity and other important operational data instruments in support of CNS/ATM emerging technologies will be realized.

In order to harmonize communications developments and requirements between the CAR and SAM Regions as specified in the CAR/SAM Air Navigation Plan, plans are now underway to interconnect the REDDIG and VSAT MEVA II network *(editor's note: please see page 36 for more on the MEVA and MEVA II initiatives)*, with completion expected before the end of 2009.

In order that REDDIG continues to provide the same high quality of service employing the most modern digital telecommunications technologies, plans are now being developed to revise the network's topology and technology in the near-term. This will help to ensure that REDDIG will continue to allow Regional objectives to be harmonized and fully up-to-date with ICAO's global ATM priorities. ∎

NAM/CAR priorities and the role of the Aeronautical Meteorological Service

Volcanic ash clouds in the international airways of the NAM/CAR Regions can represent a serious safety hazard to aviation and cause considerable damage to aircraft. This image depicts the explosive activity seen at Popocatepetl in 2003 (photo courtesy of SENEAM/CENAPRED).

Despite the fact that aeronautical technology has delivered great achievements throughout the modern era, aircraft operations remain vulnerable to adverse meteorological conditions and volcanic ash clouds that cause accidents, incidents and unwanted delays.

Enrique Camarillo, NACC Regional Officer, Aeronautical Meteorology (RO/MET), highlights for the *Americas Regional Report* how the meteorological services in the North American, Central American and Caribbean Region are of crucial importance for the safety and efficiency of air transport operations in affected States.

Enrique Camarillo joined the Aeronautical Meteorology Branch at Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM) in 1986, where he has been a meteorological forecaster, head of the Meteorological Forecasting and Analysis Centre, Acting Deputy Director and Acting Director of Aeronautical Meteorology. His activities and projects have been related to the automation of forecasting and climatological practices, quality control of meteorological products, services to the users and operational manuals. In 2008, Camarillo was designated by SENEAM to support the ICAO NACC Regional Office as Regional Officer, Aeronautical Meteorology.

Flights are cancelled or delayed every year in the NAM/CAR Regions due to the presence of tropical cyclones. Operations are also affected by Regional and seasonal occurrence of snow storms, high winds, cold fronts, icing, fog and tornados in the northern areas, as well as thunderstorm clouds, heavy rainfall, reduced visibility and tropical cyclones in the southern areas. Active volcanoes are also located throughout the Region.

Whether flying towards northern metropolitan centres for business or south to a sunny holiday destination, air transport operations demand high accurate and up-to-date meteo-rological information to take advantage of fair weather and avoid dangerous atmospheric phenomena and volcanic ash. Furthermore, timely and reliable weather information contributes to decreased flight times, environmental impacts and the overall cost-effectiveness of aeronautical operations by limiting unnecessary delays and fuel consumption.

ICAO participates in the preparation of Standards and Recommended Practices (SARPs) to be used by States to prepare and disseminate aeronautical weather reports, aero-drome forecasts and warning messages concerning weather hazards and volcanic ash clouds. This is referred to as Operational Meteorological data or OPMET data. Currently, the ICAO Global Air Navigation Plan and related objectives demand immediate access to real-time global OPMET data in support of a seamless global Air Traffic Management system. The NACC Regional Office continues to endeavour to achieve this goal.

Current CAR MET programmes

In 2008 and 2009, ICAO implemented Special Implementation Projects (SIP) to enhance the Aeronautical Meteorological Service in the CAR Region. These SIPs primarily affect Mexico, Central America, and Caribbean States and territories. The NACC Regional Officer in this domain conducts mission visits to the States to follow-up on the implementation of ICAO SARPs for the Meteorological Service for International Air Navigation, and provides assistance to eliminate deficiencies. ICAO also promotes coordination between the meteorological, air traffic control, communications and aeronautical information services to improve the overall coordination and effectiveness of the aeronautical meteorological service.

Meteorologists of the CAR States and territories do their best effort to provide timely and relevant information to the airlines, often overcoming limited resources with creative solutions, but in spite of their efforts some errors and deficiencies remain in this regard. For this reason, ICAO's Regional mission visits are an essential measure to help ensure that aeronautical meteorological services are supplied to local end-users in compliance with the ICAO SARPs. The MET Regional Officer thus regularly monitors Aeronautical Meteorological Reports (METAR) and Aerodrome Forecasts (TAF) issued by CAR States and territories and, in those instances where data are not

Flights are cancelled or delayed every year in the NAM/CAR Regions due to the presence of tropical cyclones. Hurricane 'Wilma' significantly affected aerodromes in the Yucatan Peninsula in 2005 (photo courtesy SENEAM).

available or contain coding errors, provide tailored assistance to resolve any problems.

State meteorological personnel prepare and issue hourly and extraordinary meteorological reports and aerodrome forecasts—occasionally under severe weather conditions caused by tropical cyclones, etc. These severe conditions often affect communications facilities, and when this is the case the NACC MET Regional Officer promotes and leverages Regionally cooperative solutions to help disseminate this urgently-required data and ensure its availability for local operators.

The NACC Regional Office also promotes, on an ongoing basis, education and training of aeronautical personnel, with the MET Regional Officer participating as a coordinator and instructor at these seminars and workshops.

Coordination

Frequent communication is maintained by ICAO with CAR States and territories and with additional aeronautical and meteorological agencies (i.e. the World Meteorological Organization; Federal Aviation Administration; National Weather Service; U.S. Geological Service; and Volcanic Ash Advisory Centres). Permanent coordination is also maintained between the NACC MET RO and their counterpart at the ICAO South American (SAM) Regional Office in order to regularly update the meteorological sections of the Air Navigation Plan for the CAR and SAM Regions and prepare guidance material in this area as required. Currently, the SAM Regional Office organizes the Tenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS) Aeronautical Meteorology Subgroup (AERMETSG/10). The NACC Office participates in

this meeting, which is attended by participants from States, related aviation and meteorological agencies as well as airlines (IATA).

Major topics at the gatherings currently include the ongoing implementation of the World Area Forecast System (WAFS), implementation of the International Airways Volcano Watch (IAVW), implementation of SIGMET, exchange of OPMET data, implementation of meteorological quality systems, Regional meteorological requirements for Air Traffic Management (ATM) and regular review of the region's Air Navigation Plan. There is occasional need to seek advice from the MET Section at ICAO Headquarters which provides suitable guidelines and information related to the more global issues that may arise.

Achievements

Frequent mission visits to all States and territories in the CAR Region are not feasible due to operational constraints, but ICAO has suitably leveraged e-mail and other communications tools to circumvent these limitations over the years and effectively continues to disseminate information and assistance concerning new aeronautical meteorological standards and procedures. Such was the case when the new Terminal Aerodrome Forecast (TAF) code became

effective on November 5, 2008. Information and assistance were provided via internet and ICAO was very pleased to notice that, by the middle of that month, all but one CAR State had adopted the new TAF template.

Present and future challenges

Currently, the Regional Officer MET promotes and participates, based on available resources, in the following tasks:

- Improving OPMET data exchange in the Region by implementing control procedures and quality assurance systems to ensure availability of timely and reliable OPMET data for States, OPMET data banks and aircraft.
- Training aeronautical personnel in the interpretation and use of meteorological satellite imagery, radar products and WAFS meteorological graphical products that include new charts on turbulence, icing and convective clouds.
- Enhancing the International Airways Volcano Watch by improving coordination between volcano observatories, air traffic control and meteorological services, in order to convey volcanic ash messages to the airlines and Volcanic Ash Advisory Centres as soon as possible.

- Formation of Aeronautical Meteorological Personnel Adopting Standards of ICAO and the World Meteorological Organization

The Global Air Navigation Plan (Doc 9750) already demands timely and reliable world aeronautical meteorological information in support of a uniform global air traffic management system. Therefore, it is expected that there will be an increased use of automated weather systems and uplinks to provide instant meteorological information to the flight crew on the flight deck and an increasing number of downlinks to provide aircraft weather information to meteorological and air traffic control units. The World Area Forecasting System will provide better alphanumerical and graphical meteorological information and the States will have to implement a quality assurance system in their aeronautical meteorological services. Also, the present and future aeronautical meteorological services will demand meteorologists and meteorological technicians with higher education and more training to assimilate and apply the new methods and technologies. ■

Meeting the threat of the 'Ring of Fire'

The West Coast of the South American Region lies within the area of highest concentration of active volcanoes in the world—known commonly as the 'Ring of Fire'. In this Regional review, Nohora Arias, SAM Aeronautical Meteorology Regional Officer, describes how ICAO's International Airways Volcano Watch Operational Subgroup works with Regional stakeholders to abate to the fullest extent possible the serious threat this volcanic activity can pose to Regional aircraft and aerodrome operations.

Nohora Arias Fandiño has been the Meteorological Regional Officer of the ICAO South American Office in Lima since 1993. Arias previously served as a meteorologist at the Colombian National Weather Service and as Chief of Aeronautical Meteorology at the DGCA in Colombia. She also held a post as a university physics professor and provided information on the weather in the print and television media.

Explosive volcanic eruptions can shoot several cubic kilometres of vitreous particles and volcanic ash (powdered rock) and corrosive gases high into the atmosphere. They cover a broad area for several days at a time and represent a serious threat to en route aircraft and downwind aerodrome operations.

The intake of volcanic ash into the turbines of aircraft in flight can seriously impair performance and even cause operational failures by eroding the moving parts of the engine (compressor/blades). Additionally, the accumulation of ash in the hot section of the engine can produce a 'flame out' or power loss.

Alerting international aviation to volcanic events requires close coordination with the aeronautical community, aeronautical meteorologists and volcanologists as well as a solid framework of international arrangements and procedures. In this sense, and in response to Recommendation 1/22 of the Meteorology Divisional Meeting (2002), ICAO established the International Airways Volcano Watch Operational Subgroup (IAVWOPSG) to ensure continuous coordination, operation and development of the International Airways Volcano Watch (IAVW). The IAVWOPSG also coordinates respective planning and implementation

by ICAO Regional groups such as GREPECAS for the Caribbean and South American (CAR/SAM) Regions.

As designated by CAR/SAM Regional air navigation agreement and to enhance the safety of these Regions, the Buenos Aires and Washington Volcanic Ash Advisory Centres (VAACs) prepare volcanic ash (VA) advisories for distribution to Regional stakeholders. Meteorological Watch Offices (MWOs) then use these advisories to prepare volcanic ash alert information (SIGMET WV), while International NOTAM Offices (NOFs) promptly prepare and issue ASHTAM or NOTAM messages in keeping with ICAO Standards and Recommended Practices (SARPs) and the Regional Air Navigation Plan (R-ANP)—which in the case of the SAM Region is proscribed within the CAR/SAM ANP.

The West Coast of the South American Region lies within the area of highest concentration of active volcanoes in the world—known commonly as the 'Ring of Fire'. Volcanic activity in the South American Region has therefore been

A lightning flash punctuates electrical storm activity over the Chaitén volcano in Chile in May 2008.

A crew cleans volcanic ash from an aircraft at Mariscal Sucre International Airport in Quito, Ecuador, November 2002. The massive Reventador eruption sent an ash cloud 17 km into the Ecuadorian skies, with falling ash drifting 100 km and more to cover the aircraft at the Quito facility.

It is important to highlight that not all volcanoes show gradual pre-eruption development that lasts for weeks or months. One such case was Reventador. Ten seismic events were registered at the Ecuadorian location on October 6, 2002, and surface manifestations in the surrounding area were minimal. On the day of the event, only seven hours before the eruption, there were seismic movements and more than 100 local tremors preceding a paroxysmic explosion at 09:12 local time. The eruption generated pyroclastic flows that surged 9 km down the valley and a 17 km high volcanic ash cloud that seriously affected the international airport at Quito. The facility was located 100 km from the volcano and had to be closed by 12:45 because aircraft on its aprons were fully covered by volcanic ash.

Events such as those described demonstrate clearly how serious the threat of volcanic activity is to aviation and states in and around our Region's notorious Ring of Fire. As a result of implementation activities and in order to optimize to the fullest extent possible the timely and reliable reporting of volcanic eruptions by VAACs and MWOs, the CAR/SAM Regions conduct two volcanic ash eruption simulations per year. ■

significant and, in some cases, aircraft have encountered volcanic ash clouds as a result of this activity. This was the case of the Nevado del Ruíz volcano in Colombia in 1985, the Hudson volcano in Chile in 1991, and the Guagua Pichincha and Tungurahua eruptions in Ecuador in 1999.

The last encounter an aircraft had with volcanic ash clouds in the CAR/SAM Region was on May 5, 2008, during the eruption of the Chaitén volcano in Chile. The Chaitén eruption sent volcanic ash over 35,000 feet and could have posed a serious threat to flight safety. Fortunately, the timely information provided by the Buenos Aires VAAC and the MWOs of Argentina, Chile and Uruguay prevented any serious incidents, reinforcing the value of ongoing efforts by the ICAO SAM Office and Member States in the Region to more comprehensively implement ICAO SARPs under the IAVW scheme, *inter alia.*

An especially active area that has been characterized by unusually high volcanic activity in recent years is located in Ecuador. This volatile territory features huge volcanoes with heights exceeding 15,000 feet in some cases, making them prime candidates to detrimentally threaten the routes used by Regional commercial operators.

The eruptions of Guagua Pichincha (1999) and Reventador (2002) in the Ecuadorian hot-zone were short-lived events but with an eruptive power (a volcano explosiveness index (VEI) factor of ≥ three—where seven is the highest intensity) that generated huge columns of volcanic material reaching upward as high as the earth's stratosphere.

A peculiar characteristic of these eruptive columns is that they split apart around the tropopause (a region of discontinuity between the troposphere and the stratosphere) due to a 180° change of wind direction at the Equator. This effect generates an east-west virtual shadow of ash for commercial routes running north-south along the South American Pacific Coast.

ICAO delivers newer, more dynamic online tools for NAM/CAR/ SAM and global stakeholders

The new NACC web site was launched in late 2008 to provide users from States, territories and the aviation community in general, with a more dynamic tool to access information and events related to the Office's ongoing activities and objectives.

In addition to a revamped design and English/Spanish content offerings to improve navigation, Claudia López, NACC Assistant and Webmaster, describes for the Regional Report how the NACC site also incorporates several new sections devoted to the GANDD, Meeting documentation, e-Documents and ICAO Publications.

Claudia López joined the NACC Regional Office in 1997 as a Registry Clerk. Since 1998, she has been an Assistant and has worked supporting the Regional Officers for Air Transport, Aeronautical Information Services, Air Traffic Management, Aerodromes and Ground Aids, Aviation Security, Flight Safety, and Communications, Navigation and Surveillance. In addition to her work as an Assistant, López is in charge of the production of templates and presentations, the provision of software tutorials, and resolving graphic design needs for the NACC Office, among other activities. She has served as Webmaster of the NACC Regional Office web site since 2008, in collaboration with the ICT Assistant.

Meeting, seminar and workshop-related activities are at the heart of the NACC Regional Office's ongoing activities. In keeping with their importance, special emphasis has been allotted in the new NACC Web site to allow users to access important and timely data relating to these events—with visitors now being able to access meeting information quickly and easily from any page in the site.
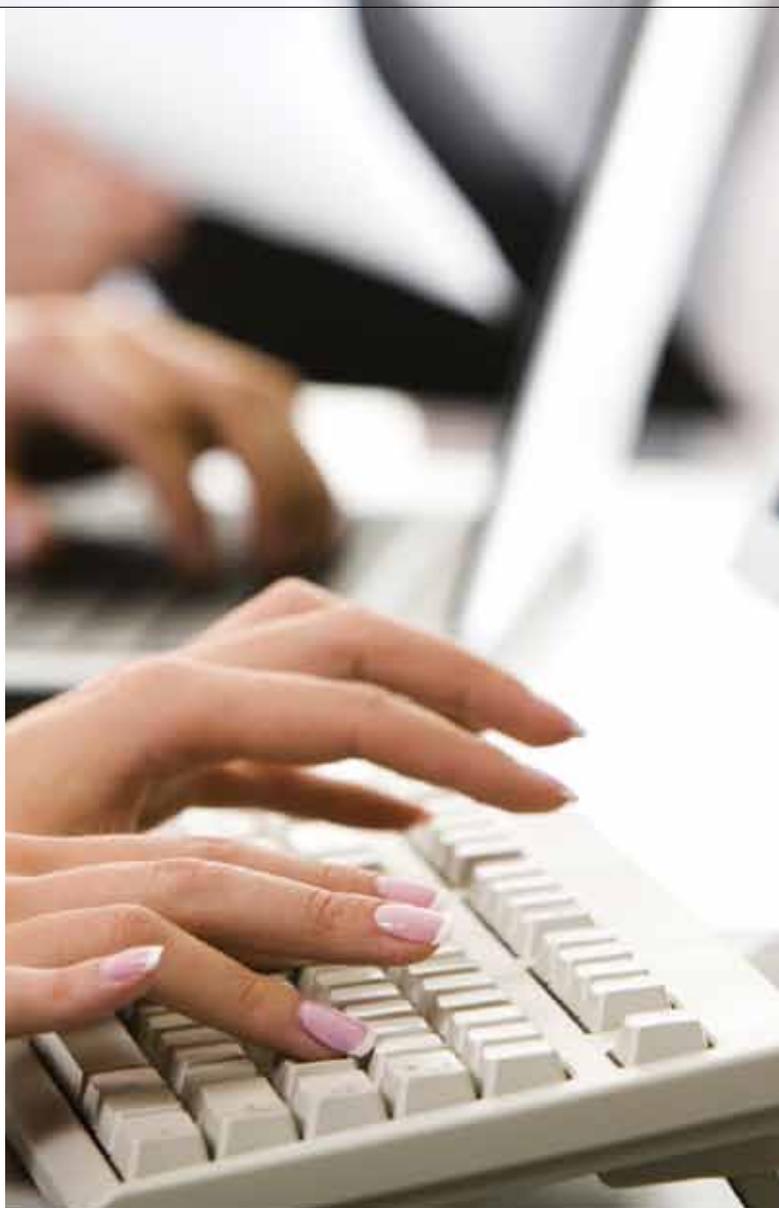
A new **Objectives** section has also been developed for the NACC site where visitors find a list of all year-round meetings, their objectives and, especially important, web links directing them to documentation, invitation letters and registration forms. This new organization of information and functionality has tremendously streamlined the NACC site experience for many of its visitors. A printable and regularly-updated meeting list in PDF format has also been made available for download and, last but not least, the NACC site home page now includes an **Upcoming Events** column that provides access to schedules and related event documentation directly from the home page.

In consideration of the importance of real-time communication for Regional and global aviation stakeholders, a new password-protected section has been included to provide access to State Letters issued by the NACC Office to all its

accredited States, territories and international organizations. This is essential to help the Office maintain close contact with these stakeholders in the event of a missed message due to an e-mail system failure or a web server error.

A **News** section has also been included in the revamped NACC site to allow visitors to be informed of other important announcements issued by the NACC Office and ICAO, such as press releases, vacancy notices and other ICAO news. More recently, this section became essential to keep our visitors informed of updates related to the H1N1 influenza outbreak. H1N1 struck at the heart of the NAM/CAR Regions and necessitated several important announcements and postponement relating to Regional events.

The site's new **e-Documents** section, which was previously a simple list of downloadable documents, has also been redesigned and recategorized based on the different aviation sectors of activity currently under the Office's responsibility. Here users can find, among many other documents, the Frequency Assignment Lists, FASID Tables, the NACC 5LNC Assignment List, the CAR/SAM ICD, the OPMET Data Exchange AFTN Addresses as well as links to the ICAO Global Aviation Safety Plan (where users can find Part 1 and 2 of the Global Aviation Safety Roadmap).

The e-Documents section is intended to serve as a direct point of contact between NACC Regional Officers and associated users from States/territories. It now enables important documents to be made immediately available for download or consultation and will soon host the highly anticipated e-ANP (Air Navigation Plan).

Another set of handy tools now available on the NACC site can be found in the **Visiting our Office?** section which offers NACC Office and hotel area maps, Mexico City general information and a list of suggested nearby accommo-

The new-and-improved ICAO NACC Office web presence.

dations. The **About NACC Office** section provides a brief history of the Office, a list of NACC Contracting States, the NACC Organizational Chart, holiday schedules for the NACC Office and ICAO Headquarters, and finally Flight Information Regions (FIRs) and Air Traffic Flow maps for the NAM/CAR Regions.

An updated list of web links for all accredited States, territories and international organizations is also now available from the NACC home page.

All of these new sections and functions have been carefully designed to help visitors enjoy a more efficient and user-friendly visit. The Web site project is considered an ongoing process so that this important online tool will continue to provide prompt and useful information related to the NACC Office, its activities, its staff and its stakeholders. ◼

PERÚ | Ministerio de Transportes y Comunicaciones | Viceministerio de Transportes | Dirección General de Aeronáutica Civil

Directorate General of Civil Aviation of Peru
Committed to modernization, integration and efficiency

www.mtc.gob.pe/dgac.html

The Directorate General of Civil Aviation of Peru (DGAC) is the specialized unit of the Ministry of Transportation and Communications (MTC), which holds the Civil Aviation Authority of Peru. This governmental agency is responsible for promoting, regulating and managing the development of air transportation activities and civil aviation in the Peruvian territory.

Lima, Peru's capital, is located in the center of South America, facilitating connections with other cities in the region. This explains why it is currently the hub of the most important airlines in South America. In addition, the Peruvian market is considered very attractive with a passenger traffic growth rate exceeding 14.75% per annum on average in the 2003-2008 period.

Committed to modernization
Airport infrastructure modernization

Concessions have allowed the modernization of airport infrastructure, creating the conditions for massive use of air transport in favor of territorial integration and economic development. Estimated investments will be around US$1,061.52 millons in Jorge Chavez International Airport (Lima) and US$ 232 millons in the First Group of Regional Airports (12 airports). Currently, the process of granting a second group of airports (6

airports) is underway. It is expected that the concession will be awarded at the beginning of 2010.

Agreement of resources management between ICAO and MTC
Peruvian government has signed an agreement with ICAO to extend surveillance of upper airspace by installing and operating a network of 7 MSSR Secondary Radars, S mode, at appropiate locations in the country. In addition, the replacement of the Secondary Radar and the Air Traffic control center at Jorge Chavez International Airport has been considered, as well as investments into the ILS Class III system, among others.

Committed to integration
Subsidies for routes to distant locations in the rainforest
Peru will soon start the granting of subsidies to air routes connecting locations of the Amazon Region that are not attractive to operate from the commercial standpoint, thus, achieving the integration of these remote populations shortly. In a first stage, more than US$ 700 000 will be delivered to subsidize these flights through cofinancing, and, the selection of the next towns to join this program will begin by the end of 2009.

LAR harmonization process
The Peruvian Government, committed to the establishment of the Regional Safety Oversight Cooperation System, leads the process of harmonization of national legislation with the Latinamerican Aeronautical Regulations (LARs) in the region, through close coordination with ICAO's Regional Office. So far, LAR Airworthiness and LAR Operations harmonization have been

International routes served from Lima
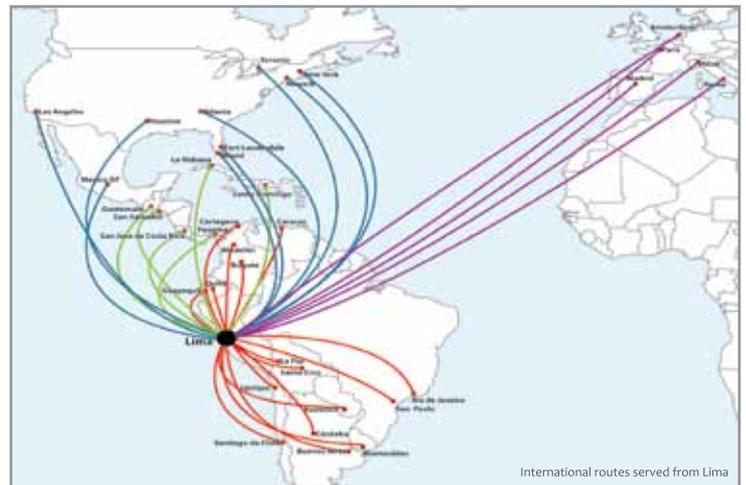
completed, while the others are still under process.

Committed to efficiency
Promotion of Civil Aviation
In April 2009 the Action Plan for the Promotion of Civil Aviation of Peru was launched with the objective of promoting and fostering the development of the aviation sector, with special emphasis on general aviation activities, administrative simplification of procedures for users and in generating more connectivity, among others. As of November 2009, the percentage of accomplishment is 78%.

Decentralization process
Part of the Peruvian decentralization process implies the transference of functions and infrastructure to the three levels of Government in order to manage, operate and invest efficiently airport infrastructure. As of November 2009, more than 80% of National Airports has been or is in process of private concession; Regional Airports will be soon transferred to its own government and the transference of Local

Airports is expected to conclude in 2010.

Committed to the future: goals for 2010
Assessment for the development of domestic and border routes
Given the importance and the need to develop the commercial aviation sector on domestic routes and borders, the Ministry of Transportation and Communications in cooperation with the Ministry of Foreing Commerce and Tourism will lead a specialized assessment for the design and elaboration of a Business Plan for a regional air operation to allow the development of strategic air routes.

Centennial of the Peruvian Civil Aviation
Next year we commemorate 100 years of the worldwide aviation pioneer feat achieved by Peruvian Jorge Chavez Dartnell, who crossed the Alps commanding a Bleriot XI, in 1910. This event is considered the beginning of Peruvian Civil Aviation. The official program of this Centennial celebration is currently in place.

Tarapoto National Airport

Leadership and Vision
in Global Civil Aviation

The International Civil Aviation Organization